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Hall Ticket Number:

CE/EC/ME111 (R20)

B.TECH. DEGREE EXAMINATION, DECEMBER-2024

Semester I [First Year] (Supplementary)

MATHEMATICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) State symmetry of beta function — CO1
   (b) Compute $\Gamma\left(-\frac{5}{2}\right)$. — CO1
   (c) Find the area enclosed by the parabolas $x^2 = y$ and $y = x$. — CO1
   (d) Write the geometrical interpretation of Lagranges mean value theorem. — CO2
   (e) Show that $\sum_{n-1}^{\infty} \sin\left(\frac{1}{n}\right)$ is divergent. — CO2
   (f) State Rolle's theorem. — CO2
   (g) If $\bar{f} = xy^2\bar{\imath} + 2x^2\, yz\bar{\jmath} - 3yz^2\bar{k}$ find $div\bar{f}$ at $(1, -1, 1)$. — CO3
   (h) If $x = r\cos\theta$, $y = r\sin\theta$ Show that $\frac{\partial r}{\partial x} = \frac{\partial x}{\partial r}$. — CO3
   (i) Find the Fourier sine series of $f(x) = x^2$ in $[0, \pi]$. — CO3
   (j) Find the rank of a matrix $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 4 \\ 7 & 10 & 12 \end{bmatrix}$. — CO4
   (k) If $A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ then find the eigen values of A^T. — CO4
   (l) If $\lambda = 1, 2, 3$ are the eigen values of a matrix $A_{3\,x\,3}$, then find the eigen values of A^{-1}. — CO4
   (m) State cayley-Hamilton theorem. — CO4

(n) Find the value of 'k' such that the rank of $\begin{bmatrix} 1 & 2 & 3 \\ 2 & k & 7 \\ 3 & 6 & 10 \end{bmatrix}$ is 2. CO4

UNIT – I

2. (a) Show that the equation of the evolute of the parobala $x^2 = 4ay$ is $4(y - 2a)^3 = 27ax^2$. (7M) CO1

(b) Prove that $\int_0^1 \frac{x^2\,dx}{\sqrt{1-x^4}} \times \int_0^1 \frac{dx}{\sqrt{1-x^4}} = \frac{\pi}{4}$. (7M) CO1

(OR)

3. (a) Prove that $\int_0^{\pi/2} \sin^{2m-1}\theta \cos^{2n-1}\theta\, d\theta = \frac{1}{2}\beta(m,n)$ (7M) CO1

(b) Find the surface area of revolution generated by revolving the curve $x = y^3$ from $y = 0$ to $y = 2$. (7M) CO1

UNIT – II

4. (a) Use Taylor's series to expand $2x^3 + x^2 + x + 1$ in powers of $(x - 1)$. (7M) CO2

(b) Verify Rolle's theorem for the function $\log\left[\frac{x^2+ab}{x(a+b)}\right]$ in (a, b), where $a > 0$. (7M) CO2

(OR)

5. (a) Examine the convergence of the series $1 - \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{3}} - \frac{1}{\sqrt{4}} + - - -$ (7M) CO2

(b) Test for convergence of $\sum\left[\sqrt{n^3+1} - \sqrt{n^3}\right]$ (7M) CO2

UNIT – III

6. (a) If $r^2 = x^2 + y^2 + z^2$ and $u = r^m$ and then prove that $\frac{\partial^2 u}{\partial x^2} + \frac{\partial^2 u}{\partial y^2} + \frac{\partial^2 u}{\partial z^2} = m(m+1)r^{m-2}$ (7M) CO3

(b) Obtain the Fourier series for the function $f(x) = x \sin x$, $0 < x < 2\pi$. (7M) CO3

(OR)

7. (a) Find div $\bar{f}$ where $\bar{f} = r^n \bar{r}$. Find n if it is solenoidal. (7M) CO3

(b) Find the maximum and minimum values of $f(x, y) = x^2y + xy^2 - axy$. (7M) CO3

UNIT – IV

8. (a) Reduce the matrix $\begin{bmatrix} 1 & 2 & -2 & 3 \\ 2 & 5 & -4 & 6 \\ -1 & -3 & 2 & -2 \\ 2 & 4 & -1 & 6 \end{bmatrix}$ into normal form and hence find its rank. (7M) CO4

(b) Determine the rank, nature, index and signature of the quadratic form $2xy + 2yz + 2zx$ by reducing into canonical form using orthogonal transformation. (7M) CO4

(OR)

9. (a) Test for consistency and hence solve $x + y + 2z = 4$, $2x - y + 3z = 9$, $3x - y - z = 2$. (7M) CO4

(b) Determine the modal matrix P for $A = \begin{bmatrix} 1 & 1 & 3 \\ 1 & 5 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ and hence diagonalize A. (7M) CO4

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CE/EC/ME111 (R20)

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Hall Ticket Number:

CE/EC/ME111 (R20)

B.TECH. DEGREE EXAMINATION, APRIL-2024

Semester I [First Year] (Supplementary)

MATHEMATICS-I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a) What is the value of $\int_0^\infty e^{-x}dx$? CO1

(b) Define gamma function. CO1

(c) Write different kinds of improper integrals. CO1

(d) State Lagrange's mean value theorem. CO2

(e) Write Maclaurin's series expansion of $\tan^{-1}x$ if it exists. CO2

(f) Determine the nature of the sequence $\left\{\frac{1+(-1)^n}{n}\right\}_{n=1}^{\infty}$. CO2

(g) Write the necessary condition for convergence of a series. CO3

(h) Define half-range sine series. CO3

(i) If $x^y = y^x$ is the implicit relationship between x and y, then find $\frac{dy}{dx}$. CO3

(j) Define saddle point of a function two variables. CO4

(k) Is $\overline{f} = (y+z)\overline{i} + (z+x)\overline{j} + (x+y)\overline{k}$ irrotational vector? CO4

(l) Write elementary row transformations on a matrix. CO4

(m) State Cayley-Hamilton theorem. CO4

(n) When we say the system of linear equations are consistent? CO4

UNIT – I

2. (a) Discuss the convergence of $\int_0^3 \frac{1}{x^2-3x+2}dx$. (7M) CO1

   (b) Evaluate the integral $\int_0^1 x^5\left[\ln(1/x)\right]^3 dx$. (7M) CO1

(OR)

3. Determine the volume and surface area of the solid generated by the revolution of the lemniscate $r^2 = a^2\cos 2\theta$ about the perpendicular line. CO1

UNIT – II

4. (a) Verify Rolle's theorem for $f(x) = \ln\left(\frac{x^2+ab}{x(a+b)}\right)$ in (a,b) where a > 0. (6M) CO2

   (b) Expand sin x in powers of $x-\pi/2$ and hence find the value of $\sin 91^o$ correct to 4 decimal places. (8M) CO2

(OR)

5. (a) Discuss the convergence of $\sum_{n=1}^{\infty}\frac{(\ln n)^2}{n^{3/2}}$. (7M) CO2

   (b) Examine the convergence of $\sum_{n=1}^{\infty}\frac{4.7...(3n+1)x^n}{1.2...n}$. (7M) CO2

UNIT – III

6. (a) Find the half-range Fourier cosine series for $f(x) = (x-1)^2$ in $0 < x < 1$. (6M) CO3

   (b) If $x^x y^y z^z = e$, then prove or disprove that $\frac{\partial^2 z}{\partial x\,\partial y} = -\left[x\ln(ex)\right]^{-1}$ at $x = y = z$. (8M) CO3

(OR)

7. (a) Find the points on the surface $z^2 = xy+1$ that are nearest to origin. (9M) CO3

   (b) Find the angle of intersection of the surfaces $x^2+y^2+z^2 = 9$ and $x^2+y^2-z = 3$ at the point $(2,-1,2)$. (5M) CO3

UNIT – IV

8. (a) Determine a, b, c so that A is orthogonal, where $A = \begin{bmatrix} 0 & 2b & c \\ a & b & -c \\ a & -b & c \end{bmatrix}$. (4M) CO4

   (b) Show that the system of equations $2x-2y+z = \lambda x,\ 2x-3y+2z = \lambda y,\ -x+2y = \lambda z$ can possess a non-trivial solution only if $\lambda = 1, \lambda = -3$. Obtain the general solution in each case. (10M) CO4

(OR)

9. Reduce the quadratic form $5x^2+26y^2+10z^2+4yz+6xy+14zx$ to the canonical form by using diagonalization method, and hence find its rank, nature, index and signature. CO4

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CE/EC/ME111 (R20)

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Hall Ticket Number:

CE/EC/ME111 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2024

Semester I [First Year] (Regular & Supplementary)

MATHEMATICS-I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define evolute. CO1
   (b) Define beta function. CO1
   (c) Write the relation between beta and gamma functions. CO1
   (d) State Lagrange's mean value theorem. CO2
   (e) Write Maclaurin's series expansion of f(x). CO2
   (f) State Raabe's test for convergence. CO2
   (g) Define Irrotational vector. CO3
   (h) Define stationary point of a function. CO3
   (i) Define gradient of a function. CO3
   (j) Define minor of a matrix. CO4
   (k) State Rank-Nullity theorem. CO4
   (l) Write the eigen values of A^2 if $A = \begin{bmatrix} 2 & 1 & 1 \\ 0 & 3 & 2 \\ 0 & 0 & 2 \end{bmatrix}$. CO4
   (m) State Cayley-Hamilton theorem. CO4
   (n) Define canonical form of a quadratic form. CO4

UNIT – I

2. (a) Prove that the evolute of the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ is $ax^{2/3} + by^{2/3} = (a^2 - b^2)^{2/3}$. (7M) CO1
   (b) Show that $\int_0^\infty x^4 e^{-x^2} dx = \frac{3\sqrt{\pi}}{8}$. (7M) CO1

(OR)

3. (a) Prove that $\int_0^1 (x-a)^m (b-x)^n dx = (b-a)^{m+n+1} \beta(m+1, n+1)$. (7M) CO1

(b) Find the volume of a solid generated by revolving the portion of the parabola $y^2 = 4ax$ cut off by its latus-rectum about the axis of the parabola. (7M) CO1

UNIT – II

4. (a) Verify Rolle's theorem for the function $\log\left[\frac{x^2+ab}{x(a+b)}\right]$ in (a, b), a > 0, b > 0. (7M) CO2

(b) Find the Taylor's series expansion of sin x in powers of $(x - \frac{\pi}{4})$. (7M) CO2

(OR)

5. (a) Test for convergence of the series $\sum \frac{1}{n} \sin \frac{1}{n}$. (7M) CO2

(b) Test for convergence of the series $\sum \frac{n+1}{n} x^{n-1}$. (7M) CO2

UNIT – III

6. (a) Find the Half-range sine series for the function $f(x) = x(\pi - x)$ in the range $(0, \pi)$ and hence deduce that $\frac{1}{1^3} - \frac{1}{3^3} + \frac{1}{5^3} - \cdots = \frac{\pi^3}{32}$. (7M) CO3

(b) Find the minimum value of $x^2 + y^2 + z^2$ if $x + y + z = 3a$. (7M) CO3

(OR)

7. (a) Find the directional derivative of $f = xy + yz + zx$ in the direction of vector $\bar{i} + 2\bar{j} + 2\bar{k}$ at the point $(1, 2, 0)$. (7M) CO3

(b) Show that $\nabla^2(r^m) = m(m+1)r^{m-2}$ (7M) CO3

UNIT – IV

8. (a) Find the rank of the matrix $\begin{bmatrix} 1 & 2 & 3 & 2 \\ 2 & 3 & 5 & 1 \\ 1 & 3 & 4 & 5 \end{bmatrix}$ by reducing it into normal form. (7M) CO4

(b) Prove that the following system of equations are consistent and solve them $3x + 3y + 2z = 1$; $x + 2y = 4$; $10y + 3z = -2$; $2x - 3y - z = 5$. (7M) CO4

(OR)

9. (a) Using Cayley-Hamilton theorem, find the inverse of the matrix $\begin{bmatrix} 2 & 2 & 0 \\ 2 & 5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$. (7M) CO4

(b) Reduce the following quadratic form to canonical form $2x^2 + 2x^2 + 2x^2 - 2xy - 2yz - 2zx$. (7M) CO4

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CE/EC/ME111 (R20)

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Hall Ticket Number:

CE/EC/ME111 (R20)

B.TECH. DEGREE EXAMINATION, JUNE-2023

Semester I [First Year] (Supplementary)

MATHEMATICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define Gamma function. CO1
   (b) Write the formula for volume of solid of revolution of a curve y = f(x) about x-axis form x = a to x = b. CO1
   (c) Determine $\beta\left(\frac{5}{2}, \frac{3}{2}\right)$. CO1
   (d) Explain why mean value theorem does not hold for $f(x) = x^{\frac{2}{3}}$ in [−1, 1] CO2
   (e) Discuss the convergence of series $\sum_{n=0}^{\infty} \frac{1}{3^n}$ CO2
   (f) State Lagrange's Mean value theorem. CO2
   (g) Explain geometrical interpretation of $V\phi$ CO3
   (h) Find $\frac{\partial^2 u}{\partial x \partial y}$ for the function $u = \tan^{-1}\left(\frac{x}{y}\right)$ CO3
   (i) Write the Dirichlet's conditions for the existence of Fourier series. CO3
   (j) Define rank of a matrix and find the rank of identity matrix of order n. CO4
   (k) If $A = \begin{bmatrix} -1 & 0 & 0 \\ 0 & 2 & 0 \\ 0 & 0 & 3 \end{bmatrix}$ then find the eigen values of A^T. CO4
   (l) State Cayley-Hamilton theorem. CO4
   (m) Find the rank of a matrix $\begin{bmatrix} 1 & 2 & 3 \\ 3 & 4 & 4 \\ 7 & 10 & 12 \end{bmatrix}$. CO4
   (n) If the Eigen values of matrix A_{3X3} are 1, 2, 3 then find det(A). CO4

UNIT – I

2. (a) Find the evolute of the asteroid $x = a\cos^3\theta$, $y = a\sin^3\theta$. (7M) CO1

(b) Prove that $\int_0^{\frac{\pi}{2}} \sqrt{\cos x}\, dx \times \int_0^{\frac{\pi}{2}} \frac{dx}{\sqrt{\cos x}} = \pi$ (7M) CO1

(OR)

3. (a) Prove that the evolute of the curve $x = a(\cos\theta + \theta\sin\theta)$, $y = a(\sin\theta - \theta\cos\theta)$ is a circle. (7M) CO1

(b) Prove that $\int_0^{\pi/2} \sin^{2m-1}\theta \cos^{2n-1}\theta\, d\theta = \frac{1}{2}\beta(m,n)$ (7M) CO1

UNIT – II

4. (a) Expand $x^3 - 2x^2 + x - 1$ in powers of $(x - 1)$ using Taylor's series. (7M) CO2

(b) Find the nature of the series

$$\frac{1}{2}x + \frac{1.2}{2.5}x^2 + \frac{1.2.3}{2.5.8}x^3 + - - - - (x > 0)$$ (7M) CO2

(OR)

5. (a) Test for convergence of the series $\sum_{n=1}^{\infty} \frac{1}{x^n + x^{-n}}$, $x > 0$. (7M) CO2

(b) Calculate approximately $\sqrt[5]{245}$ by using Lagrange's mean value theorem. (7M) CO2

UNIT – III

6. (a) A rectangular box open at the top is to have volume of 32 cubic ft. Find the dimensions of the box requiring least material for its construction. (7M) CO3

(b) Find the directional derivative of $x^2yz + 4xz^2$ at the point $(1, -2, -1)$ in the direction of the normal to the surface $x\log z - y^2$ at $(-1, 2, 1)$. (7M) CO3

(OR)

7. (a) Show that the vector $(x^2 - yz)\bar{i} + (y^2 - zx)\bar{j} + (z^2 - xy)\bar{k}$ is irrotational. (7M) CO3

(b) Find the half-range cosine series for the function $f(x) = x(2-x)$, $0 \le x \le 2$ and hence find sum of series $\frac{1}{1^2} - \frac{1}{2^2} + \frac{1}{3^2} - \frac{1}{4^2} + - - - -$ (7M) CO3

UNIT – IV

8. (a) Find the value of λ for which the equations $3x - y + 4z = 3$; $x + 2y - 3z = -2$; $6x + 5y + \lambda z = -3$ will have infinite number of solutions and solve them with that λ value. (7M) CO4

(b) Find the value of K if the rank of $A = \begin{bmatrix} 0 & 1 & -3 & -1 \\ 1 & 0 & 1 & 1 \\ 3 & 1 & 0 & 2 \\ 1 & 1 & k & 0 \end{bmatrix}$ is 2. (7M) CO4

(OR)

9. (a) Diagonalise the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 1 & 2 & 1 \\ 2 & 2 & 3 \end{bmatrix}$ and hence find A^3. (7M) CO4

(b) If $A = \begin{bmatrix} 1 & 2 \\ -1 & 3 \end{bmatrix}$ express $A^6 - 4A^5 + 8A^4 - 12A^3 + 14A^2$ as a linear polynomial in A. (7M) CO4

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CE/EC/ME111 (R20)

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Hall Ticket Number:

CE/EC/ME111 (R20)

B.TECH. DEGREE EXAMINATION, MARCH-2023

Semester I [First Year] (Regular & Supplementary)

MATHEMATICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define Evolute. CO1
   (b) Investigate the convergence of $\int_0^1 \frac{1}{1+x^2}dx$. CO1
   (c) Prove that $\Gamma(1)=1$. CO1
   (d) State Lagrange's mean value theorem. CO2
   (e) Investigate the nature of $\sum_{n=1}^{\infty}\left(\frac{2022}{2021}\right)^n$ CO2
   (f) State the comparison test for convergence. CO2
   (g) Write Parseval's formula. CO3
   (h) Find $\frac{dy}{dx}$ for $f(x,y)=x^2+y^2$ CO3
   (i) Give the necessary condition for a function $f(x,y)$ have maxima or minima. CO3
   (j) When do you say the vector point function $\vec{F}$ is irrotational? CO4
   (k) Define rank of a matrix. CO4
   (l) What do you mean by a system is said to be consistant? CO4
   (m) Find eigen values of a matrix $\begin{bmatrix}1 & 0\\ 0 & 2\end{bmatrix}$ CO4
   (n) Define canonical form of a quadratic form. CO4

UNIT – I

2. (a) Find the evolute of the curve $y^2 = 4ax$ (7M) CO1

(b) Prove that

$$\int_a^b (x-a)^m (b-x)^n dx = (b-a)^{m+n+1} \beta(m+1, n+1)$$ (7M) CO1

(OR)

3. (a) Prove that $\Gamma(n)\Gamma(1-n) = \frac{\pi}{\sin n\pi}$ (7M) CO1

(b) Find the area of the surface generated when the loop of the curve $9ay^2 = x(3a-x)^2$ revolves about the x-axis. (7M) CO1

UNIT – II

4. (a) Verify Rolle's theorem for the function $\ln\left[\frac{(x^2+ab)}{(a+b)x}\right]$ in [a, b], where a > 0. (7M) CO2

(b) Obtain the Maclaurin's series expansion of $\log_e(1+x)$ (7M) CO2

(OR)

5. (a) Test for convergence of the series $\frac{1}{1.3.5} + \frac{2}{3.5.7} + \frac{3}{5.7.9} + \ldots$ (7M) CO2

(b) Test for convergence of the series $1 + \frac{x}{2} + \frac{x^2}{5} + \frac{x^3}{10} + \ldots + \frac{x^n}{n^2+1} + \ldots$ (7M) CO2

UNIT – III

6. (a) Prove that $x^2 = \frac{\pi^2}{3} + 4\sum_{n=1}^{\infty} (-1)^n \frac{\cos nx}{n^2}, \quad -\pi < x < \pi$

and hence show that $\sum_{n=1}^{\infty} \frac{1}{n^2} = \frac{\pi^2}{6}$. (7M) CO3

(b) Investigate the maxima and minima of the function $f(x) = x^3 y^2 (1-x-y)$. (7M) CO3

(OR)

7. (a) Find the directional derivative of $\phi = xy + yz + zx$ at A in the direction of $\overrightarrow{AB}$ where $A = (1, 2, -1)$, $B = (1, 2, 3)$. (7M) CO3

(b) Define divergence and curl of a vector point function and give examples of each. (7M) CO3

UNIT – IV

8. (a) Find the rank of the matrix $A = \begin{bmatrix} 1 & -1 & -1 \\ 1 & 1 & 1 \\ 3 & 1 & 1 \end{bmatrix}$ by reducing into normal form. (7M) CO4

(b) Determine the value of λ for which the following set of equations may possesses non trivial solution $3x_1 + x_2 - \lambda x_3 = 0,\ 4x_1 - 2x_2 - 3x_3 = 0,\ 2\lambda x_1 + 4x_2 - \lambda x_3 = 0$ also find the solution for each λ. (7M) CO4

(OR)

9. (a) Verify Cayley Hamilton theorem for the matrix $A = \begin{bmatrix} 3 & 2 & 4 \\ 4 & 3 & 2 \\ 2 & 4 & 3 \end{bmatrix}$. (7M) CO4

(b) Reduce the quadratic form $x^2 + 3y^2 + 3z^2 - 2yz$ into canonical form. (7M) CO4

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Hall Ticket Number:

CE/EC/ME111(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

MATHEMATICS-I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define evolute. CO1
   (b) Investigate the convergence of $\int_0^1 \frac{1}{x^2}dx$ CO1
   (c) Define Gamma function. CO1
   (d) State Taylor's series. CO2
   (e) Is the series $1-\frac{1}{5}+\frac{1}{5^2}-\frac{1}{5^3}+...\infty$ convergent or divergent CO2
   (f) State the nth root test. CO2
   (g) Find the half range sine series for $f(x)=x^2$ in $(0,1)$ CO3
   (h) Evaluate $\lim_{(x,y)\to(1,5)} \frac{xy}{x+y}$ CO3
   (i) Define the stationary point of a function. CO3
   (j) Define divergence of a vector point function. CO4
   (k) Find the product of the eigen values of the matrix
   $$\begin{bmatrix} 2 & 18 & 20 \\ 0 & 4 & 19 \\ 0 & 0 & -1 \end{bmatrix}$$ CO4
   (l) Define eigen vector of a matrix. CO4
   (m) Define the canonical form of a quadratic form. CO4
   (n) Define normal form of a matrix. CO4

UNIT – I

2. (a) Find the envelope of a system of concentric and coaxial ellipses of constant area. (7M) CO1

   (b) Show that $\beta\left(m,\frac{1}{2}\right)=2^{2m-1}\beta(m,m)$ (7M) CO1

(OR)

3. (a) Show that $\int_0^\infty \frac{x^4}{4^x}dx=\frac{\Gamma(5)}{(\log x)^5}$ (7M) CO1

   (b) Prove that the evolute of the ellipse b $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$ is $(ax)^{\frac{2}{3}}+(by)^{\frac{2}{3}}=\left(a^2-b^2\right)^{\frac{2}{3}}$ (7M) CO1

UNIT – II

4. (a) Verify Rolle's theorem for $\frac{\sin x}{e^x}$ in $(0,\pi)$ (7M) CO2

   (b) Expand $\log_e x$ in powers of $(x-1)$ (7M) CO2

(OR)

5. (a) Test for convergence of the series $1+\frac{2^2}{2!}+\frac{3^2}{3!}+\frac{4^2}{4!}+...\infty$ (7M) CO2

   (b) Test for convergence of the series $\sum_{n=1}^{\infty}\frac{1}{\sqrt{n}+\sqrt{n+1}}$ (7M) CO2

UNIT – III

6. (a) Find the half range cosine series for $f(x)=x^2$ in $(0,\pi)$ (7M) CO3

   (b) In a plane triangle find the maximum value of the function $\cos A\cos B\cos C$ (7M) CO3

(OR)

7. (a) Show that $\nabla\left[\frac{f(r)}{r}R\right]=\frac{1}{r^2}\frac{d}{dr}\left[r^2 f(r)\right]$ (7M) CO3

   (b) Find the directional derivative of $x^2yz+4xz^2$ at the point $(1,-2,1)$ in the direction of the vector $2\vec{i}-\vec{j}+2\vec{k}$ (7M) CO3

UNIT – IV

8. (a) Find the rank of the matrix by reducing it to the normal form given (7M) CO4

$$A=\begin{bmatrix}1 & 2 & 3 & 4\\ 2 & 3 & 2 & 4\\ 1 & -1 & 1 & -1\end{bmatrix}$$

   (b) Test for consistency $4x-2y+6z=8, x+y-3z=-1, 15x-3y+9z=21$ (7M) CO4

(OR)

9. (a) Verify Cayley-Hamiton theorem find the inverse of the matrix. (7M) CO4

$$A=\begin{bmatrix}2 & -1 & 1\\ -1 & 2 & -1\\ 1 & -1 & 2\end{bmatrix}$$

   (b) Reduce the quadratic form $8x^2+7y^2+3z^2-8yz+4zx-12xy$ to canonical form. (7M) CO4

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Hall Ticket Number:

file-2

CE/EC/ME111(R20)

B.TECH. DEGREE EXAMINATION, JULY-2021

Semester I [First Year] (Regular)

MATHEMATICS-I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define Involute. CO1
   (b) Investigate the convergence of $\int_0^1 \frac{1}{x} dx$ CO1
   (c) Define Beta function. CO1
   (d) State Maclaurian's series. CO2
   (e) Is the series $1-\frac{1}{2}+\frac{1}{2^2}-\frac{1}{2^3}+\ldots\infty$ convergent or divergent. CO2
   (f) State the Ratio test. CO2
   (g) Find the half range sine series for $f(x)=x$ in $(0,1)$ CO3
   (h) Evaluate $\lim_{(x,y)\to(0,0)} \frac{3x^2y}{x^2+y^2}$ CO3
   (i) Define the stationary point of a function. CO3
   (j) Define curl of a vector point function. CO3
   (k) Find the product of the eigen values of the matrix. CO4
   $$\begin{bmatrix} 1 & 5 & 7 \\ 0 & 2 & 5 \\ 0 & 0 & 6 \end{bmatrix}$$
   (l) Define eigen values of a matrix. CO4
   (m) Define the canonical form of a quadratic form. CO4
   (n) Define normal form of a matrix. CO4

UNIT – I

2. (a) Prove that the evolute of the hyperbola $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ is $(ax)^{\frac{2}{3}}-(by)^{\frac{2}{3}}=(a^2+b^2)^{\frac{2}{3}}$ (7M) CO1

(b) Show that $\int_0^1 y^{q-1}\left[\log\frac{1}{y}\right]^{p-1}dy=\frac{\Gamma(p)}{q^p}$ (7M) CO1

(OR)

3. (a) Prove $\beta(m,n)=2\int_0^{\pi/2}\sin^{2m-1}\theta\cos^{2n-1}\theta\,d\theta$ (7M) CO1

(b) Find surface area of the solid formed by the revolution of $y^2=4ax$ about its axis by the arc. (7M) CO1

UNIT – II

4. (a) Verify Lagrange's mean value theorem for $(x+2)^3(x-3)^4$ in $(-2,3)$. (7M) CO2

(b) Find tan$x$ by Maclaurian's series upto the term containing x^5. (7M) CO2

(OR)

5. (a) Test for convergence of the series $\sum\frac{1}{n}\cos\left(\frac{1}{n}\right)$ (7M) CO2

(b) Test for convergence of the series $\frac{1}{1\cdot2\cdot3}+\frac{3}{2\cdot3\cdot4}+\frac{5}{3\cdot4\cdot5}+\ldots\infty$ (7M) CO2

UNIT – III

6. (a) Find the half range sine series for $f(x)=x^2$ in $(0, \pi)$. (7M) CO3

(b) In a plane triangle find the maximum value of the function $\sin x \sin y \sin(x+y)$. (7M) CO3

(OR)

7. (a) Show that $\nabla^2(f(r))=f''(r)+\frac{2}{r}f'(r)$ (7M) CO3

(b) Find the directional derivative of xy^2+yz^3 at the point $(2,-1,1)$ in the direction of the normal to the surface $x\log z-y^2=-4$ at $(-1,2,1)$ (7M) CO3

UNIT – IV

8. (a) Find the rank of the matrix by reducing it to the normal form given (7M) CO4

$$A=\begin{bmatrix}0&1&2&3\\4&5&6&7\\1&1&1&1\end{bmatrix}$$

(b) For what value of k the equations $x+y+z=1,\ 2x+y+4z=k,\ 4x+y+10z=k^2$ has a solution and solve them completely in each case. (7M) CO4

(OR)

9. (a) Using Cayley-Hamiton theorem find the inverse of the matrix (7M) CO4

$$A=\begin{bmatrix}5&4&0\\1&2&0\\1&2&2\end{bmatrix}$$

(b) Reduce the quadratic form $3x^2+5y^2+3z^2-2yz+2zx-2xy$ to canonical form. (7M) CO4

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Hall Ticket Number:

CD/CE/CM/CO/EE/ME112 (R20)

B.TECH. DEGREE EXAMINATION, DECEMBER-2024

Semester I [First Year] (Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is the electrolyte in Dry cell? CO1
   (b) What is hydrogen bonding? CO1
   (c) Write the CFSE formula for octahedral complex CO1
   (d) Define Osmosis. CO2
   (e) Give example for coagulant reagent. CO2
   (f) How acid affects the metal corrosion. CO2
   (g) Define degree of polymerization. CO3
   (h) Write Diels Alder reaction CO3
   (i) What are the uses of conducting polymers? CO3
   (j) Define Beer Lamberts law. CO4
   (k) What is Bathochromic effect? CO4
   (l) Which molecules are IR active? CO4
   (m) Write two Fluorescence applications in medical field. CO4
   (n) Give example for bending vibration. CO4

UNIT – I

2. (a) Describe the salient features of CFT. Explain the splitting of d-orbitals in tetrahedral & octahedral environments by Crystal field theory. (7M) CO1
   (b) How Lead acid battery is better than Dry cell and writes discharging cell reactions involved in Lead acid battery. (7M) CO1

(OR)

3. (a) Write construction and working principle of Li-Ion battery. (7M) CO1
   (b) Explain the magnetic properties of $[Cu(NH_3)_4]^{2+}$ and $[Co(NH_3)_6]^{3+}$ complexes taking NH_3 as strong field ligand. (7M) CO1

UNIT – II

4. (a) Explain Ion-exchange method for softening water. (7M) CO2
   (b) Explain about Sacrificial anodic protection method and impressed current cathodic protection. (7M) CO2

(OR)

5. (a) (i) Define differential aeration corrosion.
   (ii) Write about electroplating (Cu). (7M) CO2
   (b) What are the steps involved in municipal water treatment? (7M) CO2

UNIT – III

6. (a) Explain the synthesis of Aspirin. (7M) CO3
   (b) (i) How addition polymer is weaker than condensation polymer (ii) Give examples for addition polymer and condensation polymer. (7M) CO3

(OR)

7. (a) Write about P-doped and N-doped mechanism in conducting polymers. (7M) CO3
   (b) Write the differences between E1 and E2 reactions. (7M) CO3

UNIT – IV

8. (a) Write the principle involved in UV-VIS spectroscopy and write its limits. (7M) CO4
   (b) Write all stretching and bending vibration in IR spectroscopy. (7M) CO4

(OR)

9. (a) Explain colorimetric determination of Fe(III). (7M) CO4
   (b) How IR helps to determine the structure of H_2O and CO_2. (7M) CO4

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CD/CE/CM/CO/EE/ME112 (R20)

(b) (i) What is bathochromic shift? Explain with an example.
(ii) What is hyperchromic shift? Explain with an example. (7M) CO4

(OR)

9. (a) What is the condition necessary for a compound to be IR active? Draw different modes of vibrations possible in a triatomic molecule. (7M) CO4
(b) Describe the phenomenon of 'fluorescence' using Jablonski's diagram. Mark the non-radiative decay pathways. (7M) CO4

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Hall Ticket Number:

CD/CE/CM/CO/EE/ME112 (R20)

B.TECH. DEGREE EXAMINATION, APRIL-2024

Semester I [First Year] (Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
(a) Define 'spectrochemical series'. What is the importance of it? CO1
(b) Why d-orbital splitting is reversed in the crystal field splitting of the tetrahedral compared to octahedral? CO1
(c) What happens when a zinc rod is dipped in a solution of aqueous copper sulphate? CO1
(d) What is the disinfection of water? CO2
(e) Why does a part of a nail inside the wood undergo corrosion easily? CO2
(f) How would you regenerate the exhausted cation exchange resin in the Ion-exchange process? CO2
(g) What is 'Markonikoff's rule'? Give an example. CO3
(h) What kind of solvents are used for SN^1 reactions? CO3
(i) What is meant by 'Dienophile'? Give an example. CO3
(j) Name two factors that effect the 'Glass Transition Temperature'. CO3
(k) Why 'photo-multiplier tube (PMT)' is better than a 'phototube' as a detector in the absorption spectrophotometer? CO4
(l) Name the possible electronic transitions that occur in 'ethylene'? CO4
(m) Name two sources that are commonly used in IR spectrophotometer. CO4
(n) How many normal modes of vibrations expected for carbon dioxide molecule? CO4

UNIT – I

2. (a) (i) Calculate the magnetic moment of the metal ions having d^5 and d^7 configurations of an octahedral and tetrahedral complexes under strong field ligand.
   (ii) What are the applications of 'crystal field theory'? (7M) CO1
   (b) Describe Andrew's isotherm for CO_2 with proper representation. (7M) CO1

(OR)

3. (a) (i) What is electrochemical series? Give its applications.
   (ii) Calculate the emf of the following cell and write the cell reaction
   $Zn(s)|Zn^{2+}(0.1M)||Ag^{+}(0.01M)/Ag(s)$
   Given $E^{o}_{Zn^{2+}|Zn} = -0.76\ V, E^{o}_{Ag^{+}|Ag} = +0.80\ V$ (7M) CO1
   (b) What is a fuel cell? Explain H_2-O_2 fuel cell in detail with a neat diagram along with the reactions at the anode, cathode, and overall cell reaction. (7M) CO1

UNIT – II

4. (a) What is reverse osmosis? Explain the purification of seawater by reverse osmosis with a neat labelled diagram along with its advantages (7M) CO2
   (b) What are WHO standards of potable water? Explain various steps involved in the removal of impurities in the municipal treatment of water for domestic purposes. (7M) CO2

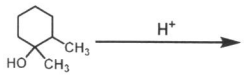
(OR)

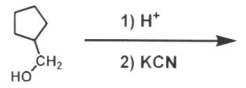
5. (a) Explain the electrochemical theory of corrosion along with the mechanism involved in rusting of iron in an acidic medium with a diagram. (7M) CO2

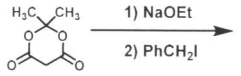
   (b) Explain the galvanic corrosion and differential aeration corrosion with suitable examples. (7M) CO2

UNIT – III

6. (a) Write the products for the following reactions. Show the mechanism of formation. (7M) CO3



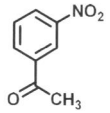




   (b) What are 'extrinsically conducting polymers'? Give example. (7M) CO3

(OR)

7. (a) Propose a plausible mechanism for the synthesis of the following compound. (7M) CO3



   (b) What is meant by 'condensation polymerization'? Explain it with an example. (7M) CO3

UNIT – IV

8. (a) A compound A exhibits molar absorptivity, $\varepsilon = 2.01\ Lmol^{-1}cm^{-1}$ in an absorption spectrophotometer of cuvette length 1.0 cm, what is the concentration of the solution if (7M) CO4
   (i) The absorbance is 0.804?
   (ii) The % transmittance is 50.0?

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Hall Ticket Number:

CD/CE/CM/CO/EE/ME112 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2024

Semester I [First Year] (Regular & Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define secondary cell. CO1
   (b) What is hydrogen bonding? CO1
   (c) What are the uses of Crystal field theory? CO1
   (d) Define scale and sludge. CO2
   (e) What is coagulation? CO2
   (f) Write anodic reaction when zinc metal in HCl solution. CO2
   (g) Define degree of polymerization. CO3
   (h) Write Diel's-Alder reaction. CO3
   (i) What are the uses of conducting polymers? CO3
   (j) What is hypochromic effect? CO4
   (k) Define Beer Lambert's law. CO4
   (l) Give example for bending vibration. CO4
   (m) Define Fluorescence. CO4
   (n) Which molecules are IR active? CO4

UNIT – I

2. (a) Explain the magnetic properties of $[Cu(NH_3)_4]^{2+}$ and $[Co(NH_3)_6]^{3+}$ complexes taking NH_3 as strong field ligand. (7M) CO1
   (b) How Lead acid battery is better than Dry cell and writes discharging cell reactions involved in Lead acid battery. (7M) CO1

(OR)

3. (a) Write construction and working principle of Li-Ion battery. (7M) CO1
   (b) Describe the salient features of CFT. Explain the splitting of d-orbitals in tetrahedral and octahedral environments by Crystal field theory. (7M) CO1

UNIT – II

4. (a) What are the steps involved in municipal water treatment. (7M) CO2
   (b) Explain about Sacrificial anodic protection method and impressed current cathodic protection. (7M) CO2

(OR)

5. (a) Explain Ion-exchange method for softening water (7M) CO2
   (b) (i) Define Galvanic corrosion.
   (ii) Write about electroplating (Cu). (7M) CO2

UNIT – III

6. (a) Write the differences between E1 and E2 reactions (7M) CO3
   (b) (i) How addition polymer is weaker than condensation polymer.
   (ii) Give examples for addition polymer and condensation polymer. (7M) CO3

(OR)

7. (a) Write about P-doped and N-doped mechanism in conducting polymers. (7M) CO3
   (b) Explain the synthesis of Aspirin. (7M) CO3

UNIT – IV

8. (a) Write the principle involved in UV-Vis spectroscopy and write its limits. (7M) CO4
   (b) How IR helps to determine the structure of H_2O and CO_2 (7M) CO4

(OR)

9. (a) Write all stretching and bending vibration in IR spectroscopy. (7M) CO4
   (b) Explain colorimetric determination of Fe(III). (7M) CO4

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CD/CE/CM/CO/EE/ME112 (R20)

F-2

Hall Ticket Number:

CD/CE/CM/CO/EE/ME112 (R20)

B.TECH. DEGREE EXAMINATION, JUNE-2023

Semester I [First Year] (Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is crystal field splitting energy? CO1
   (b) Give the critical temperature of CO_2 in Andrews Isotherm? CO1
   (c) Define Electrochemical series. CO1
   (d) Illustrate the use of coagulants in water treatment process. CO2
   (e) What is dechlorination? CO2
   (f) Nuts and bolts are to be made of the same metal. Give reason CO2
   (g) State the principle involved in a fuel cell. CO2
   (h) What is Markownikoff's rule? Give example. CO3
   (i) Classify polymers based on Tactility? CO3
   (j) List out two factors that affect glass transition temperature. CO3
   (k) What are Elastomers? Give example. CO3
   (l) State Beer -lamberts law. CO4
   (m) Methane does not absorb IR energy. Why? CO4
   (n) What is Fluorescence? CO4

UNIT – I

2. (a) Describe crystal field splitting in Tetrahedral complexes. (8M) CO1
   (b) Discuss briefly the magnetic properties in complex compounds. (6M) CO1

(OR)

3. (a) List out the differences between primary, secondary and fuel cell batteries. (6M) CO1
   (b) Explain the principle and working of lithium ion battery with equations. (8M) CO1

UNIT – II

4. Discuss briefly the various steps involved in the Municipal water treatment of drinking water. CO2

(OR)

5. (a) Describe the mechanism involved in the rusting of iron by electro chemical corrosion theory. (8M) CO2
   (b) Explain cathodic protection by sacrificial anode protection method. (6M) CO2

UNIT – III

6. (a) Explain the synthesis of Aspirin. (7M) CO3
   (b) List out the differences between addition and condensation polymerization. (7M) CO3

(OR)

7. (a) What are conducting polymers? How are they classified? List out their applications. (6M) CO3
   (b) Discuss the mechanism of conduction in Polyacetylene. (8M) CO3

UNIT – IV

8. (a) Explain the basic components of UV spectroscopy and give the various types of electronic transitions that take place in UV spectroscopy. (7M) CO4
   (b) Discus the applications of UV spectroscopy. (7M) CO4

(OR)

9. (a) Explain the basic components of IR spectroscopy and give various modes of vibrations of AB_2. (7M) CO4
   (b) Discuss the IR spectrum of CO_2 molecule. (7M) CO4

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File – 2

Hall Ticket Number:

CD/CE/CM/CO/EE/ME112 (R20)

B.TECH. DEGREE EXAMINATION, MARCH-2023

Semester I [First Year] (Regular & Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is the crystal field stabilization energy? CO1
   (b) Define hydrogen bonding and mention the types. CO1
   (c) What are the components of dry cell? CO1
   (d) Write any TWO differences between primary and secondary batteries. CO1
   (e) What is coagulation? CO2
   (f) What is sacrificial anode method? CO2
   (g) Define electroless plating. CO2
   (h) Identify any differences between SN^1 and SN^2 reactions. CO3
   (i) Define Markownikoff's rule. CO3
   (j) Define the functionality of a monomer. CO3
   (k) Write TWO examples for addition polymers. CO3
   (l) Write any TWO applications of Fluorescence in medicine. CO4
   (m) What are blue shift and red shift in electronic spectroscopy? CO4
   (n) Write any TWO applications of UV-Vis spectroscopy. CO4

UNIT – I

2. (a) Explain crystal field splitting of d-orbital in octahedral complexes. (7M) CO1
   (b) Define electrode potential. Derive Nernst equation for the determination of single electrode potential. (7M) CO1

(OR)

3. (a) Describe Andrew's isotherm of CO_2 with a neat diagram. Define hydrogen bonding. (7M) CO1
   (b) Summarize the construction and working of Li-MnO_2 battery with suitable chemical reaction. (7M) CO1

UNIT – II

4. (a) Describe the Ion-Exchange process for the purification of water with neat diagram. (8M) CO2
   (b) Explain the theory of electrochemical corrosion with example. (6M) CO2

(OR)

5. (a) Illustrate the steps involved in the municipal water treatment. (8M) CO2
   (b) Discuss the factors effecting rate of corrosion. (6M) CO2

UNIT – III

6. (a) Outline the steps involved in the synthesis of aspirin with suitable mechanism. (7M) CO3
   (b) Differentiate addition and condensation polymerisation. (7M) CO3

(OR)

7. (a) Differentiate SN1 and E1 reaction. (7M) CO3
   (b) Explain the mechanism of conduction in polyacetylene. (7M) CO3

UNIT – IV

8. (a) Explain Beer-Lambert's law of absorption and discuss its limitations. (7M) CO4
   (b) Describe the instrumentation of IR spectroscopy and its components with the help of block diagram. (7M) CO4

(OR)

9. (a) Explain various electronic transitions observed in UV-Visible spectroscopy. (7M) CO4
   (b) Explain the vibrational modes of AB_2 molecule (7M) CO4

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File-2

Hall Ticket Number:

CE/EE/ME112(R20)

B.TECH. DEGREE EXAMINATION, MARCH-2022

Semester I [First Year] (Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Arrange the following ligands in the order of increasing field-strength,
   (i)CO (ii) NH_3 (iii) H_2O CO1
   (b) Why crystal field splitting of tetrahedral complexes is less than octahedral complexes? CO1
   (c) Name the electrolyte used in Li-MnO_2 batteries. CO1
   (d) Write the Nernst equation for single electrode potential. CO1
   (e) Recall various steps involved in water treatment for drinking purpose. CO2
   (f) Why does corrosion occur in steel pipe connected to copper plumbing? CO2
   (g) What is meant by over voltage? CO2
   (h) State Markownikoff's rule. CO3
   (i) Give any two examples for intrinsically conducting polymers. CO3
   (j) How polymers are classified based on tacticity? CO3
   (k) What is meant by step growth polymerization? CO3
   (l) Define chromophore. CO4
   (m) How many vibrational modes are possible for CO_2 molecule? CO4
   (n) Which type of detector is used in IR spectrophotometer? CO4

UNIT – I

2. (a) Explain the crystal field splitting of d-orbitals in octahedral complexes of transition metals. (7M) CO1
   (b) What is meant by electrochemical series? Explain its significance. (7M) CO1

(OR)

3. (a) Describe the construction and working of lead-acid battery with reactions occurred during discharging and charging. (7M) CO1
   (b) Define fuel cell. Explain the construction and working of H_2-O_2 fuel cell and its applications. (7M) CO1

UNIT – II

4. (a) What is meant by desalination? Explain desalination of brackish water by reverse osmosis method. (7M) CO2
   (b) What are the specifications of potable water according to WHO guidelines? (7M) CO2

(OR)

5. (a) Define electroplating and write the conditions required for Cu electroplating. (7M) CO2
   (b) Illustrate galvanic corrosion with examples. (7M) CO2

UNIT – III

6. (a) Write the synthesis and pharmaceutical applications of Aspirin. (7M) CO3
   (b) Differentiate between mechanisms of SN^1 and SN^2 reactions. (7M) CO3

(OR)

7. (a) Define conducting polymer and explain their general applications. (7M) CO3
   (b) What is meant by glass transition temperature (Tg) and discuss the factors affecting glass transition temperature. (7M) CO3

UNIT – IV

8. (a) State Beer-Lambert's law and explain Bathochromic and Hypsochromic shifts with examples (7M) CO4
   (b) Discuss the principle and procedure involved in estimation of Iron (III) by Colorimetric method. (7M) CO4

(OR)

9. (a) Summarize the principle, conditions for IR activity and applications of IR spectroscopy. (7M) CO4
   (b) What is the principle of fluorescence spectroscopy and discuss its applications in medicine. (7M) CO4

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Hall Ticket Number:

file-2

CE/EE/ME112(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define crystal field splitting energy. CO1
   (b) What are advantages of fuel cell? CO1
   (c) Name active materials of lead acid battery. CO1
   (d) Distinguish primary battery from secondary battery CO2
   (e) Explain how an exhausted cation exchange resin can be regenerated? CO2
   (f) What is sedimentation? CO2
   (g) What is electro plating? CO3
   (h) Where do we observe galvanic corrosion? CO3
   (i) What is Anti Markownikoffs rule? CO3
   (j) Outline the significance of glass transition temperature. CO4
   (k) Explain the degree of dissociation with example. CO4
   (l) Explain Beer-Lambert's Law. CO4
   (m) Organise the various electronic transitions in the order of increasing energy. CO4
   (n) Mention the detector used in UV-Visible spectrophotometer. CO4

UNIT – I

2. (a) Illustrate crystal field spitting of d orbitals in tetrahedral geometry. (7M) CO1
   (b) Describe Andrews isotherms of Carbon dioxide. (7M) CO1

(OR)

3. (a) Derive Nernst equation for electrode potential. (7M) CO1
   (b) Describe construction and working of Lithium ion battery with neat diagram (7M) CO1

UNIT – II

4. (a) Discuss the municipal water treatment in detail. (8M) CO2
   (b) Describe desalination of water by reverse osmosis method. What are its advantages? (6M) CO2

(OR)

5. (a) Discuss the mechanism electrochemical corrosion with necessary reactions. (7M) CO2
   (b) Explain cathodic protection method to control the corrosion. (7M) CO2

UNIT – III

6. (a) Discuss the mechanism of Diel's Alder reaction with two examples. (7M) CO3
   (b) Discuss the mechanism of elimination reactions with suitable examples. (7M) CO3

(OR)

7. (a) Analyse the relationship between structure and properties of a polymer. (6M) CO3
   (b) Identify the reason for conductivity of polyacetylene by writing the mechanism of conduction. (8M) CO3

UNIT – IV

8. (a) Illustrate components and working of UV spectrophotometer with neat block diagram. (8M) CO4
   (b) Classify electronic transitions and write about blue shift and red shift with examples. (6M) CO4

(OR)

9. (a) Explain fluorescence and write its applications in medicine. (7M) CO4
   (b) Outline the condition for a molecule to be IR active. Classify types of vibration modes of polyatomic molecules. (7M) CO4

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Hall Ticket Number:

file-2

CE/EE/ME112(R20)

B.TECH. DEGREE EXAMINATION, JULY-2021

Semester I [First Year] (Regular)

ENGINEERING CHEMISTRY

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define CFSE. CO1
   (b) Define critical temperature. CO1
   (c) Distinguish primary battery from secondary battery. CO1
   (d) Name active materials of dry battery. CO1
   (e) Explain how an exhausted ion exchange resins can be regenerated? CO2
   (f) What is coagulation? CO2
   (g) What is electroless plating? CO2
   (h) Explain the effect of pH on rate of corrosion. CO2
   (i) What is Markownikoffs rule? CO3
   (j) Outline the significance of glass transition temperature. CO3
   (k) Write the functionality of ethylene. CO3
   (l) Write mathematical expression of Beer-Lambert's Law. CO4
   (m) Organise the various electronic transitions in the order of increasing energy. CO4
   (n) Define fluorescence. CO4

UNIT – I

2. (a) Illustrate crystal field spitting of d-orbitals in octahedral geometry. (7M) CO1
   (b) Make use of Vander waal's equation, derive critical constants. (7M) CO1

(OR)

3. (a) Derive Nernst equation for electrode potential and list the factors affecting electrode potential. (7M) CO1
   (b) Describe construction and working of H_2-O_2 fuel cell with neat diagram. (7M) CO1

UNIT – II

4. (a) Explain breakpoint chlorination. What is its significance in water treatment? (7M) CO2
   (b) Describe desalination of water by reverse osmosis method. What are its advantages? (7M) CO2

(OR)

5. (a) Discuss the mechanism of rusting of iron by electrochemical corrosion with necessary reactions. (7M) CO2
   (b) Explain sacrificial anodic method to control the corrosion. (7M) CO2

UNIT – III

6. (a) Discuss the mechanism of Diel's Alder reaction with two examples. (7M) CO3
   (b) Compare the mechanism of SN^1 and SN^2 reactions with suitable examples. (7M) CO3

(OR)

7. (a) Distinguish addition polymerisation from condensation polymerisation. (6M) CO3
   (b) Analyse the reason for conductivity of polyacetylene with necessary chemical reactions. Write any two applications of conducting polymers. (8M) CO3

UNIT – IV

8. (a) Explain how amount of ferric iron is determined by Colourimetry. (8M) CO4
   (b) Distinguish conjugate and non conjugate diene using electronic spectroscopy. (6M) CO4

(OR)

9. (a) Illustrate components and working of IR spectrophotometer with neat block diagram. (8M) CO4
   (b) Mention the condition for a molecule to be IR active. Explain various vibration modes of CO_2 and H_2O molecules. (6M) CO4

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grandstand into unusual, special stall. Horse is nervous. Sometimes he does not know what to do when starting gate flies open and track is before him. If he does not begin to run instantly, other horses are already ahead of him. During race, when he sees another horse just ahead of him, he will try to pass him. Sometimes jockey holds him back to save his energy for last stretch.

(b) Choose the correct option in the following sentences: (5M) CO3
(i) The answer (is, are) acceptable.
(ii) Every one of those books (is, are) fiction.
(iii) Nobody (know, knows) the trouble I've seen.
(iv) (Is, Are) the news on at five or six?
(v) Mathematics (is, are) John's favourite subject.

(c) Fill in the blanks with the correct form of the given verbs. (4M) CO3
(i) Bruce _____ (not stop) studying until he _____ (cover) all of the exam topics.
(ii) When the old woman ____ (hear) that her grandson _____ (arrest) for robbery, she _____ (shock).
(iii) We _____ (wait) for the bus for nearly half an hour, but it _____ (not arrive) yet so I don't think we _____ (be)

UNIT – IV

8. (a) Compare and Contrast Online and offline shopping and construct an essay. (7M) CO4
(b) What is the difference between note-taking and making? Explain with suitable examples. (7M) CO4

(OR)

9. (a) Mention the methods to prepare notes and cite relevant examples. (7M) CO4
(b) Construct an essay on the following topic: (7M) CO4
We learn our most valuable lessons in life from struggling with our limitations rather than from enjoying our successes.

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F-2

Hall Ticket Number:

CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

B.TECH. DEGREE EXAMINATION, DECEMBER-2024

Semester I [First Year] (Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully:
(a) They change often our seats at work. CO1
(b) I work here since 2010. CO1
(c) When I was a kid I used to playing sports with my friends. CO1
(d) Today we discussed about potential strategies. CO1
(e) I wish to have a relaxing vacation this December. CO1
(f) We need to analyze more deeply this problem. CO1
(g) I got here late because the traffic. CO1
(h) Each of the player performed well in the match. CO1
(i) None of the student scored above 90% in boards. CO1
(j) The intruder stood quietly for few moments CO1
(k) The police has so far succeeded in recovering only a part of the stolen property. CO1
(l) She went to school despite of her 'illness'. CO1
(m) They have decided to quit their job a week ago. CO1
(n) What type of the books you like to read? CO1

UNIT – I

2. (a) Explain forming of at least two words for each of the following root words and provide its meaning. (7M) CO1
(i) jud (ii) mater (iii) multi (iv) struct
(v) auto (vi) ambi (vii) aqua
(b) Form two words for each prefix and suffix given below: (7M) CO1
Prefix: mis-, re-, pre, semi
Suffix : -al, -ive, -ing

(OR)

3. (a) Write one word substitutes for the following:
(i) A cold-blooded vertebrate animal that is born in water and breathes with gills (7M) CO1

(ii) The arrangement of events or dates in the order of their occurrence
(iii) Fear of heights
(iv) A carriage for dead people
(v) A recurrent urge to steal, typically without regard for need or profit.
(vi) That boy keeps himself very reserved and conservative.
(vii) Study of Living Things

(b) Provide full form for the following acronyms: (7M) CO1
(i) ASAP (ii) APL (iii) NGP (iv) GDP
(v) GST (vi) FDI (vii) PAN.

UNIT – II

4. (a) You bought a new 'VIP' Washing Machine from M/s Rama Electronic, Commercial Street, Guntur last week. Now you find that the machine makes an unbearable noise and motor tears delicate fabrics. Write a letter to the dealer complaining about the same and requesting him to change the machine as early as possible. (7M) CO2

(b) You would like to start a book donation drive in your college. Write a proposal in about 350 words, stating the steps you would take to successfully execute the drive. (7M) CO2

(OR)

5. (a) Draft an E-mail to the Manager, LG electronics (Analog and Digital Electronics) seeking an opportunity for an internship. (7M) CO2

(b) Construct a precis for the following passage and suggest a suitable title. (7M) CO2

On 28 July, Mountbatten held a reception at which he, Patel and V.P. Menon joined forces to bully the princes. The Maharajas stood around nervously to watch this daunting triumvirate at work. Mountbatten would not be able to provide Patel with a completely full basket of apples, but it is striking that he managed to secure as many as he did.

Most of the princes would disappear quietly into estate management or gin palaces, as they pleased. But an impressive number of exceptions ran for office in the new democratic India. Whatever may be said

about Mountbatten's tactics or the machinations of Patel, their achievement remains remarkable. Between them, and in less than a year, it may be argued that these two men achieved a larger India, more closely integrated, than had 90 years of the British raj, 180 years of the Mughal Empire, or 130 years of Ashoka and the Maurya rulers.

UNIT – III

6. (a) Fill in the blanks with suitable prepositions (5M) CO3
(i) Those trousers went _____ fashion many years ago.
(ii) We heard about the natural disaster _____ the news.
(iii) I was ___ the impression that we didn't want to offend him.
(iv) Unemployment is____ the increase in many European countries.
(v) I don't know _____ certain, but I think she's on leave at the moment.

(b) Fill in the blanks with the correct form of the verb given within brackets (5M) CO1
(i) The clouds _____ (move) across the sky.
(ii) Sita _____ (talk) gently with everyone.
(iii) It seldom _____ (rain) here in February.
(iv) The horse _____ (gallop) across the fields.
(v) When I ___ (go) to see him, he _____ (sleep).

(c) Correct the sentence from redundancy: (4M) CO1
(i) Turn left at the green-colored house.
(ii) She spoke in a very convincing manner..
(iii) I returned back to my room after the meeting was over.
(iv) I heard they trustees are going to put a movie theatre on campus.

(OR)

7. (a) Write the following paragraphs, inserting a, an, and the where needed. (5M) CO3

Horse knows when he is going to race. How does he know? His breakfast was scanty. (He is angry about that.) He does not have saddle on his back. He is being led, not ridden, to grandstand. He is led under

F-2

Hall Ticket Number:

CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

B.TECH. DEGREE EXAMINATION, APRIL-2024

Semester I [First Year] (Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Rewrite the following after making appropriate changes:

(a)	An atheist is one who believes in god.	CO1
(b)	A philanthropist is one who hates humans.	CO1
(c)	An inventor is someone who invents excuses.	CO1
(d)	An alumnus is a person who sells aluminum.	CO2
(e)	A butcher is one who kills prisoners.	CO2
(f)	A reviewer examines patents.	CO2
(g)	A trickster is one who performs magic.	CO3
(h)	IBM stands for Internal Business Matter.	CO3
(i)	The teacher was applied for leave.	CO3
(j)	Emails need to be informal always.	CO4
(k)	Emails must be very lengthy.	CO4
(l)	We are not knowing the answer.	CO4
(m)	We knowed he was wrong.	CO4
(n)	I am working with Google since 1995.	CO4

UNIT – I

2. (a) Attach suitable prefixes or prefixes to the words below: (7M) CO1

(i) Make	(ii) movable	(iii) Prove
(iv) learn	(v) reversible	(vi) happy
(vii) arise	(viii) timely	(ix) trained
(x) useful	(xi) true	(xii) tenable
(xiii) scientific	(xiv) bright	

(b) Construct words using the following roots and give their meaning: (7M) CO1

(i) mal (ii) circ (iii) tomnis
(iv) eu (v) carn (vi) culp
(vii) magnus (viii) loc (ix) verbum
(x) am (xi) contra (xii) solo
(xiii) (xiv) ac

(OR)

3. (a) Give one-word substitute for the following: (7M) CO1

(i) The act of killing a king
(ii) The act of killing a brother
(iii) The mass murder of people of a religion or community
(iv) One has irrational fear of people from other castes, religion or communities
(v) One who has a tendency to eat much
(vi) One who is an expert on food and wine
(vii) One who doesn't smoke or drink
(viii) One who loves mankind
(ix) One who rules a country with an iron hand
(x) One who wants to steal out of habit
(xi) One who refuses to see the good in anything
(xii) One who preaches peace
(xiii) A person who believes in the superiority of one gender over another
(xiv) A person who believes in pleasure principle

(b) Expand the following abbreviations/acronyms: (7M) CO1

(i) DRDO (ii) DRDL (iii) ISRO
(iv) NASA (v) WWW (vi) viz.
(vii) URL (viii) PDF (ix) CD-ROM
(x) USB (xi) ASAP (xii) Fig.
(xiii) rpm (xiv) CEO

UNIT – II

4. (a) Write a letter of thanks to the HR of the company, thanking them for recruiting more than 150 students from your college in the campus recruitment drive. (7M) CO2

(b) Write a letter to the local tour operator asking him details about the expenses that would be incurred for an industrial tour lasting a week. The industrial tour will have 100 students who will travel by bus to Bangalore. The tour is of a week's duration and you exopect the tour operator to arrange accommodation as well for the said number. (7M) CO2

(OR)

5. (a) Write a precis for the following passage and suggest a suitable title.

Almost every organism has the tendency to react to certain stimuli for survival. This reaction to each and every situation has an evolutionary basis of adaptation. The study of human emotions dates back to the 19th century and psychologists have since then discovered many reasons for every emotion, yet these are just theories. The arousal of emotions and their assumed structures is said to occur due to repeated encounters with a situation followed by the adaptation of the encounter. Human emotions have been linked to adaptively regulate emotion-gathering mechanisms. The emotion of fear which is associated with ancient parts of the brain has presumably evolved among our pre-mammal ancestors while the emotion of a mother's love called the 'filial emotion' has seen to evolve among early mammals. Various emotions work as manipulative strategies that favours survival.

Feigning emotions by an accused person may help him be saved from the punishment. An exaggerated display of anger is also associated with manipulating or threatening someone. (7M) CO2

(b) What is e-mail etiquette? Explain the don'ts when composing an e-mail. (7M) CO2

UNIT – III

6. (a) Fill in the blanks with suitable articles: (5M) CO3
   (i) We met _____ amazing magician.
   (ii) I cannot see_____ shop that you were talking about.
   (iii) He went to _____ Ivy League university
   (iv) There were no fingerprints at ____ scene of crime.
   (v) _____ impossible task awaited him.

   (b) Fill in the blanks with suitable prepositions. (5M) CO3
   (i) Keep it ____ the shelf.
   (ii) Make me a cup ___ coffee.
   (iii) Come _____ me and I will take you there.
   (iv) We met ____ June.
   (v) They married _____ 16 August.

   (c) Remove redundant expressions in the sentences below: (4M) CO3
   (i) We met at 12 noon.
   (ii) My cousin brother is here.
   (iii) They were repeating the instructions again.
   (iv) Here is your free present.
   (v) Write a short precis.

(OR)

7. (a) Choose appropriate verb form from the verb given in brackets. (5M) CO3
   (i) I _____ (write) a letter.
   (ii) I_____ (see) her from a distance.
   (iii) I _____ _____(know) this would happen.
   (iv) They _____ out of London a week ago.

(b) Rewrite the sentences below by ensuring subject verb agreement. (5M) CO3
   (i) They belongs to Karnataka.
   (ii) He and his friends is travelling.
   (iii) Did you had breakfast?
   (iv) Did you fell down?
   (v) He have a lot of money.

(C) Rewrite the sentences ensuring noun pronoun agreement. (4M) CO3
   (i) If any of the brothers is willing to come_____ (they, he) can.
   (ii) If you see anyone looking for me, ask _____ (them / their) to meet me at the department.
   (iii) Neither the boy nor his friends have given _____ (his, their) consent.
   (iv) Every one of the women had _____ (her/their) questions answered.

UNIT – IV

8. (a) What are the main features of a narrative paragraph? When is a narrative paragraph used? Write a paragraph of about 200 words on 'My experience with Online classes'. (7M) CO4

   (b) What are the main features of expository writing? When is expository writing used? Construct a paragraph on 'My plans after I graduate'. (7M) CO4

(OR)

9. (a) What are the different note making methods? Illustrate any 2 with examples. (7M) CO4

   (b) Make notes on the following passage.
   What actually is a robot? When different persons have different concepts of robots, the only way of deciding what really is a robot is to look for a definition of the term robot. (7M) CO4

The dictionary meaning of a robot is that it is an automatic apparatus or device that performs functions ordinarily ascribed to human beings or operates with what appears to be almost-human intelligence. It is interesting to observe that this meaning does not give a human shape to the robot. In order to dramatise the fact that the robot does the work of a human being, a human shape is given to the robot in science-fiction stories and movies. The human shape is irrelevant as far as the functions of the robot are concerned.

The Robot Institute of America, which is an association of several robot manufacturers gives the following definition of an industrial robot.

"An industrial robot is a reprogrammable, multifunctional manipulator designed to move material, parts, tools or specialised devices through variable programmed motions for the performance of a variety oftasks. "

The key word in this definition is 'reprogrammable'. This means that a robot is capable of being reprogrammed. This feature is the one that distinguishes it from a fixed automation. A fixed automation is designed to do one, and only one, specific task. If the specifications of the tasks change even slightly, the fixed automation becomes incapable of performing the task it was designed to perform according to one fixed specification. However, a robot can be reprogrammed to perform even when the specifications are changed drastically. The original program is simply erased and the new program takes care of the changed tasks.

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(b) Analyse 'subject and verb agreement' in the following sentences and rewrite them meaningfully.
   (i) Each student are required to pass the final exam. (5M) CO3
   (ii) Neither the dogs nor the cat are going outside
   (iii) Mary and John usually plays together.
   (iv) Measles are a contagious childhood disease.
   (v) High levels of pollution causes damage to the respiratory tract.

(c) Select the right option for given for every sentence for 'noun-pronoun agreement': (4M) CO3
   (i) The troupe of jugglers shocked _____ audience when an ill-flung knife impaled our friend Jarod's foot.(its/their)
   (ii) Every puppy and kitten will cry at night until _____ owner offers a spot on the bed. (its/their)
   (iii) Each of these computers has _____ own technical glitch that can frustrate the user (its/their)
   (iv) Sonya must remember to buy shampoo so that her roommates can wash _____ hair tomorrow morning (her/their)

UNIT – IV

8. (a) Define what a 'Narrative paragraph' is and develop a paragraph on 'my first day at college'. (7M) CO4
   (b) Construct an expository essay on 'How internet has changed our lives completely'. Discuss the pros and cons. (7M) CO4

(OR)

9. (a) Explain how 'note making and note taking 'skills are useful? (7M) CO4
   (b) Discuss the important steps of note making. (7M) CO4

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CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

F-2

Hall Ticket Number:

CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2024

Semester I [First Year] (Regular & Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully:
   (a) Government runs by two persons is monarchy. CO1
   (b) One who hates mankind is philanthropist. CO1
   (c) PAN is abbreviated as Permanent Access Number. CO1
   (d) Cc in email format is a 'copy of the copy'. CO2
   (e) Full block format is rarely used in formal letter writing. CO2
   (f) Budget details are not usually part of proposal writing. CO2
   (g) I am loving you. CO3
   (h) The French is a difficult language to learn. CO3
   (i) All the students will work on a collaborative environment. CO3
   (j) The two companies merge together by the end of March. CO3
   (k) Note making does not mean recording the essence of information that is crucial. CO4
   (l) We seldom use abbreviations in note making. CO4
   (m) Charting is not one of the methods of note making. CO4
   (n) Descriptive writing is not using the power of words to arouse the imagination. CO4

UNIT – I

2. (a) Illustrate the following 'prefixes and suffixes' with two examples each: (7M) CO1
   (i) de- (ii) mal- (iii) mega- (iv) omni- (v) -ian (vi) –ious (vii) -ward
   (b) Build words for the following roots and provide meaning: (7M) CO1
   (i) somn (ii) serve (iii) sci (iv) retro (v) port (vi) pel (vii) od

(OR)

3. (a) Choose 'one word substitute' for the following: (7M) CO1
   (i) One who does a thing for pleasure and not as a profession
   (ii) Something is certain to happen
   (iii) A person who compiles dictionaries
   (iv) A room in a public building where outdoor clothes or luggage may be left safe.
   (v) The sound of Frogs
   (vi) Killing of a large group of people
   (vii) A person who goes on foot

   (b) Define the full form of the following abbreviations: (7M) CO1
   (i) DVD (ii) DRDO (iii) BBC (iv) USB (v) def
   (vi) contd (vii) quot

UNIT – II

4. (a) Draft a letter of complaint to local municipal authorities regarding ineffective collection methods of waste and its transport from households to dumping yards. (7M) CO2

   (b) Develop a proposal to submit to the District collector on the management of libraries in all Govt high schools with minimum resources, minimum funding and involving local NGOs. (7M) CO2

(OR)

5. (a) Explain components of 'email' and draft an email to a foreign university authorities to send you details of new courses they offer in new technologies (7M) CO2

   (b) Construct a précis for the following passage and suggest a suitable title: (7M) CO2

Exercise is essential for maintaining physical health and can have many benefits for mental well-being as well. Regular physical activity can help reduce the risk of developing chronic conditions such as obesity, type 2 diabetes and heart disease. It can improve sleep, increase energy levels, and reduce stress and anxiety. Despite the many benefits of exercise, many people struggle to make it a regular part of their routine.

One reason for this could be that they don't know how to get started or don't have access to resources like a gym or personal trainer. However, there are

many easy ways to incorporate exercise into daily life, such as walking or cycling, participating in team sports or trying home workout videos. (246 words).

UNIT – III

6. (a) Choose appropriate 'articles' for the blanks: (5M) CO3
   (i) _____ youngest boy of the family is missing.
   (ii) I will pay you two hundred _____ week.
   (iii) Try to know _____ man standing in front of you.
   (iv) Vegetables are delivered to _____ prison twice a week.
   (v) The speed limit on motorways is seventy miles _____ hour.

   (b) Find suitable 'prepositions' for the blanks: (5M) CO3
   (i) Can you look _____a word in your dictionary?
   (ii) Could i speak _____ Ram, Please?
   (iii) The children in swim suits were jumped _____ the water.
   (iv) He has been missing _____ four days.
   (v) I have heard a lot _____ him.

   (c) Identify 'redundancy' in the sentences and reconstruct them meaningfully: (4M) CO3
   (i) Our top student is a physically ill student today.
   (ii) I will complete my research paper in a period of a week.
   (iii) Pavan's stylish boots, made of crocodile skin, cost him an arm and a leg.
   (iv) Sarma is the teacher who teaches chemistry at her high school.

(OR)

7. (a) Select appropriate 'verb form' for the blanks: (5M) CO3
   (i) He _____ (walk) across the road when the bicycle hit him.
   (ii) The boys _____ (play) cricket in the evening every day.
   (iii) My father _____ (retire) next month.
   (iv) The train _____ (leave) before we reached the station.
   (v) Don't ring now; she _____ (watch) her favourite show on TV.

business people's organizations may meet as often as once a week in one of private dining rooms of town's leading hotel for lunch. They have good lunch, hear good program, and continue their fundraising program for worthy organization, such as local hospital. (5M) CO3

(b) Choose the correct option in the following sentences: (Subject Verb Agreement) (5M) CO3

(i) The movie, including all the previews, (take, takes) about two hours to watch.
(ii) The players, as well as the captain, (want, wants) to win.
(iii) Either answer (is, are) acceptable.
(iv) Every one of those books (is, are) fiction.
(v) Nobody (know, knows) the trouble I've seen.

(c) Fill in the blanks with the correct form of the given verbs. (4M) CO3

(i) I _____ (attend) the meeting tomorrow.
(ii) Cricket _____ (originate) in England.
(iii) I _____ (try) to solve this sum.
(iv) He _____ (study) hard these days.

UNIT – IV

8. (a) Construct an essay on the following topics
In any field — business, politics, education, government — those in power should be required to step down after five years. (7M) CO4

(b) What is the difference between note-taking and making? Explain with suitable examples. (7M) CO4

(OR)

9. (a) Mention three methods to prepare notes and cite relevant examples. (7M) CO4

(b) Construct an essay on the following topic
Educational institutions should actively encourage their students to choose fields of study that will prepare them for lucrative careers. (7M) CO4

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CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

F-2

Hall Ticket Number:

CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

B.TECH. DEGREE EXAMINATION, JUNE-2023

Semester I [First Year] (Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully.

(a) What sort of an insect is that? CO1
(b) None of the students scored above 90 % in boards. CO1
(c) The resources was divided based on its expertise CO1
(d) If Jahnavi would have called me. I would have picked her up from the airport. CO1
(e) Rama told his wife, he would not mind standing and eat the dinner. CO1
(f) Though he studies hard, he is not quite as smart as her CO1
(g) If I were her, I'd sign up for that class. CO1
(h) Many a politicians have promised to make changes. CO1
(i) A large number of students was absent. CO1
(j) The number of aspirants have not appeared in the examination CO1
(k) He succeeded because he studies regularly. CO1
(l) Akhil is stronger than any boy in the class. CO1
(m) Our mathematics teacher is giving us too much tasks. CO1
(n) Do he have any idea where he is going? CO1

UNIT – I

2. (a) Explain forming of at least two words for each of the following root words and provide its meaning. (7M) CO1
(i) mal (ii) phobia (iii) phil (iv) logy
(v) fact (vi) anti (vii) aqua

(b) Form two words for each prefix and suffix given below
Prefix : Over-, im- , dis, mid
Suffix : -ful, -ive, -able (7M) CO1

(OR)

3. (a) Write one word substitutes for the following: (7M) CO1
   (i) This person is a hater of mankind.
   (ii) I am interested in the study of ancient things.
   (iii) That boy keeps himself very reserved and conservative.
   (iv) She is someone who puts forth an idea that she herself doesn't believe.
   (v) Mapping of earth and its formation.
   (vi) Study of handwriting.
   (vii) The study of Human Mind.

   (b) Provide full form for the following acronyms: (7M) CO1
   (i) DRDO
   (ii) ISRO
   (iii) RAM
   (iv) NSG
   (v) GST
   (vi) NOTA
   (vii) PIN

UNIT – II

4. (a) Draft a letter to be submitted to the HR manager, Tata Consultancy Services Ltd. Seeking an internship. (7M) CO2

   (b) You would like to start a robotics club in your college. Draft a proposal in about 350 words, stating the steps you would take to execute the activities of the club. (7M) CO2

(OR)

5. (a) Draft an E-mail to the HR Manager L&T Metro rail seeking permission for an industry visit. (7M) CO2

   (b) Construct a precis for the following passage and suggest a suitable title.

   It is physically impossible for a well-educated, intellectual, or brave man to make money the chief object of his thoughts: Just as it is for him to make his dinner the principal object of them. All healthy people like their dinners, but their dinner is not the main object of their lives. So all healthy minded people like making money ought to like it and enjoy the sensation of winning it; it is something better than money. A good soldier, for instance, mainly wishes to do his fighting well. He is glad of his pay-very properly so and justly grumbles when you keep him ten years without it-till, his main mission of life is to win battles, not to be paid for winning them. So of clergymen. The clergyman's object is essentially baptize

and preach not to be paid for preaching. So of doctors. They like fees no doubt-ought to like them; yet if they are brave and well-educated the entire object to their lives is not fees. They on the whole, desire to cure the sick; and if they are good doctors and the choice were fairly to them, would rather cure their patient and lose their fee than kill him and get it. And so with all the other brave and rightly trained men: their work is first, their fee second-very important always; but still second (7M) CO2

UNIT – III

6. (a) Fill in the blanks with suitable prepositions (5M) CO3
   (i) He started learning English _____ 2005.
   (ii) You have to pay _____ the tickets on the day you order them.
   (iii) We are very proud _____ this company.
   (iv) It's very kind _____ you to help us.
   (v) The old man suffered _____ a heart attack.

   (b) Fill in the blanks with the correct form of the verb given within brackets (5M) CO1
   (i) Your friends_____ for you for over an hour.(wait)
   (ii) It is not worth _____ so much money for this concert (pay).
   (iii) When I reached the station, the train _____(leave).
   (iv) I _____the TajMahal last month. (visit).
   (v) The criminal _____the victim with a blunt object. (attack).

   (c) Correct the sentence from redundancy: (4M) CO1
   (i) This is the true fact.
   (ii) Go and fetch some water for me.
   (iii) As road traffic increases, elevated highways are built to solve the problem of traffic jam."
   (iv) 'He ordered for a cup of tea.'

(OR)

7. (a) Write the following paragraphs, inserting *a*, *an*, and *the* where needed.

   Most working people have fewer hours to give to time-consuming activities of clubs than they used to have, but most people in small town belong to club or two. One of clubs is likely to be social and benevolent organization, such as Rotary or Elks. Business people are likely to belong, also to either Kiwanis Club or Lions. Such

(vi) Bornholm is ___ island in the Baltic Sea.
(vii)Christmas comes once ___ year.

UNIT – IV

8. (a) Write a narrative paragraph in about 50-70 words on the theme 'My Passion'. (7M) CO4

(b) Make notes of the given passage: (7M) CO4

A venture isn't fruitful in light of the fact that it has been finished on schedule and inside spending plan. There is one other factor that is basic to progress: quality. Regardless of how rapidly and inexpensively a task is finished, partners won't be upbeat if the nature of the item or administration doesn't live up to their desires. Along these lines, one significant technique to follow and examine the nature of the task and ensure it meets the necessities of the clients is Quality affirmation. QA according to ISO 9000 is characterized as "a component of value the executives concentrated on giving certainty that quality prerequisites will be satisfied". This deformity counteractive action in quality confirmation contrasts unpretentiously from imperfection recognition and dismissal in quality control and has been alluded to as a move left since it centers around quality prior all the while. The expressions "quality affirmation" and "quality control" are frequently utilized conversely to allude to methods for guaranteeing the nature of an assistance or item. For example, the expression "confirmation" is frequently utilized as pursues: Execution of investigation and organized testing as a proportion of value affirmation in a TV programming venture at Philips Semiconductors is depicted. The expression "control", in any case, is utilized to portray the fifth period of the Characterize, Measure, Break down, Improve, Control (DMAIC) model. DMAIC is an information driven quality system used to improve forms.

(OR)

9. (a) Write an Expository essay in about 300-350 words on the topic 'Indian Tri-Forces'. (7M) CO4

(b) Why is preparing notes important? Suggest some productive tips. (7M) CO4

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Hall Ticket Number:

CD/CE/CH/CM/CO/EC/EE/ME113 (R20)

B.TECH. DEGREE EXAMINATION, MARCH-2023

Semester I [First Year] (Regular & Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a) Plagiarism means… CO1
(b) The synonym of the word 'alms' is_____ CO1
(c) The antonym of the word 'deceit' is_____ CO1
(d) Proposals are written by employers to employees. CO2
(e) Give two example 'salutations' of a formal letter. CO2
(f) 'Yours faithfully' can be a formal email's closing. CO2
(g) Everybody needs to bring their assignments. CO3
(h) The information I found on the topic is limited. CO3
(i) I have a one-rupee note. CO3
(j) A paragraph does not contain examples. CO4
(k) An expository essay contains only an introduction and a conclusion. CO4
(l) Making notes will not help us in revising before exams. CO4
(m) What is the structure of a paragraph? CO4
(n) An essay should be written only in simple present tense. CO4

UNIT – I

2. (a) Write meanings and at least two examples for each of the given foreign root words: (7M) CO1
(i) sens (ii) terr (iii) vis (iv) hab (v) phil (vi) tale (vii) gno

(b) Construct meaningful words using the given prefixes & suffixes: (7M) CO1
Prefix: (i) circum- (ii) epi- (iii) homo- (iv) mono-
Suffix: (v) -acy (vi) -ity (vii) -ify

(OR)

3. (a) Write meanings of the given one-word substitutes: (7M) CO1
(i) Unanimous (ii) Lump sum (iii) Parasite (iv) Oasis
(v) Chronology (vi) Pedagogy (vii) Bouquet

(b) Write synonyms and antonyms of the given words: (7M) CO1
Synonyms: (i) thin (ii) see (iii) think (iv) fall
Antonyms: (v) small (vi) kind (vii) fonder

UNIT – II

4. (a) Write a precis of the given text: (7M) CO2

There has been a significant role in engineering since when human civilization started. The evidence from ancient Harappa and Mohenjodaro civilizations show that it had a planned layout of the street grids along with equal-sized buildings, structural city division for commercial purposes, well-planned drainage system, etc., which are all considered to be very advanced civil engineering activities for the period of the civilization.

As we proceed further down the timeline, we have witnessed several other civil engineering wonders like the great pyramids, Great Wall of China, TajMahal, etc. Engineers from places like Japan, where earthquakes are common, found a way to withstand natural disasters by building shock-proof structures, and such inventions have saved a million lives. Ancient Greeks made machines for civilians, military, and as well as commercial purposes.

(b) You are an English teacher at an Engineering college. Write an email to your students explaining the significance of Letter Writing in professional contexts. (7M) CO2

(OR)

5. (a) The Indian Govt. has released a notification seeking applications from Engineering students to organize an SSDP (Students' Skill Development Program) at their respective institutions. Draft a proposal to grab the fund to organize the SSDP at your college. (7M) CO2

(b) Write a letter to the Commissioner of Police of your locality, requesting him or her to arrange some police protection near colleges and bus stops to prevent ragging. (7M) CO2

UNIT – III

6. (a) Correct the following sentences where necessary in their subject-verb agreement: (7M) CO3

(i) Some of the students is going out.

(ii) The number of soldiers at the border are large.

(iii) Everyone are selfish.

(iv) 0 of every 100 children is malnourished.

(v) Ninety rupees are too much for this toy.

(vi) There is many objections to plan the new session.

(vii) Two-thirds of the city are in ruins.

(b) Fill-in the blanks with appropriate prepositions: (7M) CO3

(i) Don't forget to put your return address _____ the envelope.

(ii) He sat _____ the campfire.

(iii) Mr. Flanagan, who is _____ Ireland, is staying at his sister's home in Boston.

(iv) Someone has spilled ink _____ this rug and has burned a hole on that one.

(v) The door was locked; so I shoved the letter _____ the door.

(vi) He piled the books _____ the table.

(vii) He arrived _____ Switzerland last week.

(OR)

7. (a) Correct the following sentences using appropriate tense forms: (7M) CO3

(i) I'm going to _____ (buy) Isabel a book about cats for her birthday because she's crazy about them.

(ii) We can't go away in May. We'll be _____ (revise) for our exams then.

(iii) This time tomorrow I _____ (give) my presentation and I'll be able to relax!

(iv) I _____ (want) to be a vet ever since I was little.

(v) I _____ (not have) any brothers or sisters.

(vi) When I was younger, we _____ (do) much sport at my primary school.

(vii) We _____ (have, do) any practice tests yet so I'm not sure what they're like.

(b) Fill in the blanks with appropriate articles: (7M) CO3

(i) I can't believe I failed ____ yesterday's test!

(ii) Do you have ____ dictionary that I can borrow?

(iii) There were many dogs in the park. One dog was ____ Dalmatian.

(iv) Pandas and ____ tigers are both endangered animals.

(v) Magda is wearing ____ blue dress with red shoes

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Hall Ticket Number:

CE/CH/EC/EE/ME113(R20)

B.TECH. DEGREE EXAMINATION, MARCH-2022

Semester I [First Year] (Supplementary)

ENGLISH FOR COMMUNICTION SKILLS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully:

(a)	A lexicographer is one who writes biography.	CO1
(b)	Polyglot is one who knows several places.	CO1
(c)	OMG is abbreviated as Oh My Gold.	CO1
(d)	Looking forward to send the documents.	CO3
(e)	Salutation of a letter is nothing but leave taking.	CO3
(f)	It is not necessary to maintain a positive tone in an Email.	CO2
(g)	The box of chocolates have been found missing.	CO3
(h)	I, you and Rohan have to attend the program.	CO3
(i)	Phillip is an European citizen.	CO3
(j)	The Corona pandemic is causing havoc for two years.	CO3
(k)	The cattle is grazing in the field.	CO3
(l)	The topic sentence should appear only at the beginning of a paragraph.	CO4
(m)	Sales proposals and research proposals are the same.	CO4
(n)	Précis writing is elaboration of any passage.	CO4

UNIT – I

2. (a) Identify and write at least one word with each of the following prefixes:
(i) anti- (ii) bi- (iii) centi- (iv) co- (v) dis-
(vi) de- (vii) ill- (viii) im- (ix) ir- (x) inter-
(xi) micro- (xii) mis- (xiii) multi- (xiv) post- (7M) CO1

(b) Identify and write at least one word by using the following suffixes:
(i) -able (ii) -age (iii) -ian (iv) -ly (v) -ion
(vi) -ee (vii) -er (viii) -or (ix) -ful (x) -hood
(xi) -ive (xii) -ize (xiii) -ious (xiv) -less (7M) CO1

(OR)

3. (a) Choose 'one-word substitute' for the following:
(i) An important person.
(ii) A person who spends too much time using a computer.
(iii) Talking in sleep.
(iv) A supposed cure for all diseases or problem.
(v) The one who does not believe in God.
(vi) The study of rocks and soil.
(vii) One who looks at the brighter side of everything.
(viii) One who eats human flesh.
(ix) Someone with beautiful hand writing.
(x) A government that has monarch as the head.
(xi) The killing of oneself.
(xii) The study of plants.
(xiii) The gathering of cows.
(xiv) A doctor who treats the heart dieses. (7M) CO1

(b) List synonyms for the following words:
(i) awful (ii) break (iii) calm (iv) delicious
(v) false (vi) mischievous (vii) predicament
(viii) scared (ix) aghast (x) sumptuous (xi) fable
(xii) underscore (xiii) sanguine (xiv) baffling (7M) CO1

UNIT – II

4. (a) Compose a letter to the municipal commissioner requesting him for rectification of drainage system in your locality. (7M) CO3

(b) As a fresh graduate in engineering you have decided to establish a manufacturing unit in your hometown. For this purpose, you have to get loan facility under the Self-employment Scheme. So, you wish to submit a proposal for the manufacture of an item of your choice seeking loan from the State Industrial Development Corporation, Vijayawada.
Develop a proposal to be sent to the Director, State Industrial Development Corporation, Vijayawada, Andhrapradesh. (7M) CO3

(OR)

5. (a) E-mails have changed the business correspondence drastically. Explain both advantages and limitations of E-mails. (7M) CO2

(b) Précis writing involves summarizing a document to extract maximum information with minimum number of words. Explain some steps to effective précis writing. (7M) CO2

UNIT – III

6. (a) Find the suitable prepositions for the blanks. (5M) CO3
(i) Rishi is senior _____ me.
(ii) I am fond _____music.
(iii) Pratap has been teaching _____ 25 years.
(iv)The film was directed _____ Michael.
(v) Dorathi is suffering _____ fever for two days.

(b) Find the suitable articles for the blanks. (5M) CO3
(i) He is _____university graduate.
(ii) This is _____best book on Earth Science.
(iii) Krithika has prepared for the program for _____hour.
(iv) Kalidasa is _____Shakespeare of India.
(v) I have _____ few friends who are everything to me.

(c) Identify 'redundancies' in the following sentences and rewrite them meaningfully. (4M) CO3

(i) Our college will collaborate together with Skill Development University in near future.

(ii) My house has a strong compound wall.

(iii) I met my friend yesterday at 9:00 am in the morning.

(iv) All other boys except Peter came for picnic.

(OR)

7. (a) Examine the following sentences and reconstruct them in concurrence with 'subject-verb agreement'.

(i) My best friend and advisor have met me recently.

(ii) Ms. Paul with her sons and daughters aregoing to the party.

(iii) Either October or November is a good vacation month.

(iv) News aretravelling faster than ever before.

(v) These poultry isready for sales. (5M) CO3

(b) Select appropriate verb form for the following sentences.

(i) A rolling stone_____(gather) no mass.

(ii) I_____(finish)the course this week.

(iii) It_____(rain) sincemorning.

(iv) Rithika_____(perform) dance in a function last week.

(v) She_____(build) a new house next year. (5M) CO3

(c) Examine the following sentences and reconstruct them as per 'Noun-Pronoun agreement'.

(i) One should keep his promise.

(ii) That chair belongs to mine.

(iii) What car came first in the race?

(iv) The house which Joe built is small. (4M) CO3

UNIT – IV

8. (a) How is a narrative paragraph developed? Develop a narrative paragraph on 'My childhood'. (7M) CO3

(b) Essays are often used as tools to improve writing skills. Illustrate some characteristics and steps to 'essay writing'. (7M) CO4

(OR)

9. (a) Note Taking is an essential learning skill for students to implement during and outside of class time. How do you organize 'Note Taking' in order to improve your learning ability? (7M) CO4

(b) Compare the learning skills 'Note Making' and 'Note Taking'. Write some of the uses of these skills. (7M) CO4

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9. (a) Read the given passage and make effective notes using the Cornell Method. (7M) CO4

Over the last 30 years the West has witnessed the East strive for a larger 'piece of the economic pie', aiming for similar living standards to the EU and US. This has increased pressure on natural resources and prompted suggestions for governments to limit consumption. This idea is severely flawed because it reduces product safety and building products to last would harm the poor.

Firstly, the suggestion that governments should discourage consumers from purchasing 'up to date products' would eliminate the opportunity to improve their safety. This is because as technology improves, new discoveries can be used to increase their utility.

Take for example the car industry, here technology such as ABS brakes, air-bags, seat belts have all been derived from a constant flow of improvements. Therefore if the authorities were permitted to limit purchases, car companies would be reluctant to invest in new features, and safety would never improve.

Secondly, it is true we are consuming more, through ever increasing populations, nevertheless, the argument that 'products should be made to last' is redundant. If products were built stronger they would be more expensive. This would harm the less wealthy consumer, furthermore with modern technology these products can often be recycled at a later date anyway.

Glass, plastic, paper, batteries, and even mobile phones are now collected to be re-purposed, reused and recycled. Therefore durable products are unnecessary and would harm lower income demographics.

(b) Explain how to use Outline Method to prepare effective notes. Draft an example of 'Outline Method of Note Making/Taking. (7M) CO4

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Hall Ticket Number:

CE/CH/EC/EE/ME113(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully.
   (a) 'bat' is the root word of 'acrobat'. CO1
   (b) 'master' is the suffix of 'masterpiece'. CO1
   (c) The term 'aquatic' relates animals living in jungles. CO1
   (d) SOP stands for 'Statements of Purposes'. CO1
   (e) Good writing demands correct grammer. CO2
   (f) Précis is a form of reading. CO2
   (g) We write 'yours faithfully' in a formal email. CO2
   (h) They was playing in the ground. CO3
   (i) Rama jumped into the room. CO3
   (j) I like football why because my father is a football champion. CO3
   (k) Narrative essay deals with facts. CO3
   (l) We make notes while listening to a speaker. CO4
   (m) Mind-mapping is not a method of preparing notes. CO4
   (n) Sita goes to school daily and he likes her classmates. CO4

UNIT – I

2. (a) Form at least TWO words and construct ONE meaningful sentence using each of the given Prefixes and Suffixes: (7M) CO1
   (i) mis- (ii) pre- (iii) de- (iv) dis- (v) –ic (vi) –ion (vii) –ness
   (b) Write one-word substitutions of the given meanings: (7M) CO1
      (i) Walking in a slow relaxed way
      (ii) A secret massage written in code
      (iii) A little bird told me
      (iv) A person who rides horses in races as an occupation
      (v) Caught between two stools
      (vi) One who copies from other writers
      (vii) To scold or rebuke somebody

(OR)

3. (a) Construct meaningful words using the given root words from Greek: (7M) CO1
   (i) anti (ii) aqu (iii) bio (iv) chrono (v) biblio (vi) hyder (vii) doc.

(b) Write at least TWO synonyms to each of the following words: (7M) CO1
(i) service (ii) lift (iii) favour (iv) promotion (v) dictate (vi) notice (vii) speech.

UNIT – II

4. (a) Write a letter to the HR Manager, Infosys, Mumbai, requesting him as the Guest of Honour for the upcoming Annual Students' Educational Fair 2021 at your campus. (7M) CO3

(b) You have developed a prototype engine for the electric cars with a team of seven other students. Develop a proposal to submit to the TATA Industries, India for its financial support. (7M) CO3

(OR)

5. (a) Draft an email to your Head of the Department of your stream, requesting him/her to facil tate authentic learning materials during or after the online teaching instruction. (7M) CO3

(b) Analyse the given information and write a précis in one third of the given text. Give an appropriate title. (7M) CO3

The possibility of life on Mars has excited the imagination. Among the scientific community, the current thinking is that life may have existed on the earth's ruddy planetary neighbour a long time ago. Understanding this will enrich our studies of evolution and nurture of life outside the earth. The recent NASA mission, Mars 2020, that was launched from Cape Canaveral, Florida on July 30, 2020, landed on the Jezero Crater in Mars on February 18, to much celebration. Of special magnificence was the entry, descent and landing of the mission's Perseverance rover, described as the 'shortest and most intense part'. Entering the Martian atmosphere at about 20,000 km per hour, the mission had to bring the Perseverance rover to a halt on the surface in just seven minutes. Also, since it takes 11 minutes for a radio signal to reach the earth from Mars, the mission control could not really guide the landing, and the rover had to complete this process by itself. During the complicated landing process, using a camera eye, the rover checked the ground below to avoid hazardous terrain, all in a few breathtaking minutes.

UNIT – III

6. (a) Make these sentences meaningful by using ***'a, an or the'***: (7M) CO3

He told me that he once met _____ alien from _____ space. This alien didn't need _____ oxygen to live; it didn't have _____ nose. That's _____ hard story to believe. I'm not sure he was telling me _____ truth. Maybe he isn't so honest, after all. The stress can make_____ life unpleasant.

(b) Complete the sentences using appropriate prepositions *(by, in, on or with).* (7M) CO3

(i) Have you ever been bitten _____ a dog?
(ii) We managed to put the fire out _____ a fire extinguisher.

(iii) Who's that man standing _____ the window?
(iv) Do you travel much _____ bus?
(v) We travelled _____ my friend's car because it is larger and more comfortable than mine.
(vi) It was only _____ accident that I discovered the error.
(vii) These pictures were taken _____ a very good camera.

(OR)

7. (a) Complete the sentences using the given words (in the correct form): (7M) CO3
(crawl, cry, explode, get, happen, lie, put, ride, say, slam, stand, tell).

(i) The bus stopped at the bus stop but I didn't see anybody _____ off.
(ii) I saw two people _____ outside your house. I don't know who they were.
(iii) I thought I heard somebody 'Hi', _____ so I turned round.
(iv) Listen. Can you hear a baby _____?
(v) I know you took the key. I saw you _____ it in your pocket.
(vi) We listened to the old man _____ his story from beginning to end.
(vii) Everybody heard the bomb _____. It was a tremendous noise.

(b) Mark the appropriate verb choice for each of the following sentences. (7M) CO3

(i) The players or their coach _____ (is, are) holding a press conference.
(ii) Neither of the students _____ (has, have) been to Europe.
(iii) The problems _____ (was, were) due to a misunderstanding.
(iv) Which _____ (is, are) more interesting, the red jackets or the blue sweaters?
(v) _____ (Has, Have) the manager or the assistant manager approached you?
(vi) Joan, as well as my sister, _____ (is, are) in college now.
(vii) Several of the students _____ (has, have) left.

UNIT – IV

8. (a) Write a descriptive paragraph in about 100 words on 'Personal Digital Assistants – PDAs role in a Student's life'. (7M) CO4

(b) Write an expository essay in about 200-300 words on 'The amount of time spent in sports and physical exercise should be increased in every individual's life to safeguard the health'. (7M) CO4

(OR)

UNIT – IV

8. (a) Construct a narrative and meaningful paragraph in about 100-150 words on 'one of your recent adventures'. (7M) CO4

   (b) Write an expository essay in about 200-300 words on 'The prevention of health problems and illness is more important than treatment and medicine'. (7M) CO4

(OR)

9. (a) Read the given passage and make effective notes using the Mind-Mapping Method.

Experts throughout both the developing and developed world have debated whether the advent of sophisticated modern technology such as mobile phones, laptops and iPad have helped to enhance and improve people's social lives or whether the opposite has become the case. Personally, I strongly advocate the former view. This essay will discuss both sides using examples from the UK government and Oxford University to demonstrate points and prove arguments.

On the one hand there is ample, powerful, almost daily evidence that such technology can be detrimental especially to the younger generation who are more easily affected by it's addictive nature and which can result in people feeling more isolated from the society. The central reason behind this is twofold, firstly, the invention of online social media sites and apps, such as Twitter and Facebook have reduced crucial face-to-face interactions dramatically. Through use of these appealing and attractive mediums, people feel in touch and connected yet lack key social skills and the ability to communicate.

Secondly, dependence on such devices is built up frighteningly easily which may have a damaging effect on mental health and encourage a sedentary lifestyle. For example, recent scientific research by the UK government demonstrated that 90% of people in their 30s spend over 20 hours per week on Messenger and similar applications to chat with their friends instead of meeting up and spending quality time together or doing sport. As a result, it is conclusively clear that these technology advancements have decreased and diminished our real life interactions.

On the other hand, although there are significant downsides to technological developments, its' multifold advantages cannot be denied. This is largely because the popularity of technology such as cellphones allows people to connect freely and easily with no geographical barriers.

(7M) CO4

   (b) Explain how to use Cornell Method to make or take notes effectively. Draft an example 'Cornell Method of Note Making. (7M) CO4

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CE/CH/EC/EE/ME113(R20)

B.TECH. DEGREE EXAMINATION, JULY-2021

Semester I [First Year] (Regular)

ENGLISH FOR COMMUNICATION SKILLS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Improve the following sentences meaningfully:

(a)	A monotheist is a person who believes in all gods.	CO1
(b)	'Declare' is the opposite word of announce.	CO1
(c)	'Theology' is the study of human beings.	CO1
(d)	'Wrathful' is synonym of peaceful.	CO1
(e)	'A proposal' is a detailed descriptions of series of activities.	CO2
(f)	'Respected Sir/Madam' is a wrong salutation of...	CO2
(g)	'aeap' stands for...	CO1
(h)	A précis should have a titles.	CO3
(i)	They has a beautiful house.	CO3
(j)	Ram and Raj are a international starts.	CO3
(k)	A good paragraph have thesis statement.	CO2
(l)	An essay is written in a single paragraph.	CO3
(m)	Note-Making or Note Taking have only one format.	CO4
(n)	'Cornell method' cannot be use to prepare notes.	CO4

UNIT – I

2. (a) Form at least TWO words and construct ONE meaningful sentence using each of the given Prefixes and Suffixes. (i) de- (ii) inter- (iii) over- (iv) non- (v) –ed (vi) –est (vii) –ful (7M) CO1

   (b) Write the meanings of the given One-word Substitutions. (i) Inexplicable (ii) Affidavit (iii) Inn (iv) Spokesman (v) Bureaucracy (vi) Optician (vii) convoy. (7M) CO1

(OR)

3. (a) Construct meaningful words using the given root words: from Latin: (i) ab (ii) audi (iii) bene (iv) fund (v) gen (vi) mis (vii) mit. (7M) CO1

   (b) Write at least TWO synonyms to each of the given words: (i) assurance (ii) bond (iii) command (iv) commitment (v) dictate (vi) advice (vii) gift. (7M) CO1

UNIT – II

4. (a) Write a letter to the Commissioner, Municipal Corporation of your locality discussing the sanitization issues in your area. In your letter discuss... (7M) CO3
(i) who you are (ii) what are the issues (iii) how long the issues remained unresolved.

(b) Develop a proposal on Organizing National-Level Technical Fest for the students of Govt. Schools of the town. The proposal needs to be submitted to the district collector for approval. (7M) CO3

(OR)

5. (a) Draft an email to the Chief Editor, The Hindu, requesting to publish an article on 'Productive and authentic measures to be taken by every individual to overcome Covid-19 pandemic'. (7M) CO3

(b) Analyse the given information and write a précis in one third of the given text. Give an appropriate title. (7M) CO3

The Supreme Court has issued a timely warning to the States against any attempt to clamp down on the dissemination of information about the serious health crisis besetting the country, or calls for help through social media from citizens affected by COVID-19. The comment, obviously in response to the utterly despotic threat issued by U.P. Chief Minister Yogi Adityanath that those "spreading misinformation" or "rumour" would be detained under the National Security Act (NSA) and their property seized, will surely help prevent ill-advised action by the police and the administration to treat appeals concerning shortage of hospital beds, medical oxygen and vital drugs as attempts to bring the government into disrepute. The police in Amethi registered an FIR against a man who appealed on Twitter for an oxygen cylinder for a family member for allegedly circulating a rumour and seeking to cause fear and alarm. Mr.Adityanath appears quite convinced that complaints about oxygen shortage in his State are either imaginary or, worse, malicious, and wants to treat them as attempts to "spoil the atmosphere". While it is entirely in order that the government has directed the police to crack down on the profiteering on medicines in the black market, it is quite a different matter if the administration starts seeing all appeals for help in a grave crisis as nothing more than activities aimed at tarnishing the government's image.

UNIT – III

6. (a) Make these sentences meaningful by using 'a, an or the'. (7M) CO3

I ha_____ uncle who lives in _____ home for _____ elderly. He is _____ honest man. He used to be _____ FBI agent. He once saved _____ one-year-old boy from _____ fire. He has many interesting stories.

(b) Complete the sentences using appropriate prepositions (to, for, etc.). (7M) CO3

(i) We stopped _____ petrol.
(ii) We'll need time _____ make a decision.
(iii) I went to the dentist _____ a check-up.
(iv) He's very old. He needs somebody _____ take care of him.
(v) Can you lend me money _____ a taxi?
(vi) Do you wear glasses _____ reading?
(vii) I put on my glasses _____ read the letter.

(OR)

7. (a) Complete the sentences with the verb in the correct form: (7M) CO3

Tom doesn't have the keys. He _____ them to Lisa. (give)
Tom doesn't have the keys. I saw him _____ them to Lisa. (give)
A car _____ outside our house, and then it drove off again. (stop)
We heard a car _____ outside our house, and then it drove off again. (stop)
Ben gave me the envelope and watched me _____ it. (open)
Ben gave me the envelope and I _____ it. (open)
Sarah is Canadian. I heard her _____ she's from Toronto. (say)

(b) Mark the appropriate verb choice for each of the following sentences. (7M) CO3

(i) The uninterested students _____ (have, has) to leave the class after two warnings.
(ii) Raj is the only one of the students who _____ (have, has) passed the test.
(iii) The longest of the presentations _____ (is, are) the next group.
(iv) The students and their teacher _____ (is, are) travelling to the competition.
(v) Either one of the choices _____ (is, are) going to disrupt the schedule.
(vi) This is the stereo system that _____ (have, has) been purchased most often in our store.
(vii) Nobody _____ (dare, dares) to challenge the teacher when she is wrong.

Hall Ticket Number:

CE114 (R20)

B.TECH. DEGREE EXAMINATION, DECEMBER-2024

Semester I [First Year] (Supplementary)

ENGINEERING MECHANICS

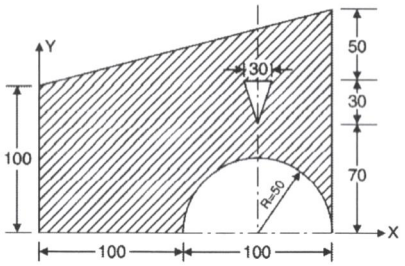
Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) State the principle of transmissibility. CO1
   (b) Distinguish between centroid and centre of gravity. CO1
   (c) What is the centroid of a triangle with respect to base? CO1
   (d) List the assumptions made in the analysis of a simple truss. CO2
   (e) State different types of friction. CO2
   (f) What is the coefficient of friction when heavy truck is at rest? CO2
   (g) Define couple. CO1
   (h) Define unit vector. CO3
   (i) State principle of virtual work. CO3
   (j) What is a redundant truss? CO2
   (k) Define moment of inertia of an area. CO4
   (l) State parallel axis theorem. CO4
   (m) Define rigid body. CO1
   (n) What is the relation between number of members and joints in perfect truss? CO2

UNIT – I

2. (a) State and prove Varignon's theorem. (6M) CO1
   (b) With respect to the coordinate axes x and y locate the centroid of the shaded area shown in figure. (8M) CO1



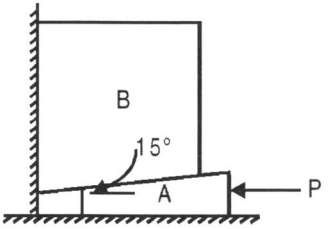
(OR)

3. (a) Explain with examples any five system of forces. (6M) CO1

   (b) Resultant of two forces, one of which is double the other is 260 N. If the direction of the larger force is reversed and the other remains unaltered, the resultant reduces to 180 N. Determine the magnitude of the forces and the angle between the forces. (8M) CO1

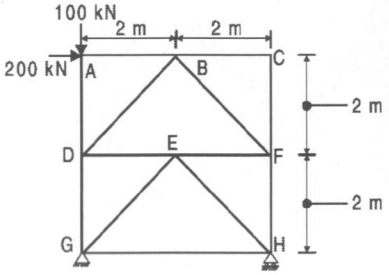
UNIT – II

4. Find the horizontal force P required to push the block A of weight 150 N which carries block B of weight 1280 N as shown in figure. Take angle of limiting friction between floor and block A as 14° and that between vertical wall and block B as 13° and coefficient of limiting friction between the blocks as 0.3 CO2



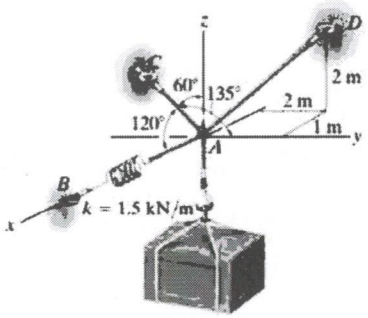
(OR)

5. Find the forces in all the members of truss shown in figure. CO2



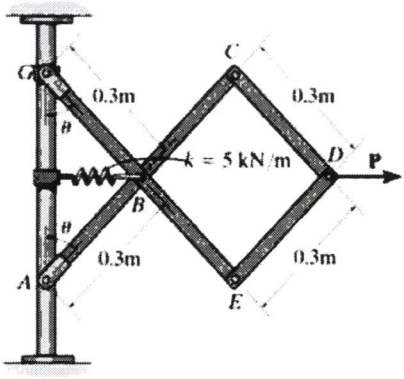
UNIT – III

6. Determine the tensions in each cord used to support the 100 kg crate shown in figure. CO3



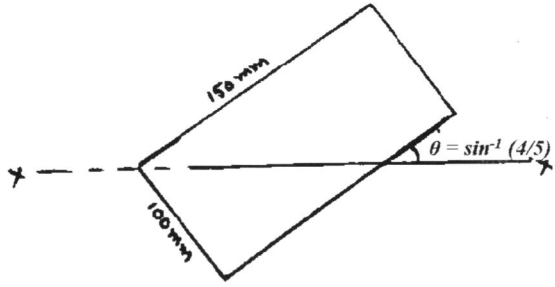
(OR)

7. Determine the required force P, needed to maintain the equilibrium of scissors linkage (shown in figure) when $\theta = 60°$ by the principle virtual work. The spring is unstretched when $\theta = 30°$. Neglect the mass of the links. CO3



UNIT – IV

8. Determine the moment of inertia of the rectangle shown in figure about x-x axis. CO4



(OR)

9. Derive the mass moment of inertia of a sphere of uniform density and radius 'R' about its diametrical axis. CO4

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CE114 (R20)

Hall Ticket Number:

CE114 (R20)

B.TECH. DEGREE EXAMINATION, APRIL-2024

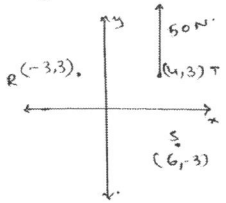
Semester I [First Year] (Supplementary)

ENGINEERING MECHANICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

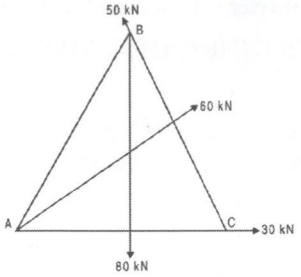
1. Answer the following:
   (a) State Lami's theorem with neat sketch. CO1
   (b) Compute the center of gravity of a semi-circular plate having diameter 66 mm from its base. CO1
   (c) State the varignons theorem of moments. CO1
   (d) Determine moment about point T in the figure below for the forces given CO1



   (e) State the assumptions made in the analysis of plane truss. CO2
   (f) Mention types of friction. CO2
   (g) Evaluate the dot product given in the following expression: {(i.i) + (-i.j) + (-k.k) + (k.i)}.(Ai +Bj + Cz) CO3
   (h) State principle of virtual work. CO3
   (i) What are the static equilibrium elements of concurrent force system in space? CO3
   (j) State perpendicular axis theorem with a neat sketch and specify the necessary equation. CO4
   (k) Write the unit of Area moment of inertia. CO4
   (l) Define mass moment of inertia. CO4
   (m) Define cone of friction. CO2
   (n) What is a rigid body? CO1

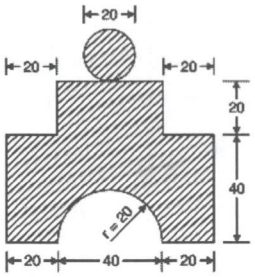
UNIT – I

2. An equilateral triangular plate of side 200 mm is acted by system of forces shown in figure. Compute the resultant force and specify the location of resultant force with respect to point A. CO1



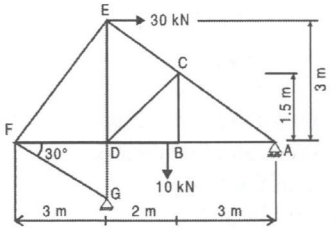
(OR)

3. Determine coordinates of centroid of the figure with respect to a specified coordinate axes. CO1



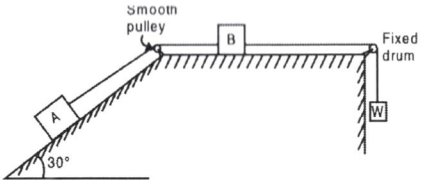
UNIT – II

4. Determine the member forces for the truss shown in figure. Truss is hinged at G and supported on Roller at A. CO2



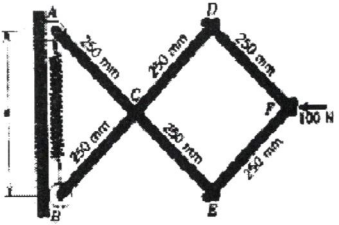
(OR)

5. Compute the minimum and maximum value of W required to move block A and block B respectively. Consider Weight of block A = 3000 N, Weight of block B = 3000 N. Coefficient of friction at all surfaces of contact is 0.2. Assume pulley as smooth. CO2



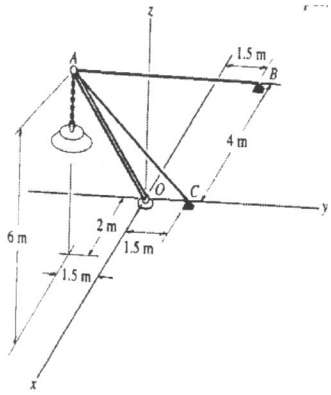
UNIT – III

6. The parallelogram frame is loaded by a horizontal 100 N force. The unstretched length of the spring is 350 mm. Determine the required stiffness k of the spring if s = 400 mm in the static equilibrium position in figure. CO3



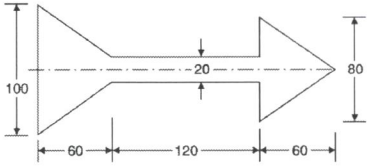
(OR)

7. The lamp is supported by pole AO and cables AB and AC in the position shown in figure. The cables AB and AC can sustain a maximum tension of 500 kN and the pole can support a maximum compression of 300 kN. Determine maximum weight of the lamp that can be supported in the position shown. Assume the force in the pole acts along the axis of the pole CO3



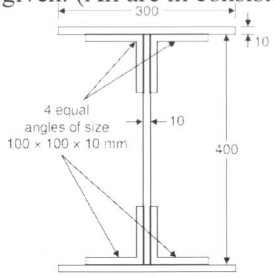
UNIT – IV

8. Determine Moment of inertia of the figure, about its centroidal X-X and Y-Y axes (all measurements shown are in consistent units) CO4



(OR)

9. Compute Moment of inertia about centroidal axes for the composite figure given. (All are in consistent units). CO4



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F-2

Hall Ticket Number:

CE114 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2024

Semester I [First Year] (Regular & Supplementary)

ENGINEERING MECHANICS

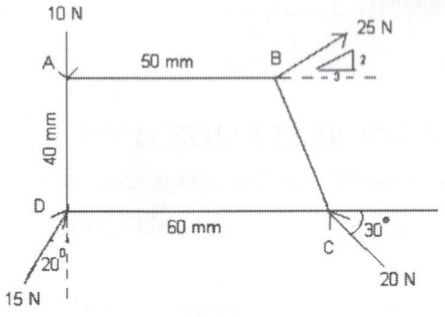
Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define a force. CO1
   (b) State law of transmissibility of forces. CO1
   (c) Define free body diagram. CO1
   (d) What is a deficient truss? CO2
   (e) What is the coefficient of friction when a heavy truck is at rest? CO2
   (f) Give the example of types of loads and beams in your class room. CO2
   (g) Define angle of repose. CO2
   (h) Differentiate moment and couple. CO1
   (i) Can you divide a vector by another vector? CO3
   (j) What is meant by position vector? CO3
   (k) What is the moment of inertia of a semicircle plate with respect to its base? CO4
   (l) Differentiate between virtual work and real work. CO3
   (m) What is the limitation of parallel axis theorem? CO4
   (n) State the relation between moment of inertia and radius of gyration. CO4

UNIT – I

2. Replace the given system of forces acting on a body as shown in the figure by a single force and couple acting at the point A. CO1

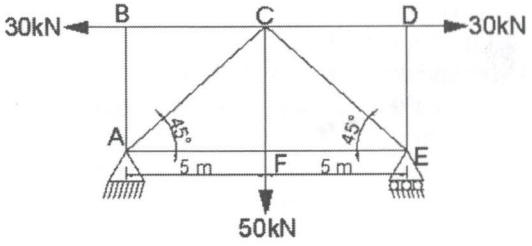


(OR)

3. (a) State and prove Varignon's theorem. (7M) CO1
   (b) State and prove parallelogram law of forces. (7M) CO1

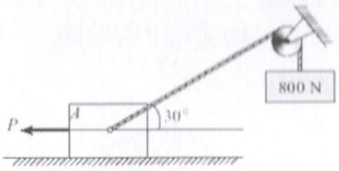
UNIT – II

4. Determine the forces in the members of the truss by method of sections. CO2



(OR)

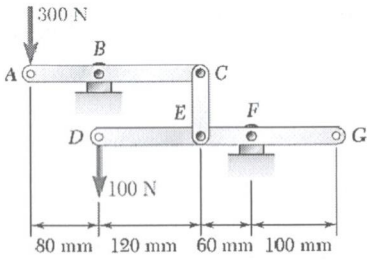
5. (a) The block A shown in figure, weighs 2000 N. The cord attached to A passes over a frictionless pulley and supports a weight equal to 800 N. The value of coefficient friction between A and the horizontal plane is 0.35. Determine the horizontal force P (i) If the motion is impending towards the left (ii) if the motion is impending towards the right. (8M) CO2



(b) What are the advantages and disadvantages of friction in the real life? (6M) CO2

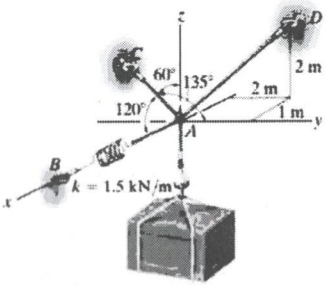
UNIT – III

6. Determine the couple M which must be applied to member DEFG to maintain the equilibrium of the linkage by virtual work method. CO3



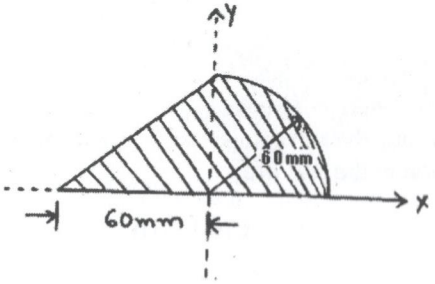
(OR)

7. Determine the tensions in each cord used to support the 100 kg crate shown in figure. CO3



UNIT – IV

8. Find the moment of inertia of the shaded area, as shown in figure about its centroidal axes parallel to x-axis. CO4



(OR)

9. Determine the mass moment of inertia of rectangular plate of width 'b', height 'h' and thickness 't' about its centroidal axes. CO4

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CE114 (R20)

File-2

Hall Ticket Number:

CE114 (R20)

B.TECH. DEGREE EXAMINATION, JUNE-2023

Semester I [First Year] (Supplementary)

ENGINEERING MECHANICS

Time: Three hours | Maximum Marks: 70

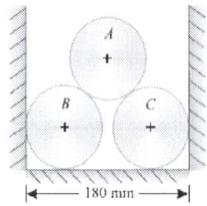
Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

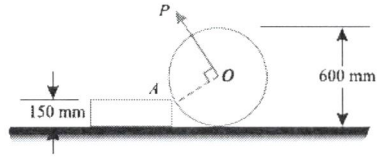
(a)	Give the equations of static equilibrium conditions.	CO1
(b)	What are the characteristics of a force?	CO1
(c)	Differentiate between moment and couple.	CO1
(d)	List the types of parallel forces.	CO2
(e)	List the types friction.	CO2
(f)	Distinguish between centroid and center of gravity.	CO2
(g)	State parallel axis theorem.	CO2
(h)	Give the moment of inertia for a sphere of radius 'R' about its geometrical axis.	CO3
(i)	What is mass moment of inertia?	CO3
(j)	Differentiate between truss and a frame.	CO3
(k)	In which situations method of sections is preferred rather than method of joints?	CO4
(l)	What is angle of friction?	CO4
(m)	What is unit vector?	CO4
(n)	List the assumptions made in the analysis of pin-jointed frame.	CO3

UNIT – I

2. (a) Three cylinders weighing 100 N each and of 80 mm diameter are placed in a channel of 180 mm width as shown in figure. Determine the pressure exerted by (i) the cylinder A on B at the point of contact (ii) the cylinder B on the base and (iii) the cylinder B on the wall. (7M) CO1

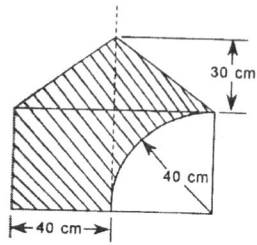


(b) A uniform wheel of 600 mm diameter, weighing 5 kN rests against a rigid rectangular block of 150 mm height as shown in figure. Find the least pull, through the centre of the wheel, required just to turn the wheel over the corner A of the block. Also find the reaction on the block. Take all the surfaces to be smooth. (7M) CO1



(OR)

3. (a) Find the centroid of the shaded area shown in figure. (7M) CO1

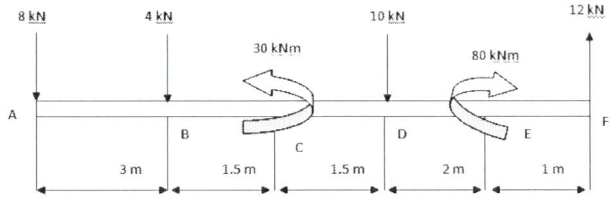


(b) Figure shows a parallel force system of four forces and two couples: (7M) CO1

(i) Replace it by single force and obtain its location from point A

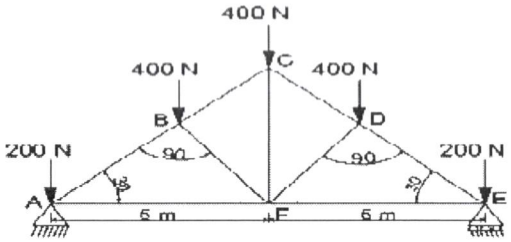
(ii) Replace it by force couple system at point A

(iii) Replace it by a force couple system at point D.



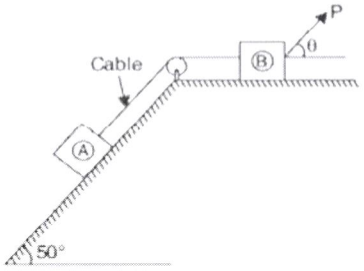
UNIT – II

4. Calculate the forces induced in the members of the pin-jointed truss shown in figure. CO2



(OR)

5. A system consists of two blocks connected by a cable is as shown in figure. The masses of the block A and B are 7.5 kg and 25 kg respectively. Determine the magnitude of minimum force and its inclination with reference to horizontal, to be applied on block B. The block having impending motion towards the right.Take coefficient of friction at all contact surfaces to be 0.28. CO2



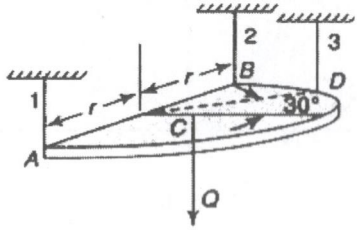
UNIT – III

6. (a) A force F = 2i + 4j – 3k is applied at a point P (1, 1, –2). Find the moment of the force F about the point (2, –1, 2). (7M) CO3

   (b) The lines of action of three forces concurrent at origin O pass respectively through points A,B,C having coordinates (–1, 2, 4), (3, 0, –3) and (2, –2, 4). The magnitude of the forces are F_a = 200 N, F_b = 45 N and F_c = 150 N. Find magnitude and direction of their resultant (7M) CO3

(OR)

7. (a) A homogeneous semicircular plate of weight 'Q' and radius 'r' is supported in a horizontal plane by three vertical strings as shown in figure. Determine the tensile forces S_1, S_2 and S_3 in these strings. (7M) CO3



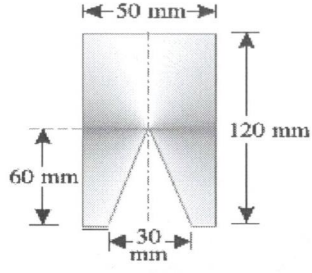
(b) Determine the resultant of a system of concurrent forces having the following magnitude and passing through the origin and indicated points p = 14000 N (12, 6 –4), T = 2600 N (–3, –4, 12), F = 1350 N (6, –3, –6). (7M) CO3

UNIT – IV

8. Determine the mass moment of inertia of a sphere of radius R about centroidal axes. CO4

(OR)

9. Find the moment of inertia of the shaded area as shown in figure about centroidal axes. CO4



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file-2

Hall Ticket Number:

CE114 (R20)

B.TECH. DEGREE EXAMINATION, MARCH-2023

Semester I [First Year] (Regular & Supplementary)

ENGINEERING MECHANICS

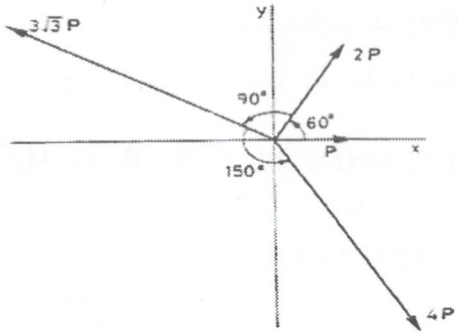
Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) State Lami's theorem. CO1
   (b) Define couple. CO1
   (c) Mention the types of friction. CO2
   (d) What is the centroid of a semi-circle? CO1
   (e) Define polar moment of inertia. CO4
   (f) Define radius of gyration. CO4
   (g) Define angle of friction. CO2
   (h) Mention the types of supports. CO1
   (i) Mention the types of system of forces. CO1
   (j) Define moment of a force about a point in force system in space. CO3
   (k) State principle of virtual work. CO3
   (l) Define mass moment of inertia. CO4
   (m) What is the mass moment inertia of circular plate of radius R and thickness t about its centroidal axis. CO4
   (n) Define cone of friction. CO2

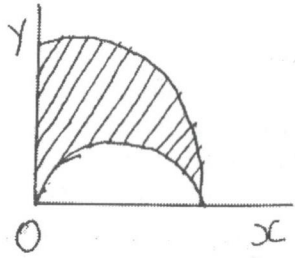
UNIT – I

2. Find the magnitude and direction of the resultant R of four concurrent forces acting as shown in figure. CO1



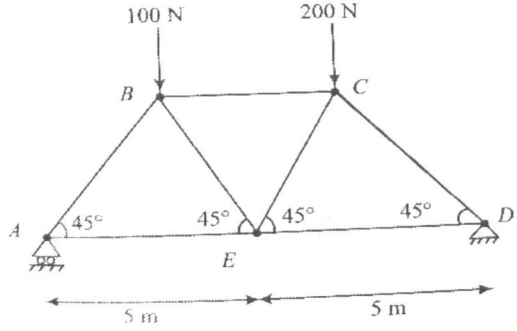
(OR)

3. Locate the centroid of the shaded area obtained by removing a semicircle of diameter 'R' from a quadrant of a circle of radius 'R' shown in figure. CO1



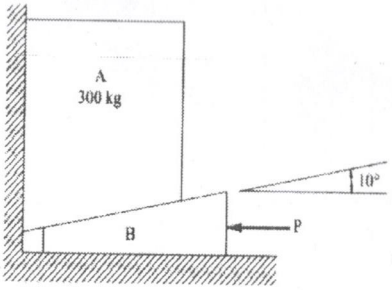
UNIT – II

4. Find the forces in all the members of the truss shown in figure by using method of joints. CO2



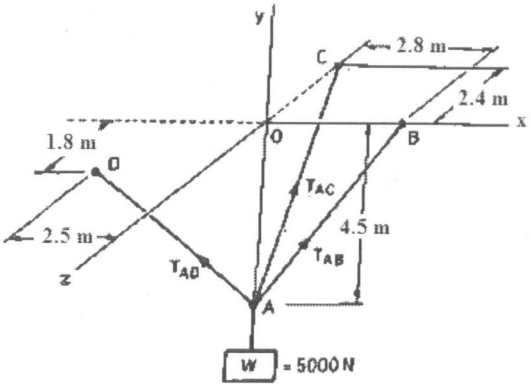
(OR)

5. If the coefficient of static friction equals 0.3 for all surfaces of contact, determine the smallest value of force P necessary to raise the block A. Neglect the weight of the wedge B. CO2



UNIT – III

6. A load W of magnitude 5000 N is supported by three cables. Determine the tension in cables. CO3

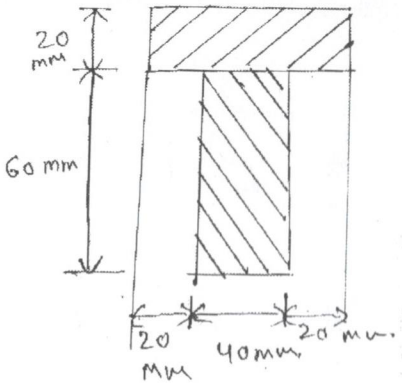


(OR)

7. Explain about principle of virtual work and application of the principle of virtual work. CO3

UNIT – IV

8. Determine the moment of inertia of the area of T-section as shown in figure with respect to the centroidal axes. CO4



(OR)

9. Find the mass moment of inertia of the solid cone of height 'h' and base radius 'R' about its axis of rotation. CO4

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CE114 (R20)

Hall Ticket Number:

file-2

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B.TECH. DEGREE EXAMINATION, MARCH-2022

Semester I [First Year] (Supplementary)

ENGINEERING MECHANICS

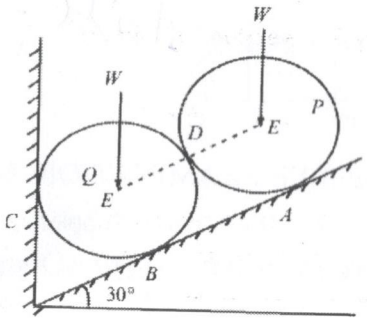
Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Mention the principle of statics. CO1
   (b) Calculate the magnitude of resultant, when two forces of magnitude 56 N and 67 N act an angle of 38^{o} degrees to each other. CO1
   (c) Distinguish between centroid and centre of gravity. CO1
   (d) Distinguish couple and torque. CO2
   (e) Enlist the types of friction. CO2
   (f) Distinguish method of sections and method of joints. CO2
   (g) Define moment of a force. CO2
   (h) Define unit vector. CO3
   (i) Give a clear representation the moment using vector notation CO3
   (j) Define dot product of vector. CO3
   (k) Define polar moment of inertia and state its equation. CO4
   (l) Calculate the radius of gyration of a circular plate of diameter 120 mm. CO4
   (m) State parallel axis theorem. CO4
   (n) What is the unit of mass moment of inertia? CO4

UNIT – I

2. Two cylindrical identical rollers A and B, each of weight W = 500 N are supported by an inclined plane and vertical wall and makes an angle of 30^{0} with the horizontal as shown in figure. Assuming all surfaces to be smooth, determine the reactions at A, B and C. CO1

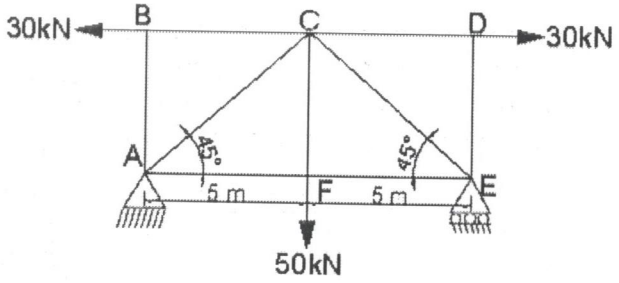


(OR)

3. (a) Define the following with examples: (7M) CO1
   (i) Coplanar and Non-coplanar forces
   (ii) Collinear and Non-collinear forces
   (b) Two forces of magnitude (P+Q) and (P–Q) acting at a point include an angle 2θ. Show that, if their resultant makes an angle α with the bisector of the angle between them, then P tan α = Q tan θ. (7M) CO1

UNIT – II

4. Using method of joints, determine the forces in all the members of a truss shown in figure.

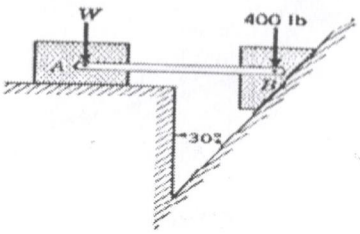


CO2

(OR)

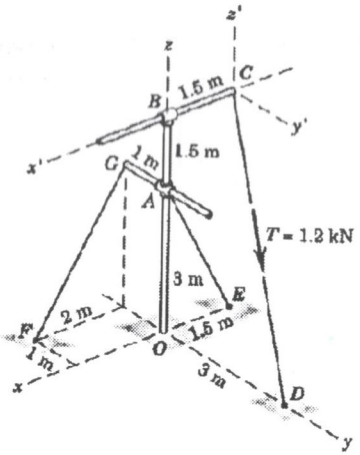
5. Two blocks, connected by a horizontal link AB are supported on two rough planes as shown in figure. The coefficient for friction of block A on the horizontal plane is

$\mu = 0.4$. The angle of friction for block B on the inclined plane is $\mu = 0.15$. What is the smallest weight W of block A for which equilibrium of the system can exist? CO2



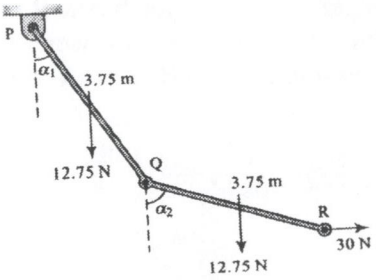
UNIT – III

6. The rigid pole and cross-arm assembly of figure. Determine the vector expression for the moment of the 1.2 kN tension (i) About point O (ii) About the pole z-axis. Find each moment in two different ways. CO3



(OR)

7. Two uniform bars from a link are shown in figure. Bars are of 3.75 m in length and 12.75 N weight. The system is pulled with a force of 30 N. Using method of virtual work, determine the angles α_1 and α_2 with the verticals. CO3

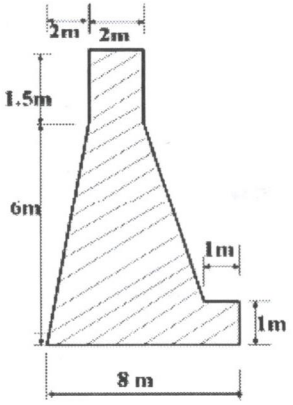


UNIT – IV

8. Determine the mass moment of inertia of right circular cone of mass M, base radius R and height H. CO4

(OR)

9. Determine moment of interia of shaded area as shown in given figure with respect to its base. CO4



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CE114(R20)

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B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester I [First Year] (Supplementary)

ENGINEERING MECHANICS

Time: Three hours

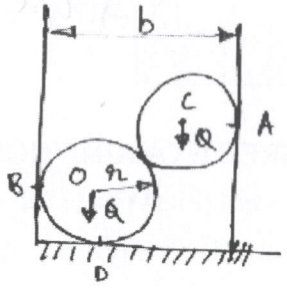
Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) State Parallelogram Law of Forces. CO1
   (b) State Law of Superposition of force. CO1
   (c) Define Moment of a Force. CO1
   (d) What is radius of gyration? CO4
   (e) Define Mass Moment of Inertia. CO4
   (f) State parallel axis theorem. CO4
   (g) What is meant by Perfect Truss? CO2
   (h) Define Kinetic friction. CO2
   (i) Define virtual displacement. CO3
   (j) Define Moment of a force in vector notation for spatial force system. CO3
   (k) Define position vector. CO3
   (l) Write the equations of equilibrium for a concurrent force system in a plane. CO1
   (m) Write the expression for mass moment of Inertia of cone of base radius R and mass M about its axis of rotation. CO4
   (n) Define (i) coefficient of friction (ii) angle of friction. CO2

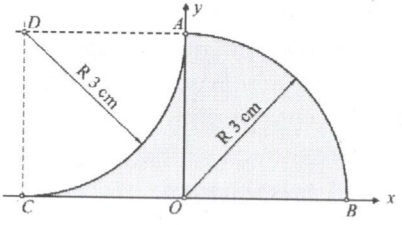
UNIT – I

2. Two smooth spheres, each of radius r and weight Q rest in a horizontal channel having vertical walls, the distance between which is b. Find the pressures exerted on the walls and floor at the points of contact A, B and D. The following numerical data are given: r = 250 mm, b = 900 mm and Q = 450 N. CO1



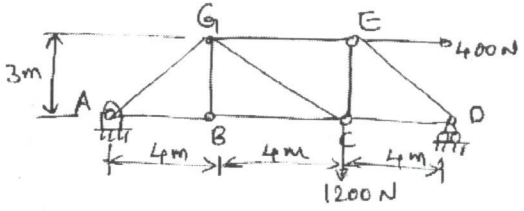
(OR)

3. Find the centroid of the shaded area as shown in figure. CO1



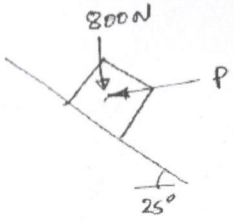
UNIT – II

4. For the truss loaded as shown in figure. Find the force in members GE, GC and BC by method of sections only. CO2



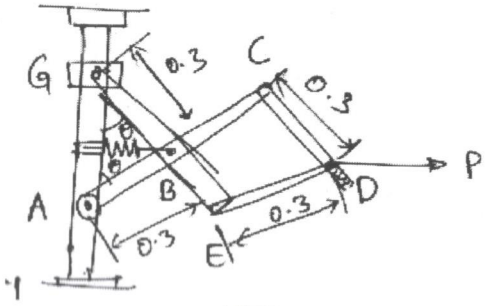
(OR)

5. A support block is acted upon by two forces as shown in figure. Knowing that $\mu_s = 0.35$, $\mu_k = 0.25$. Determine force P required (i) to start block moving up the plane (ii) to keep it moving up (iii) prevent it from sliding down. CO2



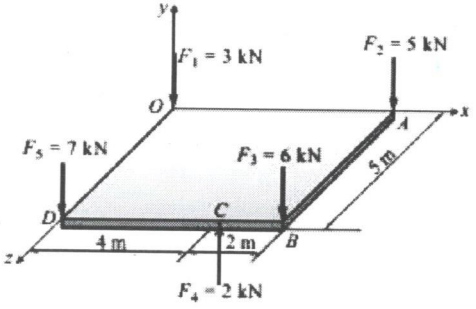
UNIT – III

6. Determine the required force P, needed to maintain equilibrium of scissors linkage when $\theta = 30^{\circ}$, mass of links are neglected. Use principle of virtual work. CO3



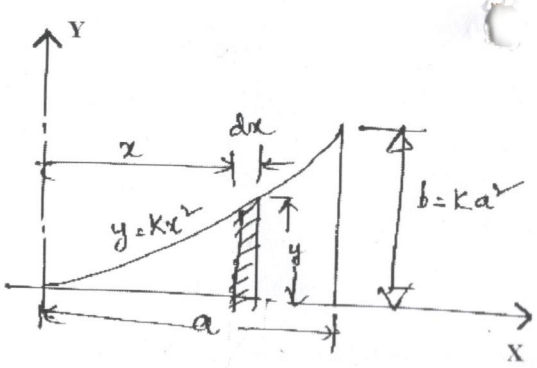
(OR)

7. Five vertical forces are acting on a horizontal plate. Find resultant of the forces and point of application w.r.t. origin. CO3



UNIT – IV

8. Calculate the moment of inertia given area of the area shown figure w.r.t x and y axes. CO4



(OR)

9. Determine the mass moment of inertia of the cylinder of length L and radius R about its vertical axis. Assume the density of the material is constant. CO4

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CE114(R20)

Hall Ticket Number:

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CE114(R20)

B.TECH. DEGREE EXAMINATION, JULY-2021

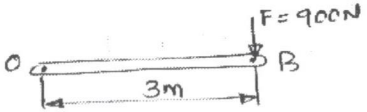
Semester I [First Year] (Regular)

ENGINEERING MECHANICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

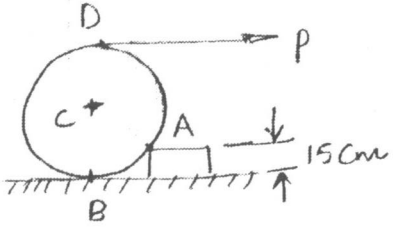
1. Answer the following:
   (a) Define Law of Parallelogram of forces. CO1
   (b) Explain Composition of forces with a simple diagram. CO1
   (c) Define Moment of a force. CO1
   (d) Define unit vector. CO3
   (e) Resolve the force F = 900 N acting at B into a couple and a force at O. CO1



   (f) Mention Degrees of Freedom in various supports used in beams. CO1
   (g) What is the centroid for semicircular area? CO1
   (h) What is meant by virtual work? CO3
   (i) Write down the relation between No. of members (m), No. of joints (j) and number of support reaction components (r) in a perfect truss. CO2
   (j) What is a perfect truss? CO2
   (k) What is imperfect redundant truss? CO2
   (l) Define polar moment of inertia of a plane area. CO4
   (m) State parallel axis theorem for mass moment of Inertia. CO4
   (n) What is the relation between coefficient of friction and angle of friction? CO2

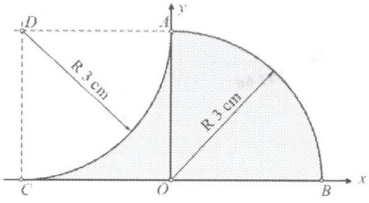
UNIT – I

2. A uniform wheel of 60 cm diameter and weighing 1000 N rest against a rectangular block 15 cm high lying on a horizontal force P applied to the end of the string wound around the circumference of the wheel. Find force P as shown in figure when the wheel is just about to roll over the block. CO1



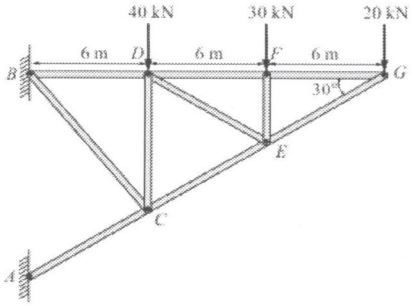
(OR)

3. Find the centroid of the shaded area as shown in figure. CO1



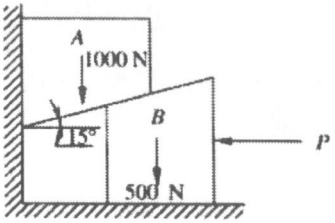
UNIT – II

4. For the truss loaded as shown in figure. Find the force in members DF, DE, CE and EF by method of joints only. CO2



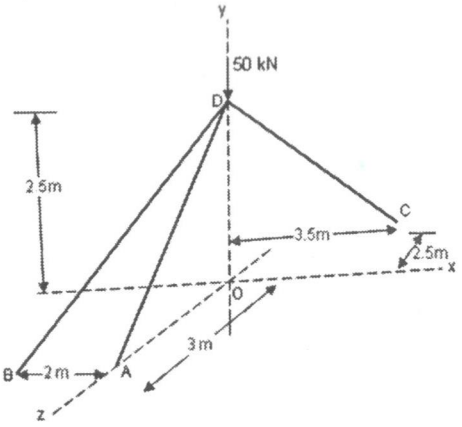
(OR)

5. A block A weighing 1000 N is to be raised by means of a 15° wedge B weighing 500 N. Assuming coefficient of friction between all contact surfaces to be 0.2, determine what minimum horizontal force P should be applied to raise the block shown in figure. CO2



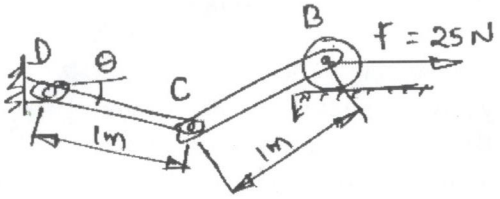
UNIT – III

6. A Tripod carrying a load of 50 kN has its supports A, B and C which are coplanar in x-z lane as shown in figure. Assuming all points to be of ball and socket type, find the forces in the members AD, BD and CD. CO3



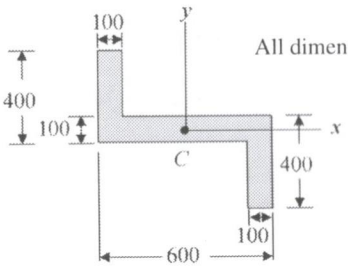
(OR)

7. Determine the angle θ for equilibrium of two-member linkage as shown in figure. Each member has a mass of 10 kg. Use principle of virtual work. CO3



UNIT – IV

8. Determine the moment of inertia of the section shown in figure about the x and y centroidal axis. CO4



(OR)

9. Determine the mass moment of inertia of the cylinder of length L about its vertical axis. The density of the material is constant. CO4

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Hall Ticket Number:

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, SEPTEMBER-2024

Semester II [First Year] (Supplementary)

MATHEMATICS - II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Find the solution of $\frac{dy}{dx} + y = 0$, given that y(0) = 5. CO1
   (b) Find the integrating factor of $xy' + y = x^3y^6$. CO1
   (c) Find the differential equation whose auxiliary equation has the roots 0, -1, -1. CO1
   (d) Write the general form of Legendre's linear equation. CO2
   (e) Find the value of the integral $\int_0^3 \int_0^2 (4 - y)^2 \, dydx$. CO2
   (f) Evaluate $\int_{-1}^{1} \int_0^z \int_1^y dxdydz$. CO2
   (g) State Green's theorem. CO3
   (h) Define circulation. CO3
   (i) State Stokes' theorem CO3
   (j) Give an example for regular function. CO4
   (k) For what values of k the function $2x - x^2 + ky^2$ is harmonic. CO4
   (l) Write Cauchy's integral theorem. CO4
   (m) Find $\int_C \frac{1}{z-a} \, dz$ where C: $|z - a| = r$. CO4
   (n) Define entire function. CO4

UNIT – I

2. (a) Solve: $y \log y \, dx + (x - \log y) \, dy = 0$. (7M) CO1
   (b) Solve: $\tan y \frac{dy}{dx} + \tan x = \cos y \cos^2 x$. (7M) CO1

(OR)

3. (a) Solve: $y'' - 2y' + 2y = x + e^x \cos x$. (7M) CO1

(b) Solve: $x^2 \frac{d^2y}{dx^2} + 5x \frac{dy}{dx} + 4y = x \log x$. (7M) CO1

UNIT – II

4. (a) Evaluate $\int_0^1 \int_x^{\sqrt{x}} xydydx$ by changing the order of integration. (7M) CO2

(b) Evaluate $\iint r \sin\theta \, dr \, d\theta$ over the cardioid $r = a(1 - \cos\theta)$ above the initial line. (7M) CO2

(OR)

5. (a) Find, by double integration, the area lying between the parabola $y = x^2$ and the line $x + y - 2 = 0$. (7M) CO2

(b) Find the volume bounded by the paraboloid $x^2 + y^2 = az$, the cylinder $x^2 + y^2 = 2ay$ and the plane $z = 0$. (7M) CO2

UNIT – III

6. (a) Apply Green's theorem to evaluate $\int_c [(xy + y^2)dx + x^2 dy]$ where c is bounded by $y = x$ and $y = x^2$. (7M) CO3

(b) Evaluate $\int_S F.NdS$, where $F = 18zi - 12j + 3yk$ and S is the portion of the plane $2x + 3y + 6z = 12$ in the first octant. (7M) CO3

(OR)

7. (a) Show that $f(x) = \begin{cases} \frac{z^5}{|z|^4}, & z \neq 0 \\ 0, & z = 0 \end{cases}$ satisfies C-R equations at $z = 0$ but not differentiable at $z = 0$. (7M) CO3

(b) Show that an analytic function of constant absolute value is constant. (7M) CO3

UNIT – IV

8. (a) Find the analytic function $f(z) = u + iv$ when $v = r^2 cos2\theta - r cos\theta + 2$. (7M) CO4

   (b) Show that $u = 4xy - 3x + 2$ is harmonic. Also construct the corresponding analytic function $f(z) = u + iv$ interms of z. (7M) CO4

(OR)

9. (a) Evaluate $\int_0^{2+i} z^2\, dz$ along the imaginary axis 0 to i and then horizontally to 2 + i. (7M) CO4

   (b) Evaluate $\int_C \frac{z^2-z-1}{z(z-1)}\, dz$, where $C: \left|z - \frac{1}{2}\right| = 1$ using Cauchy's integral formula. (7M) CO4

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CE/EC/ME121 (R20)

Hall Ticket Number:

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2024

Semester II [First Year] (Regular)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Write Bernoulli's differential equation.	CO1
(b)	Solve $(D^2 + 1)y = 0$.	CO1
(c)	Write Legendar's linear equation.	CO1
(d)	Change the order of integration $\int_{-a}^{a} \int_{0}^{\sqrt{a^2-y^2}} f(x, y)\, dxdy$	CO2
(e)	Evaluate $\int_{-1}^{1} \int_{-2}^{2} \int_{-3}^{3} dx\, dy\, dz$	CO2
(f)	Evaluate $\int_0^1 \int_0^x e^x\, dxdy$	CO2
(g)	State Green's theorem.	CO3
(h)	State Gauss Divergence theorem.	CO3
(i)	Write C-R equations in polar forms.	CO3
(j)	Give an example of not an analytic function.	CO3
(k)	Define harmonic function.	CO4
(l)	Write Cauchy's integral formula.	CO4
(m)	Evaluate $\int_C \frac{dz}{z+2}$ where C is the circle $\|z\| = 1$.	CO4
(n)	State Cauchy's theorem.	CO4

UNIT – I

2. (a)	Solve $(x + 1)\frac{dy}{dx} - y = e^{3x}(x + 1)^2$	(7M)	CO1
(b)	Solve $(D^2 - 2D + 4)y = e^x \cos x$.	(7M)	CO1

(OR)

3. (a) Solve $(1 + y^2)\,dx = (\tan^{-1} y - x)dy$. (7M) CO1

(b) Using the method of variation of parameters, Solve $\frac{d^2y}{dx^2} + 4y = \tan 2x$ (7M) CO1

UNIT – II

4. (a) Change the order of integration and hence evaluate the double integral $\int_1^2 \int_{x^2}^{2-x} xy\,dxdy$ (7M) CO2

(b) Evaluate the integral $\iiint xy^2z\,dx\,dy\,dz$ taken through the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$. (7M) CO2

(OR)

5. (a) Evaluate $\iint (x^2 + y^2)dx\,dy$ over the area bounded by the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ (7M) CO2

(b) Show that the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is $16a^2/3$ (7M) CO2

UNIT – III

6. Verify Gauss divergence theorem for the vector function $F = y\bar{i} + x\bar{j} + z^2\bar{k}$, over the cylindrical region bounded by $x^2 + y^2 = 9$, $z = 0$ and $z = 2$. CO3

(OR)

7. (a) Applying Green's theorem evaluate $\oint_C ((y - \sin x)dx + \cos x\,dy)$, where C is the plane triangle enclosed by the lines $y = 0$, $x = \frac{\pi}{2}$ and $y = \frac{2}{\pi}x$. (7M) CO3

(b) Construct the analytic function whose real part is $u = e^{-x}[(x^2 - y^2)\cos y + 2xy\sin y]$. (7M) CO3

UNIT – IV

8. (a) Evaluate $\int_c \frac{z^3+z^2+2z-1}{(z-1)^3}\,dz$ where c is the circle $|z| = 3$ using Cauchy's integral formula. (7M) CO4

   (b) Show that the function $u = 2\log(x^2 + y^2)$ is harmonic and find its harmonic conjugate. (7M) CO4

(OR)

9. (a) Using Milne-Thomson's method, find the analytic function f(z) when its real part is $u = e^x[(x^2 - y^2)cosy - 2xysiny]$. (7M) CO4

   (b) Apply Cauchy's theorem to evaluate $\int_c \frac{z^2-z+1}{z-1}\,dz$, where C is the circle $|z| = \frac{1}{2}$. (7M) CO4

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Hall Ticket Number:

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, MAY-2024

Semester II [First Year] (Supplementary)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define the linear differential equation. CO1
   (b) Write conditions for the exact differential equations. CO1
   (c) Write Cauchy's homogeneous linear equation. CO1
   (d) Evaluate $\int_0^1\int_0^1\int_0^1 dxdydz$ CO2
   (e) Evaluate $\int_0^1\int_0^x e^x\,dxdy$ CO2
   (f) Change the order of integration $\int_{x=a}^{x=b}\int_{y=f_1(x)}^{f_2(x)} f(x,y)dy\,dx$. CO2
   (g) State Stoke's theorem. CO3
   (h) State Gauss divergence theorem. CO3
   (i) Write C-R equations. CO3
   (j) Define analytic function. CO3
   (k) State Milne-Thomson method. CO4
   (l) Evaluate $\int_c \frac{z^3}{(z-2)^2}dz$ where C is the circle $|z| = 1$. CO4
   (m) Define harmonic function. CO4
   (n) State Cauchy's integral formula. CO4

UNIT – I

2. (a) Solve $x\frac{dy}{dx} + y = \log x$ (7M) CO1
   (b) Solve $(D^2 - 2D + 4)y = e^x \cos x$. (7M) CO1

(OR)

3. (a) Solve $(xy^2 - e^{1/x^3})\,dx - x^2y\,dy = 0$. (7M) CO1

(b) Using the method of variation of parameters, solve $\frac{d^2y}{dx^2} - 2\frac{dy}{dx} + y = e^x \log x$ (7M) CO1

UNIT – II

4. (a) Evaluate $\int_0^a \int_0^x \int_0^{x+y} e^{(x+y+z)}\,dzdydx$ (7M) CO2

(b) Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xydxdy$ and hence evaluate the same. (7M) CO2

(OR)

5. (a) Show that the area between the parabolas $y^2 = 4ax$ and $x^2 = 4ay$ is $16a^2/3$. (7M) CO2

(b) Find the Volume bounded by the Cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$. (7M) CO2

UNIT – III

6. Verify Stoke's theorem for $F = (x^2 + y^2)\bar{i} - 2xy\bar{j}$ taken around the rectangle bounded by the lines $x = \pm a, y = 0, y = b$. CO3

(OR)

7. (a) Evaluate $\int_c (x^2 + xy)dx + (x^2 + y^2)dy$ where c is the square formed by the lines $y = \pm 1$ and $x = \pm 1$ (7M) CO3

(b) Construct the analytic function whose real part is $u = e^{-x}[(x^2 - y^2)\cos y + 2xy\sin y]$. (7M) CO3

UNIT – IV

8. (a) Using Milne-Thomson's method, find the analytic function f(z) when its real part is $u = e^x\left[(x^2 - y^2)\cos y - 2xy\sin y\right]$. (7M) CO4

   (b) Determine $\oint_C \frac{z^2-z+1}{z-1}\,dz$, Where C is the circle $|z| = 1$. (7M) CO4

(OR)

9. (a) Find the analytic function whose imaginary part is $v = \frac{2sinx\ \sin y}{cos2x + cosh2y}$. (7M) CO4

   (b) Evaluate $\oint_C \frac{z^3+z^2+2z-1}{(z-1)^3}\,dz$, where c is $|z| = 3$ using Cauchy's integral formula. (7M) CO4

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CE/EC/ME121 (R20)

Hall Ticket Number:

F-2

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, NOVEMBER-2023

Semester II [First Year] (Supplementary)

MATHEMATICS - II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Write Bernoulli's equation. CO1
   (b) Define exact differential equation. CO1
   (c) Solve $(D^2 + 1)y = 0$. CO1
   (d) Write Cauchy's homogeneous linear equation of second order. CO1
   (e) Evaluate $\int_0^{\pi} \int_0^{a\sin\theta} r\, dr\, d\theta$. CO2
   (f) Change of order of integration in $\int_0^{\infty} \int_x^{\infty} \frac{e^{-y}}{y}\, dy\, dx$. CO2
   (g) Evaluate $\int_0^1 \int_1^2 \int_2^3 xyz\, dx\, dy\, dz$. CO2
   (h) State Stoke's theorem. CO3
   (i) State Gauss divergence theorem. CO3
   (j) Write C-R equations in cartesian form. CO3
   (k) Define conjugate harmonic function. CO4
   (l) Write Laplace's equation in two dimensions. CO4
   (m) Evaluate $\int_C \frac{dz}{z-a}$ where C: $|z - a| = R$. CO4
   (n) State Cauchy's integral theorem. CO4

UNIT – I

2. (a) Solve $\frac{dy}{dx} + y\tan x = y^2 \sec x$. (7M) CO1
   (b) Solve $x^2ydx - (x^3 + y^3)dy = 0$. (7M) CO1

(OR)

3. (a) Solve $\frac{d^2y}{dx^2}+a^2y=\cos ec\,ax$ using method of variation of parameters. (7M) CO1

(b) Solve $(2x+1)^2y''-6(2x+1)y'+16y=8(2x+1)^2$. (7M) CO1

UNIT – II

4. (a) Evaluate $\int_0^3\int_0^{\sqrt{4-y}}(x+y)dx\,dy$ by changing the order of integration. (7M) CO2

(b) Evaluate $\int_0^a\int_y^a\frac{x}{x^2+y^2}dx\,dy$ by changing to polar coordinates. (7M) CO2

(OR)

5. (a) Using double integration, find the area of a plate in the form of a quadrant of the ellipse $\frac{x^2}{a^2}+\frac{y^2}{b^2}=1$. (7M) CO2

(b) Find, bytriple integration, the volume of the sphere $x^2+y^2+z^2=a^2$. (7M) CO2

UNIT – III

6. Verify Green's theorem for $\int_C(xy+y^2)\,dx+x^2\,dy$, where C is bounded by y = x and $y = x^2$. CO3

(OR)

7. (a) Show that the function f(z) defined by $f(z) = \sqrt{|xy|}$ is not analytic at the origin even though Cauchy-Riemann equations are satisfied at the point. (7M) CO3

(b) Show that an analytic function with constant real part is constant. (7M) CO3

UNIT – IV

8. (a) If f(z) is a regular function of z, Show that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f'(z)|^2$. (7M) CO4

   (b) Applying Milne-Thomson method, construct an analytic function f(z) = u + iv whose real part is $u = e^x \cos y$. (7M) CO4

(OR)

9. (a) Verify Cauchy's theorem by integrating e^{iz} along the boundary of the triangle with the vertices at the points 1 + i, –1 + i and –1 – i. (7M) CO4

   (b) Evaluate, using Cauchy's integral formula $\int_c \frac{z+1}{z^2+2z+4}\,dz$ where c: | z + 1 + i| = 2. (7M) CO4

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Hall Ticket Number:

F-2

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2023

Semester II [First Year] (Regular & Supplementary)

MATHEMATICS - II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define exact differential equation. CO1
   (b) Solve the differential equation $(D^2 - 4D + 13)y = 0$. CO1
   (c) Evaluate $\frac{1}{(D^2-1)}(x^2 + x)$. CO1
   (d) Evaluate $\int_{x=1}^{3}\int_{y=0}^{1} xy^2\,dx\,dy$. CO2
   (e) Calculate $\int\int r^3\,dr\,d\theta$ over the area included between the circles $r = 2\sin\theta$ and $r = 4\sin\theta$. CO2
   (f) Find the limits after changing the order of integration for $\int_0^b \int_0^{a/b\sqrt{b^2-y^2}} f(x,y)\,dx\,dy$. CO2
   (g) If $\bar{r} = \bar{x}i + \bar{y}j + \bar{z}k$ then evaluate $\nabla^2(r^2)$. CO3
   (h) State Gauss divergence theorem. CO3
   (i) Define analytic function. CO3
   (j) Find the analytic function whose real part is xy. CO4
   (k) Find a unit vector normal to the surface $x^3 + y^3 + z^3 + 3xyz = 3$. CO4
   (l) Write Cauchy-Riemann equations in polar form. CO4
   (m) The directional derivative $\phi = xyz$ at the point (1, 1, 1) in the direction of $\hat{\imath}$. CO3
   (n) State Cauchy integral theorem. CO4

UNIT – I

2. (a) Solve $x\cos x\frac{dy}{dx} + y(x\sin x + \cos x) = 1$. (7M) CO1
   (b) Solve $(D^2 - 1)y = x\sin x + x^2e^x$. (7M) CO1

(OR)

3. (a) Solve $\left(y+\frac{y^3}{3}+\frac{x^2}{2}\right)dx+\frac{1}{4}(x+xy^2)dy=0$. (7M) CO1

(b) Solve $(x+1)^2\frac{d^2y}{dx^2}+(x+1)\frac{dy}{dx}+y=2\sin(\log(x+1))$. (7M) CO1

UNIT – II

4. (a) Evaluate $\iint_R xy\,dx\,dy$ where R is the region bounded by x-axis and x = 2a and the curve $x^2=4ay$. (7M) CO2

(b) Evaluate $\iint r\sin\theta\,dr\,d\theta$ over the cardioids $r=a(1-\cos\theta)$ above the initial line. (7M) CO2

(OR)

5. (a) Change the order of integration in the integral and hence evaluate it $\int_0^1\int_{\sqrt{y}}^{2-y}xy\,dx\,dy$. (7M) CO2

(b) Evaluate $\int_0^\infty\int_0^\infty e^{-(x^2+y^2)}\,dx\,dy$ by changing into polar coordinates. (7M) CO2

UNIT – III

6. (a) Find the directional derivative of the function $f=x^2+y^2+2z^2$ at the point P (1, 2, 3) in the direction of the line PQ where Q is the point (5, 0, 4). (7M) CO3

(b) Define curl of a vector function and show that $A=(x^2+xy^2)i+(y^2+x^2y)j$ is irrotational. (7M) CO3

(OR)

7. (a) Find the analytic function f(z) = u (r, θ), + iv (r, θ), when $v(r,\theta)=r^2\cos2\theta-r\cos\theta+2$. (7M) CO3

(b) Show that the real part of an analytic function f(z) = u + iv is harmonic. (7M) CO3

UNIT – IV

8. (a) If f (z) = u + iv is an analytic function of z and if u − v = $e^x(\cos y - \sin y)$ find f(z) in terms of z. (7M) CO4

   (b) If $f(z)$ is a regular function of z, prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|f(z)|^2 = 4|f'(z)|^2$ (7M) CO4

(OR)

9. (a) Evaluate $\int_C (y - x - 3x^2 i)dz$, where c consists of the line segments from z = 0 to z = i and the other from z = i to z = 1+ i. (7M) CO4

   (b) Integrate by Cauchy's integral formula $\frac{z^2}{z^2-1}$ counter clockwise around the circle $|z + 1 - i| = \frac{\pi}{2}$. (7M) CO4

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Hall Ticket Number:

file-2

CE/EC/ME121 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2023

Semester II [First Year] (Supplementary)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a) Find the integrating factor of $\frac{dy}{dx} + 2xy = e^{-x^2}$ CO1

(b) Find the complementary function of $\frac{d^2y}{dx^2} + 4y = 0$ CO1

(c) Solve $(D^2 + 16)\, y = 0$. CO1

(d) Evaluate $\int_0^2 \int_0^{x^2} y\, dx\, dy$ CO2

(e) Find the value of the integral $\int_0^{\pi} \int_0^{x} x \sin y\, dx\, dy$ CO2

(f) Transform $\int_0^a \int_0^{\sqrt{a^2-x^2}} (x^2 + y^2)\, dx\, dy$ to polar coordinates. CO2

(g) Define irrotational vector. CO3

(h) State Green's theorem. CO3

(i) Show that the function $f(z) = xy + iy$ is everywhere continuous but is not analytic. CO3

(j) State the necessary and sufficient conditions for a function $f(z)$ to be analytic. CO4

(k) Define Harmonic function. CO4

(l) Evaluate $\oint_C \frac{z^2+4}{z-3} dz$ where C is the circle $|z| = 5$. CO4

(m) If $\bar{r} = x\hat{\imath} + y\hat{\jmath} + z\hat{k}$ is position vector, then the value of $\nabla(\log r)$. CO3

(n) Find the harmonic conjugate of $u = x^3 - 3xy^2$. CO4

UNIT – I

2. (a) Solve $(1 + y^2)dx = (\tan^{-1} y - x)dy$ (7M) CO1
   (b) Solve $(D^2 + 1)y = \sec x$. (7M) CO1

(OR)

3. (a) Solve $(1 + xy + x^2y^2)ydx + (x^2y^2 - xy + 1)xdy = 0$ (7M) CO1
   (b) Solve$(x^2D^2 - 3xD + 1)y = \frac{\log x \sin(\log x)+1}{x}$ (7M) CO1

UNIT – II

4. (a) Evaluate $\int_0^a \int_y^a \frac{x}{x^2+y^2}\, dx\, dy$ by transforming into polar coordinates. (7M) CO2
   (b) Evaluate $\int\int\int xyz\, dx\, dy\, dz$ over the positive octant of the sphere $x^2 + y^2 + z^2 = a^2$. (7M) CO2

(OR)

5. (a) Change the order of integration in $\int_0^1 \int_x^{\sqrt{x}} xy\, dx\, dy$ and hence evaluate the integral. (7M) CO2
   (b) Evaluate $\int\int r^3\, dr\, d\theta$ over the area included between the circles $r = 2\sin\theta$ and $r = 4\sin\theta$. (7M) CO2

UNIT – III

6. (a) Find the angle of intersection of the spheres $x^2 + y^2 + z^2 = 39$ and $x^2 + y^2 + z^2 + 4x - 6y - 8z + 52 = 0$ at the point (4, -3, 2) (7M) CO3
   (b) Prove that the function $f(z) = \sqrt{xy}$is not analytic at the origin even though the C-R equations are satisfied there at. (7M) CO3

(OR)

7. State and verify Gauss divergence theorem for $\bar{f} = (x^3 - yz)i - 2x^2yj + zk$ taken over the surface of the cube bounded by the planes $x = y = z = a$ and coordinate planes CO3

UNIT – IV

8. (a) If u(x, y)and v(x, y)are harmonic functions in a region R, prove that the function $\left(\frac{\partial u}{\partial y} - \frac{\partial v}{\partial x}\right) + i\left(\frac{\partial u}{\partial x} + \frac{\partial v}{\partial y}\right)$ is an analytic function. (7M) CO4

(b) Find the value of 'p', if the function $f(z) = \frac{1}{2}\log(x^2 + y^2) + i\tan^{-1}\left(\frac{px}{y}\right)$ is analytic. (7M) CO4

(OR)

9. (a) Evaluate $\oint_C \frac{e^z dz}{(z+1)^2}$, where C is the circle $|z - 3| = 3$ (7M) CO4

(b) Evaluate $\oint_C \frac{(2z+1)^2 dz}{z^8(4z^3+z)}$ over a unit circle C. (7M) CO4

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file-2

Hall Ticket Number:

CE/EC/ME121(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2022

Semester II [First Year] (Regular & Supplementary)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Write Linear differential equation of first order in y. CO1
   (b) Write the condition for exact differential equation. CO1
   (c) Solve $\frac{ydx - xdy}{x^2 + y^2} = 0$ CO1
   (d) Solve $(D-2)^2 y = 0$ CO1
   (e) Evaluate $\int_0^1 \int_x^{\sqrt{x}} xy\, dy\, dx$ CO2
   (f) Change of order of integration in CO2
   $$\int_{-a}^{a} \int_{0}^{\sqrt{a^2-y^2}} f(x,y)\, dx\, dy$$
   (g) Evaluate $\int_0^1 \int_0^2 \int_0^3 xyz\, dz\, dy\, dx$ CO2
   (h) State Green's theorem in a plane. CO3
   (i) Evaluate $\int_c \bar{r}.d\bar{r}$ where $\bar{r} = x\bar{i} + y\bar{j} + z\bar{k}$ CO3
   (j) Define analytic function. CO3
   (k) Write the formula for $f'(z)$ when $f(z) = u(x,y) + iv(x,y)$. CO3
   (l) Define Harmonic function. CO4

(m) Evaluate $\int_c z^2\,dz$ where c is the straight line from $z = 0$ to $z = 2 + i$. CO4

(n) State Cauchy's integral formula. CO4

UNIT – I

2. (a) Solve $(x+y+1)\frac{dy}{dx}=1$. (7M) CO1

(b) Solve $2xydy-\left(x^2+y^2+1\right)dx=0$. (7M) CO1

(OR)

3. (a) Solve $y''-6y'+9y=\frac{e^{3x}}{x^2}$ using method of variation of parameters. (7M) CO1

(b) Solve $x^2y''+xy'+9y=\sin\left(3\log x\right)$. (7M) CO1

UNIT – II

4. (a) By changing the order of integration, evaluate $\int_0^{16}\int_{\sqrt{x}}^{4}\cos y^3\,dy\,dx$. (7M) CO2

(b) Evaluate $\int_0^a\int_0^{\sqrt{a^2-x^2}} e^{-\left(x^2+y^2\right)}\,dy\,dx$ by changing to polar coordinates. (7M) CO2

(OR)

5. (a) Find the area lying inside the cardioid $r=a(1+\cos\theta)$ and outside the circle $r=a$. (7M) CO2

(b) Evaluate $\int_{-1}^{1}\int_0^z\int_{x-z}^{x+z}(x+y+z)\,dy\,dx\,dz$. (7M) CO2

UNIT – III

6. Verify Gauss divergence theorem for the field $\overline{F} = x^3\overline{i} + y^3\overline{j} + z^3\overline{k}$ taken over the cube bounded by $0 \le x \le a,\ 0 \le y \le a,\ 0 \le z \le a$. CO3

(OR)

7. (a) Show that the function $f(z)$ defined by $f(z) = \begin{cases} \dfrac{xy^2(x+iy)}{x^2+y^4}, & z \neq 0 \\ 0, & z = 0 \end{cases}$ is not analytic at the origin. (7M) CO3

   (b) Determine p such that $f(z) = \frac{1}{2}\log\left(x^2+y^2\right) + i\tan^{-1}\left(\frac{px}{y}\right)$ be an analytic function. (7M) CO3

UNIT – IV

8. (a) If $f(z)$ is an analytic function with constant modulus, show that $f(z)$ is constant. (7M) CO4

   (b) Show that the function $u = \frac{1}{2}\log(x^2+y^2)$ is harmonic and find its harmonic conjugate. (7M) CO4

(OR)

9. (a) Verify Cauchy's theorem for the function $f(z) = 3z^2 + iz - 4$ if c is the square with vertices at $1 \pm i$ and $-1 \pm i$. (7M) CO4

   (b) Evaluate $\int_c \frac{\log z}{(z-1)^3} dz$ where $c : |z-1| = 1/2$ using Cauchy's integral formula. (7M) CO4

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Hall Ticket Number:

file-2

CE/EC/ME121(R20)

B.TECH. DEGREE EXAMINATION, FEBRUARY-2022

Semester II [First Year] (Supplementary)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Write Bernoulli's equation. CO1
   (b) Determine whether $y(1+xy)dx+(4y-x)dy=0$ is exact or not. CO1
   (c) Solve $(D^2+1)\,y=0$. CO1
   (d) Find the integrating factor for $\cos^2 x\frac{dy}{dx}+y=\tan x$ CO1
   (e) Evaluate $\int_1^2\int_1^3 xy^2\,dxdy$ CO2
   (f) Evaluate $\int_0^{\pi}\int_0^{a\sin\theta} r\,dr\,d\theta$ CO2
   (g) Evaluate $\int_1^2\int_1^3\int_1^4 xy^2 z\,dxdydz$ CO2
   (h) Change the following integral into polar form $\int_0^{2a\sqrt{2ax-x^2}}\int_0^{} dxdy$ CO2
   (i) State Gauss divergence theorem. CO3
   (j) If S is a closed surface enclosing a volume V and if $\mathbf{R}=x\mathbf{i}+y\mathbf{j}+z\mathbf{k}$ then write the value of $\int_S R.N\,ds$ CO3
   (k) Write C-R equations in polar form. CO3

(l) Define Harmonic function. CO4

(m) Evaluate $\int_0^{2+i} \bar{z}\, dz$ along the line $y = x / 2$. CO4

(n) State Cauchy's integral formula. CO4

UNIT – I

2. (a) Solve $\frac{dx}{dy} - \frac{x}{y} = 2y^2$. (7M) CO1

(b) Solve $(x^2y - 2xy^2)\, dx - (x^3 - 3x^2y)\, dy = 0$. (7M) CO1

(OR)

3. (a) Using method of variation of parameters solve $y'' + 4y = \tan 2x$. (7M) CO1

(b) Solve $x^2y'' + xy' + y = \log x \sin(\log x)$. (7M) CO1

UNIT – II

4. (a) Evaluate $\int_0^1 \int_{e^x}^{e} \frac{dxdy}{\log y}$ by changing the order of integration. (7M) CO2

(b) Evaluate $\int_0^{\infty} \int_0^{\infty} e^{-(x^2+y^2)} dxdy$ by changing to polar coordinates. (7M) CO2

(OR)

5. (a) Find the area lying between the parabola $y = 4x - x^2$ and the line $y = x$. (7M) CO2

(b) Find the volume bounded by the xy-plane, the cylinder $x^2 + y^2 = 1$ and the plane $x + y + z = 3$. (7M) CO2

UNIT – III

6. Verify Green's theorem for $\int_C [(3x - 8y^2)dx + (4y - 6xy)dy]$ where C is the boundary of the region bounded by x = 0, y = 0 and x + y = 1. CO3

(OR)

7. (a) If w = logz, find dw/dz and determine where w is non-analytic. (7M) CO3

   (b) Show that $\frac{\partial^2 u}{\partial r^2} + \frac{1}{r}\frac{\partial u}{\partial r} + \frac{1}{r^2}\frac{\partial^2 u}{\partial \theta^2} = 0$ (7M) CO3

UNIT – IV

8. (a) Find the analytic function f(z), whose real part is sin2x / (cosh2y – cos2x). (7M) CO4

   (b) Find the harmonic conjugate of $v(r,\theta) = r^2 \cos 2\theta - r\cos\theta + 2$. (7M) CO4

(OR)

9. (a) Evaluate $\int_C (z - z^2)dz$ where C is the upper half of the circle |z| = 1. (7M) CO4

   (b) Evaluate $f(2)$ and $f(3)$ where $f(a) = \int_C \frac{2z^2 - z - 2}{z - a}dz$ and C is |z| = 2.5 (7M) CO4

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file-2

Hall Ticket Number:

CE/EC/ME121(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester II [First Year] (Regular)

MATHEMATICS-II

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Write the Leibnitz's form of linear equation. CO1
   (b) Find the integrating for the differential equation $(x^2y - 2xy^2)dx - (x^3 - 3x^2y)dy = 0$ CO1
   (c) Solve $(D^2 + 2D + 5)y = 0$ CO1
   (d) Write the general form of Cauchy's equation. CO1
   (e) Change the order of integration in $\int_0^1 \int_{x^2}^{2-x} xy\,dy\,dx$ CO2
   (f) Evaluate $\int_0^5 \int_0^{x^2} xy\,dy\,dx$ CO2
   (g) Evaluate $\int_0^3 \int_0^2 \int_0^1 xyz\,dz\,dx\,dy$ CO2
   (h) State Stokes' theorem. CO3
   (i) State Gauss divergence theorem. CO3
   (j) Write C-R equations. CO3
   (k) Define Harmonic function. CO4
   (l) State Milne Thomson method. CO4
   (m) State Cauchy's theorem. CO4
   (n) Evaluate $\oint_C \frac{Sin\,z}{\left(z - \frac{\pi}{3}\right)^4} dz$ where C is the circle $|z| = 1$ CO4

UNIT – I

2. (a) Solve $\cosh x\frac{dy}{dx}+y\sinh x=2\cosh^2 x\sinh x$ (7M) CO1

   (b) Solve $(D^2-4)y=x\cosh x$ (7M) CO1

(OR)

3. (a) Solve $(2x^3y^2+4x^2y+2xy^2+xy^4+2y)dx+2(y^3+x^2y+x)dy=0$ (7M) CO1

   (b) Solve $(D^2+1)y = cosec\ x$ (7M) CO1

UNIT – II

4. (a) Change the order of integration in $I=\int_0^{4a}\int_{x^2/4a}^{2\sqrt{ax}}dydx$ and hence evaluate. (7M) CO2

   (b) Find the volume bounded by the cylinder $x^2 + y^2 = 4$ and the planes $y + z = 4$ and $z = 0$. (7M) CO2

(OR)

5. (a) Find the area lying inside the circle $r = a \sin\theta$ and outside the cardioid $r = a(1 - \cos\theta)$. (7M) CO2

   (b) Find the volume of the tetrahedron bounded by the coordinate planes and the plane $\frac{x}{a}+\frac{y}{b}+\frac{z}{c}=1$. (7M) CO2

UNIT – III

6. Verify Stoke's theorem for the vector field $\bar{F}=(x^2-y^2)\bar{i}+2xy\,\bar{j}$ over the box bounded by the planes $x = 0$, $x = a$, $y = 0$, $y = b$, $z = 0$, $z = c$ if the face $z = 0$ is cut. CO3

(OR)

7. (a) Show that the function $f(z)=\sqrt{|xy|}$ is not analytic at the origin even though Cauchy Riemann equations are satisfied thereof. (7M) CO3

(b) If $f(z)$ is an analytic function of z, then prove that $\left(\frac{\partial^2}{\partial x^2}+\frac{\partial^2}{\partial y^2}\right)|\text{Re}.f(z)|^2 = 2|f'(z)|^2$ (7M) CO3

UNIT – IV

8. (a) Determine the analytic function whose real part is $e^x\left[(x^2-y^2)\cos y - 2xy\sin y\right]$ (7M) CO4

   (b) Evaluate $\oint_C \frac{e^z}{z^2+\pi^2}dz$ where C is $|z| = 3.5$ (7M) CO4

(OR)

9. (a) Find the analytic function $f(z) = u + iv$ if $u - v = (x-y)(x^2+4xy+y^2)$ (7M) CO4

   (b) Evaluate $\oint_C \frac{e^{2z}}{(z+1)(z-2)}dz$ where C is $|z| = 2.5$ (7M) CO4

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Hall Ticket Number:

CE122 (R20)

B.TECH. DEGREE EXAMINATION, SEPTEMBER-2024

Semester II [First Year] (Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Mention examples of central forces.	CO1
(b)	Define gravitational potential energy.	CO1
(c)	Define Newton's law of inertia.	CO1
(d)	State critical damping oscillations.	CO2
(e)	Mention different kinds of damping oscillations.	CO2
(f)	Mention any two properties of a rigid body.	CO2
(g)	Mention any two examples of resonance.	CO3
(h)	State law of conservation of angular momentum.	CO3
(i)	Define a tensor quantity.	CO3
(j)	State Hooke's law.	CO4
(k)	State rolling friction.	CO4
(l)	State elasticity.	CO4
(m)	Mention difference between cartesian and spherical coordinate system.	CO4
(n)	State Centrifugal force with expression.	CO4

UNIT – I

2. (a) Show that F = - grad (V) and mention some suitable examples. (7M) CO1

   (b) Make a short note on equipotential surfaces with properties. (7M) CO1

(OR)

3. (a) Explain Centripetal and Coriolis forces with examples. (7M) CO1
   (b) Deduce an expression for Central force and mention its properties. (7M) CO1

UNIT – II

4. (a) Explain under damping oscillations with its condition. (7M) CO2
   (b) Define harmonic oscillator and also explain power dissipations in a damped harmonic oscillator. (7M) CO2

(OR)

5. (a) Make a short notes on (7M) CO2
   (i) Quality factor
   (ii) Forced oscillations
   (b) Distinguish the Over, Critical and Under damped oscillations with its conditions. (7M) CO2

UNIT – III

6. (a) Explain and deduce Euler's laws of motion. (7M) CO3
   (b) Derive angular momentum of a body rotating about a fixed axis and mention its examples. (7M) CO3

(OR)

7. (a) Define moment of inertia and explain inertia theorem. (7M) CO3
   (b) Describe the three-dimensional rigid body motion with neat diagram. (7M) CO3

UNIT – IV

8. (a) Describe Torsion pendulum and deduce expression for rigidity modulus. (7M) CO4

(b) Explain different types of bending with diagrams and examples. (7M) CO4

(OR)

9. (a) State friction and explain different types of frictions with diagrams. (7M) CO4

(b) Describe three kinds of moduli and deduce relation between them. (7M) CO4

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CE122 (R20)

Hall Ticket Number:

CE122 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2024

Semester II [First Year] (Regular)

ENGINEERING PHYSICS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	State Scalar and Vector quantities.	CO1
(b)	Define conservative force with examples.	CO1
(c)	State quality factor.	CO1
(d)	Define Resonance.	CO2
(e)	State angular momentum.	CO2
(f)	Define Moment of inertia.	CO2
(g)	Mention types of Frictions with examples.	CO3
(h)	State Poisson's ratio.	CO3
(i)	Define static friction.	CO3
(j)	State Rigid body.	CO4
(k)	Define harmonic oscillator.	CO4
(l)	Define centripetal force.	CO4
(m)	Define rigidity of modulus (n).	CO4
(n)	Define forced oscillations.	CO4

UNIT – I

2. (a) State Newton's second law. Describe the particle motion using Newton's laws of motion. (7M) CO1

   (b) Describe the Cartesian and spherical coordinate system. (7M) CO1

(OR)

3. (a) Explain Conservative and non-conservative forces with examples. (7M) CO1

(b) Explain construction and working of Foucault's pendulum. (7M) CO1

UNIT – II

4. (a) State Damped harmonic oscillator and deduce its equation. (7M) CO2
   (b) Give a short note on Over and Critical damping oscillations. (7M) CO2

(OR)

5. (a) Explain the energy dissipations in a damped harmonic oscillator. (7M) CO2
   (b) Explain Under damping oscillations (7M) CO2

UNIT – III

6. (a) Make a short note on translational and rotational motion of a rigid body. (7M) CO3
   (b) Deduce an expression for moment of inertia. (7M) CO3

(OR)

7. (a) Explain Euler's laws of motion. (7M) CO3
   (b) Describe the Moment of inertia tensor in matrix form. (7M) CO3

UNIT – IV

8. (a) Explain different types of frictions with limitations. (7M) CO4
   (b) Make a short note on Plasticity and Elasticity. (7M) CO4

(OR)

9. (a) Elucidate Stress and Strain concepts. (7M) CO4
   (b) Explain Uniform and Non-uniform bending with examples. (7M) CO4

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Hall Ticket Number:

CE122 (R20)

B.TECH. DEGREE EXAMINATION, MAY-2024

Semester II [First Year] (Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) State the law of conservation of angular momentum. CO1
   (b) Define central forces. CO1
   (c) Compare conservative and non-conservative force. CO1
   (d) Define forced oscillations. CO2
   (e) Recite harmonic oscillators. CO2
   (f) What is power dissipation in a damped harmonic oscillator? CO2
   (g) Find the angular velocity of a body which has completed 60 rotations per minute. CO3
   (h) Define rigid body. CO3
   (i) Recall moment of inertia. CO3
   (j) State parallel axes theorem of moment of inertia. CO4
   (k) Summarize the law of limiting friction. CO4
   (l) State Hooke's law. CO4
   (m) Tell the three modulus of elasticity. CO4
   (n) What is meant by bending of beams? CO4

UNIT – I

2. (a) State Newton's law of motion. How it is useful in describing the motion of a particle. (10M) CO1
   (b) Show the relation between cartesian coordinates and spherical polar coordinates. (4M) CO1

(OR)

3. (a) What is coriolis force? (2M) CO1
   (b) How a Foucault pendulum is used to detect the rotation of the earth about its axis. (12M) CO1

UNIT – II

4. (a) Recall damped harmonic oscillator. (2M) CO2
   (b) Formulate a differential equation for a damped harmonic motion and hence arrive at its solution. (12M) CO2

(OR)

5. Develop the differential equation of a particle subjected to forced vibrations and hence deduce a solution for it. CO2

UNIT – III

6. (a) State and prove perpendicular axes theorem. (10M) CO3
   (b) Discuss Euler's laws of motion. (4M) CO3

(OR)

7. (a) Apply the angular momentum of a particle to derive moment of inertia tensor. (10M) CO3
   (b) List any four properties of moment of inertia tensor. (4M) CO3

UNIT – IV

8. (a) Make use of stress-strain curve to discuss the behaviour of a material under loading. (10M) CO4
   (b) Define the terms: elasticity and plasticity. (4M) CO4

(OR)

9. (a) What is a torsional pendulum? (2M) CO4
   (b) Derive an expression for the rigidity modulus of a given wire. (12M) CO4

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Hall Ticket Number:

F-2

CE122 (R20)

B.TECH. DEGREE EXAMINATION, NOVEMBER-2023

Semester II [First Year] (Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Identify the fundamental forces in nature. CO1
   (b) Identify the symmetry operations under Newton's laws are invariant. CO1
   (c) What are central forces? CO1
   (d) Examine the equipotential surfaces? CO1
   (e) What is meant by simple harmonic motion? CO2
   (f) Interpret the relaxation time in damped harmonic oscillator. CO2
   (g) What is meant by logarithmic decrement in damped harmonic oscillator? CO2
   (h) What is a rigid body? CO3
   (i) Discover the use of parallel axis theorem. CO3
   (j) Define angular momentum of a rotating body. CO3
   (k) Define longitudinal stress. CO4
   (l) Identify the meaning of bending moment. CO4
   (m) State Hooke's Law. CO4
   (n) Define Poisson's ratio. CO4

UNIT – I

2. (a) Differentiate conservative from non-conservative forces? (7M) CO1
   (b) Show that for conservative force, F = -Grad U. (U = potential energy). (7M) CO1

(OR)

3. (a) What are plane polar coordinates? Develop an expression for velocity and acceleration of a particle in plane polar coordinates. (7M) CO1
   (b) Analyse cylindrical and spherical coordinates. (7M) CO1

UNIT – II

4. (a) Formulate the differential equation of damped harmonic oscillator and deduce its solution (7M) CO2
   (b) Analyse damped oscillations in under-damped condition. (7M) CO2

(OR)

5. (a) Construct the differential equation for forced harmonic oscillator and obtain its solution. (7M) CO2
   (b) The differential equation for a certain system is $\frac{d^2x}{dt^2} + 2b\frac{dx}{dt} + \omega^2 x = 0$. If $\omega \gg b$, evaluate the time in which amplitude falls to 1/e times of its initial value. (7M) CO2

UNIT – III

6. (a) Define angular momentum a rotating body. Show that $\tau = I\alpha$ for rigid body undergoing rotational motion. (7M) CO3
   (b) Develop the Euler's equations of rotational motion for a rigid body fixed at one end. (7M) CO3

(OR)

7. (a) Create the matrix form of moment of inertia tensor. (7M) CO3
   (b) Analyse the properties of moment of inertia tensor. (7M) CO3

UNIT – IV

8. (a) State laws of friction. Explain angle of limiting friction and angle of repose. (7M) CO4
   (b) Explain the stress-strain diagram for an elastic body. (7M) CO4

(OR)

9. (a) Explain the three moduli of elasticity. (7M) CO4
   (b) Analyse the method for determining the Young's modulus of the material of the beam by uniform bending. (7M) CO4

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F-2

Hall Ticket Number:

CE122 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2023

Semester II [First Year] (Regular & Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Specify Cartesian coordinate system and give its importance. CO1
   (b) Express the relation between angular momentum and linear momentum. CO1
   (c) Why soldiers do not march on bridges? Explain phenomenon in it? CO2
   (d) Write expression for quality factor of a mechanical oscillator. CO2
   (e) What are damped harmonic oscillations? Give one example. CO2
   (f) State parallel axis theorem. CO3
   (g) State Euler's first law of motion. CO3
   (h) Compare the kinetic energy of a body in linear and rotational motion. CO3
   (i) If mass of body is increased by 3 times, then what happens to coefficient of friction? CO4
   (j) State the units and dimensions of modulus of elasticity. CO4
   (k) What are brittle materials? Give two examples. CO4
   (l) Define Poisson's ratio. CO4
   (m) What is Coriolis force? CO1
   (n) Differentiate forced vibrations and free vibrations. CO2

UNIT – I

2. (a) What are conservative and non-conservative forces and show that F = –grad(U) for conservative forces. (7M) CO1
   (b) Describe Foucault pendulum and give its importance. (7M) CO1

(OR)

3. (a) Write a short note on conservation of angular momentum. (6M) CO1
   (b) Interpret various fundamental forces in nature. (8M) CO1

UNIT – II

4. (a) Outline the theory of damped harmonic oscillations clearly by analyzing under damped, critically damped and over damped cases. (10M) CO2
   (b) A quality factor of sonometer wire is 2000. On plucking it makes 240 vibrations per second. Calculate the time in which amplitude decreases to half of its initial value. (4M) CO2

(OR)

5. (a) Explain resonance in detail and write a note on its importance. (6M) CO2
   (b) Discuss the energy decay in damped harmonic oscillator? Write about power dissipation? (8M) CO2

UNIT – III

6. (a) What is rigid body and brief the three-dimensional rigid body motion. (7M) CO3
   (b) State and derive perpendicular axis theorem. (7M) CO3

(OR)

7. (a) Analyze the properties of moment of inertia tensor. (8M) CO3
   (b) State and explain Euler's second law of motion and give its importance. (6M) CO3

UNIT – IV

8. (a) Elaborate the various moduli of elasticity and write their importance. (6M) CO4
   (b) State and explain Hook's law? Describe the stress-strain diagram for an elastic body. (8M) CO4

(OR)

9. (a) What is limiting friction and state laws of limiting friction? (7M) CO4
   (b) Describe the concept of stress and strain at a point with example. (7M) CO4

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file-2

Hall Ticket Number:

CE122 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2023

Semester II [First Year] (Supplementary)

ENGINEERING PHYSICS

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define conservative forces and give example. CO1
   (b) Why Foucault pendulum does not work at equator. CO1
   (c) A mechanical oscillator is changed from air to water. What happens to tis Quality factor? CO2
   (d) What is resonance? Give one example for it. CO2
   (e) Write expression for power dissipation in damped harmonic oscillations. CO2
   (f) Obtain the angular displacement of seconds hand in clock in 45 seconds. CO3
   (g) Express any two equations of motion for a particle rotating about fixed axis. CO3
   (h) State perpendicular axis theorem. CO3
   (i) What it is Euler's second law of motion? CO3
   (j) State the units and dimensions of modulus of rigidity. CO4
   (k) Mention the theoretical and practical limits of Poisson's ratio. CO4
   (l) What are Ductile materials? Give two examples? CO4
   (m) What are symmetry operations? CO1
   (n) Differentiate harmonic and damped harmonic oscillations. CO2

UNIT – I

2. (a) Explain cylindrical coordinate system and obtain expression for acceleration of particle in this system. (8M) CO1
   (b) Describe central forces in detail with example. (6M) CO1

(OR)

3. (a) What is Coriolis force? Derive expression for it. (7M) CO1
   (b) Elaborate Newton laws of motion in describing particle motion. (7M) CO1

UNIT – II

4. (a) What are damped oscillations? Solve differential equation of a damped harmonic oscillator and discuss the case when it is under damped and critically damped? (9M) CO2
   (b) Formulate the equation for energy dissipation in oscillator. (5M) CO2

(OR)

5. (a) Obtain differential equation for forced harmonic oscillator and deduce its solution. (7M) CO2
   (b) Show that for simple harmonic oscillator, mechanical energy remains constant and is proportional to square of amplitude. (7M) CO2

UNIT – III

6. (a) State and explain parallel axis theorem in detail. (8M) CO3
   (b) Write a short note on moment of inertia tensor. (6M) CO3

(OR)

7. (a) Define angular momentum and derive expression for it for a body rotating in fixed axis. (7M) CO3
   (b) What is rigid body and describe its motion in translational and rotational motion in detail. (7M) CO3

UNIT – IV

8. (a) Describe the phenomenon of plasticity and elasticity with examples. (7M) CO4
   (b) State and explain Hook's law? Describe the stress-strain curve for a wire under increasing load with neat diagram. (7M) CO4

(OR)

9. (a) What are various methods to decrease friction? Find the normal force applied on a body having a coefficient of friction of 0.5 and limiting friction is 50 N. (7M) CO4
   (b) Discuss the torsional oscillations and derive expression for rigidity modulus of wire using torsional pendulum. (7M) CO4

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file-2

Hall Ticket Number:

CE122(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2022

Semester II [First Year] (Regular & Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Summarize Newton's laws of motion. CO1
   (b) Outline one application of Foucault pendulum. CO1
   (c) List all forces available in nature. CO1
   (d) Distinguish free and forced oscillations. CO2
   (e) Recite harmonic oscillators. CO2
   (f) What is energy dissipation in a damped harmonic oscillator? CO2
   (g) Find the angular velocity of a body which has completed 60 rotations per minute. CO3
   (h) Recall expression for Euler's equation of motion. CO3
   (i) Write a formula for moment of inertia tensor. CO3
   (j) Tell parallel axes theorem of moment of inertia. CO3
   (k) Summarize the law of limiting friction. CO4
   (l) What is Poisson's ratio? CO4
   (m) Define the rigidity modulus of a material. CO4
   (n) Show stress-strain curve for a brittle material. CO4

UNIT – I

2. (a) Distinguish conservative and non-conservative force. Derive relation between a conservative force and a potential energy function. (8M) CO1
   (b) Outline centripetal and coriolis force. (6M) CO1

(OR)

3. Formulate expressions for velocity and acceleration of a particle in planar polar coordinates. CO1

UNIT – II

4. (a) Recall the differential equation of a damped harmonic oscillator. (2M) CO2
   (b) Explain the conditions under which the oscillations are said to be under damped, over damped and critically damped. (12M) CO2

(OR)

5. Develop the differential equation of a particle subjected to forced vibrations and hence deduce a solution for it. CO2

UNIT – III

6. (a) Develop the matrix form of inertial tensor. (10M) CO3
   (b) Summarize the properties of inertial tensor. (4M) CO3

(OR)

7. (a) Formulate the expression for the angular momentum of a body rotating about a fixed axis. (7M) CO3
   (b) State and prove the perpendicular axes theorem. (7M) CO3

UNIT – IV

8. (a) Make use of stress-strain curve to discuss the behaviour of a material under loading. (10M) CO4
   (b) Define the terms elasticity and plasticity. (4M) CO4

(OR)

9. (a) Discuss bending of beams and derive an expression for it. (10M) CO4

(b) Compare uniform and non-uniform bending. (4M) CO4

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CE122(R20)

Hall Ticket Number:

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CE122(R20)

B.TECH. DEGREE EXAMINATION, FEBRUARY-2022

Semester II [First Year] (Supplementary)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	What is a vector field?	CO1
(b)	What are symmetry operations?	CO1
(c)	What is meant by equipotential surface?	CO1
(d)	Explain the significance of Foucault's pendulum.	CO2
(e)	What is simple harmonic motion?	CO2
(f)	What is meant by logarithmic decrement in damped harmonic oscillator?	CO2
(g)	What is meant by restoring force?	CO2
(h)	Define radian.	CO3
(i)	Differentiate translational and rotational motions.	CO3
(j)	State the parallel axis theorem.	CO3
(k)	What is meant by bending moment?	CO3
(l)	What is meant by coefficient of friction?	CO4
(m)	Compare plasticity and elasticity.	CO4
(n)	Define Poisson's ratio.	CO4

UNIT – I

2. (a) Discuss the types of fundamental forces in nature. (7M) CO1

   (b) Differentiate the conservative and non-conservative forces? Show that for conservative force, F= – Grad U. (U = potential energy). (7M) CO1

(OR)

3. (a) Derive the expressions for velocity and acceleration of a particle in plane polar coordinates. (7M) CO1
   (b) Derive the expression for centripetal force. What is its significance? (7M) CO1

UNIT – II

4. (a) Obtain the equation of motion for damped harmonic oscillator and find out its solution. (7M) CO2
   (b) Discuss various damping conditions. (7M) CO2

(OR)

5. (a) Set up the equation of motion for forced harmonic oscillator and obtain its solution. (7M) CO2
   (b) Discuss the amplitude resonance of a forced harmonic oscillator. (7M) CO2

UNIT – III

6. (a) Define angular momentum. Derive an expression for angular momentum of a body rotating about a fixed axis. (7M) CO3
   (b) State and prove perpendicular axis theorem. (7M) CO3

(OR)

7. (a) What is Euler's laws of motion? Describe the three-dimensional rigid body motion. (7M) CO3
   (b) Obtain the expression for angular velocity of a rotating rigid body. (7M) CO3

UNIT – IV

8. (a) Explain the law of limiting friction. (7M) CO4
   (b) Discuss the Stress-Strain diagram for an elastic body. (7M) CO4

(OR)

9. (a) Discuss the three moduli of elasticity. (7M) CO4
   (b) Describe the determination of rigidity modulus of the material of a wire. (7M) CO4

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Hall Ticket Number:

file-2

CE122(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester II [First Year] (Regular)

ENGINEERING PHYSICS

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	What are symmetry operations?	CO1
(b)	Mention the forces in nature.	CO1
(c)	What is meant by equipotential surfaces?	CO1
(d)	Explain the significance of Foucault's pendulum.	CO2
(e)	What is simple harmonic motion?	CO2
(f)	Define relaxation time in damped harmonic oscillator.	CO2
(g)	What is meant by quality factor?	CO3
(h)	Define radian.	CO3
(i)	Differentiate translational and rotational motions.	CO3
(j)	State the parallel axis theorem.	CO3
(k)	State Hooke's law.	CO4
(l)	What is meant by coefficient of friction?	CO4
(m)	Compare plasticity and elasticity.	CO4
(n)	Define Poisson's ratio.	CO4

UNIT – I

2. (a) Discuss the transformation of scalars and vectors under rotation. (7M) CO1
   (b) Describe the Newton's laws and its completeness in describing particle motion. (7M) CO1

(OR)

3. (a) Differentiate conservative and non-conservative forces. Define central force, giving examples. (7M) CO1
   (b) Derive the expression for Coriolis force. Explain its significance. (7M) CO1

UNIT – II

4. (a) Formulate the equation of motion for damped harmonic oscillator and find out its solution. (7M) CO2
   (b) Discuss various damping conditions of a damped harmonic oscillator. (7M) CO2

(OR)

5. (a) Set up the equation of motion for forced harmonic oscillator and obtain its solution. (7M) CO2
   (b) What is meant by resonance? Discuss the concept of amplitude resonance. (7M) CO2

UNIT – III

6. (a) Define angular momentum. Derive an expression for angular momentum of a body rotating about a fixed axis. (7M) CO3
   (b) State and prove perpendicular axis theorem. (7M) CO3

(OR)

7. (a) What are Euler's laws of motion? Describe the three-dimensional rigid body motion. (7M) CO3
   (b) Obtain the expression for angular velocity of a rotating rigid body. (7M) CO3

UNIT – IV

8. (a) Explain the concept of stress and strain at a point. (7M) CO4
   (b) Discuss the Stress-Strain diagram for an elastic body. (7M) CO4

(OR)

9. (a) Discuss about bending of beams. Compare uniform and non-uniform bending. (7M) CO4

   (b) Using torsion pendulum, explain the determination of rigidity modulus of the material of a wire. (7M) CO4

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CE122(R20)

Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, SEPTEMBER-2024

Semester II [First Year] (Supplementary)

SOLID MECHANICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Define shear stress.	CO1
(b)	State Hooke's law.	CO1
(c)	Define Bulk modulus of elasticity.	CO1
(d)	What types of stresses induced in thin walled cylindrical pressure vessel?	CO2
(e)	Define factor of safety.	CO1
(f)	Define point of contra flexure.	CO3
(g)	Mentions types of supports for a beam.	CO3
(h)	Write bending equation.	CO4
(i)	State assumptions made in the theory of simple bending.	CO4
(j)	Write flexural formula.	CO4
(k)	Write the formula for power transmitted by solid circular shaft.	CO5
(l)	What is shear flow?	CO4
(m)	Sketch the shear stress distribution in T-section beam.	CO4
(n)	Define torsional rigidity.	CO5

UNIT – I

2. (a) A solid uniform metal bar of diameter D and length L is hanging vertically from its upper end. Obtain the total elongation of the bar due to its own weight if γ is the specific weight and E is the young's modulus of the material of the bar. (7M) CO1

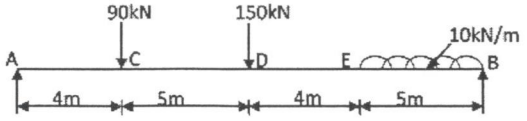
   (b) A rod of steel is 20 m long at a temperature of 20°C. Find the free expansion of the rod when the temperature is raised to 65°C. Find the temperature stress produced (i) when the expansion of the rod is prevented (ii) when the rod is permitted to expand by 5.8 mm. Consider $\alpha = 12 \times 10^{-6}$/°C and $E = 2 \times 10^5$ N/mm^2. (7M) CO1

(OR)

3. Derive the relationship between Modulus of elasticity, Modulus of rigidity and Bulk modulus. CO1

UNIT – II

4. Draw shear force and bending moment diagrams for the beam shown in figure for the given loading system. CO2



(OR)

5. A beam AB 10 m long has supports at its ends A and B. It carries a point load of 8 kN at 3 m from A and a point load of 5 kN at 7 m from A and a uniformly distributed load of 4 kN/m between the point loads. Draw the SF and BM diagrams for the beam. CO2

UNIT – III

6. (a) A proposed beam of a I section of 10 m, 600 mm deep and 200 mm wide has a flange 20 mm thick and web 15 mm thick. It carries a uniformly distributed load of 80 kN/m over the whole span. Find the extreme bending stress for the section and state if the stress is permissible. Safe stress in bending is 160 N/mm^2. (8M) CO3

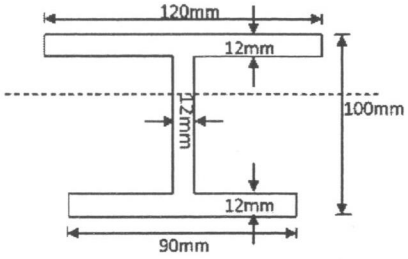
   (b) For the above problem 6 (a) if the stress is not permissible, find the width of a 15 mm thick cover plate for each flange for the section to be safe. Find also the length of this cover plate. (6M) CO3

(OR)

7. Analyze a beam of I section has top and bottom flanges 175 mm x 125 mm and web of size 300 x12 mm. It is used as a simply supported beam over a span of 4 m to carry a uniformly distributed load of 85 kN/m over its entire span. Draw the bending stress at centre of the beam. CO3

UNIT – IV

8. Analyze the beam having a cross-section as shown in figure. If the shear force acting on this is 150 kN, Draw the shear stress distribution diagram across the depth. CO4



(OR)

9. A hollow shaft of diameter ratio 3/5 is to transmit 450 kW at 120 rpm with uniform twisting moment. The shearing stress in the shaft must not exceed 60 N/mm^2 and the twist in a length of 2.5 m must not exceed 1°. Calculate the minimum external diameter of the shaft satisfying these conditions. Consider modulus of rigidity $C = 8 \times 10^4$ N/mm^2. CO4

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CE123 (R20)

Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2024

Semester II [First Year] (Regular)

SOLID MECHANICS-I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What do you mean by 'a bar of uniform strength'? CO1
   (b) Why a uniaxial tensile member fails at a lower stress than at the ultimate stress? CO1
   (c) Name the different elastic constants. Give the relationship among the elastic constants. CO1
   (d) What is point of contraflexure? CO2
   (e) What are the different loading types that generally act on a beam? CO2
   (f) Explain the terms: Sagging bending moment and Hogging bending moment. CO2
   (g) What are the assumptions of beam theory? CO3
   (h) What is the meaning of 'Strength of a section'? CO3
   (i) How would you find the bending stress in unsymmetrical section? CO3
   (j) A rectangular section of a beam is subjected to a bending moment M and a shear force F. Why bending stresses are maximum at extreme layer while shear stress is zero at these layers? CO4
   (k) Sketch the typical variation of shear stress across the depth of I-section, showing the position of maximum shear stress. CO4
   (l) Define torsional rigidity. CO4
   (m) Write the expression for torque transmitted by a solid shaft when subjected to torsion. CO4
   (n) State the assumptions of torsion theory of circular shaft. CO4

UNIT – I

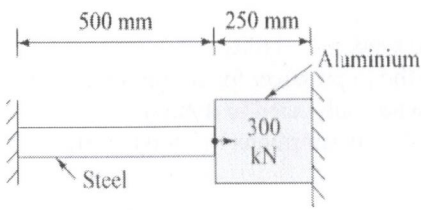
2. (a) From a tensile test, following information is available within elastic limit. A tensile load of 54 kN produces an elongation of 0.112 mm for a specimen with gauge length 300 mm. The initial diameter of the rod specimen was 30 mm and after the application of the load, it gets reduced by 0.00366 mm. Find out Poisson's ratio and values of the three elastic moduli. (7M) CO1

   (b) Draw the stress-strain diagram of a mild steel specimen subjected to tension and explain the salient features. (7M) CO1

(OR)

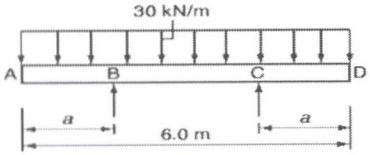
3. (a) A cylindrical pressure vessel has internal diameter 1.2 m and plate thickness of 12 mm. Find out the maximum internal pressure it can sustain so that neither circumferential nor longitudinal nor radial stress exceed 140 MPa. Also find out the maximum internal pressure that a spherical pressure vessel with same external diameter and thickness can withstand. (7M) CO1

   (b) Determine the stresses induced in aluminium and steel portions of the composite bar due to a force of 300 kN applied at the junction as shown in figure. The cross-sectional areas of steel and aluminium are 1250 mm^2 and 2500 mm^2, respectively. Modulus of elasticity of steel and aluminium are 210 GPa and 70 GPa, respectively. (7M) CO1



UNIT – II

4. A beam 6 m long rests on two supports with equal overhangs on either side and carries a uniformly distributed load of 30 kN/m over the entire length of the beam as shown in figure. Calculate the overhangs if the maximum positive and negative bending moments are to be same. Draw the shear force and bending moment diagrams and locate the salient points. CO2



(OR)

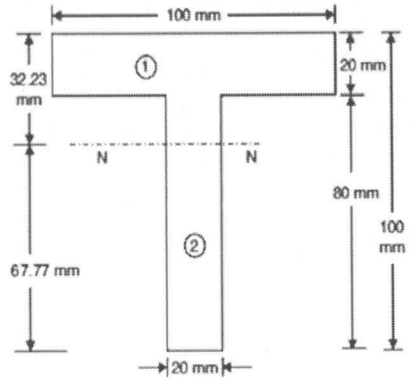
5. A beam ABCDE is 12 m long, simply supported at points B and D. Spans AB = DE = 2 m are overhanging and BC = CD = 4 m. The beam supports a uniformly distributed load of 10 kN/m over AB and 20 kN/m over CD. In addition, it also supports concentrated load of 10 kN at E and a clockwise moment of 16 kNm at point C. Sketch the bending moment and shear force diagrams. CO2

UNIT – III

6. Two circular beams where one is solid of diameter D and other is a hollow of outer diameter D_o and inner diameter D_i, are of the same length, same material and of same weight. Find the ratio of section modulus of these circular beams. CO3

(OR)

7. A cast iron beam is of T-section as shown in figure. The beam is simply supported on a span of 8 m. The beam carries a uniformly distributed load of 1.5 kN/m length on the entire span. Determine the maximum tensile and maximum compressive stresses. CO3



UNIT – IV

8. A solid steel shaft subjected to a torque of 80 kN-m. If the angle of twist is 6^{o} per meter length of the shaft and the shears stress is not to exceed 100 MPa, find (i) suitable diameter of shaft (ii) final maximum shear stress (iii) maximum shear strain in the shaft. Take G = 80 GPa. CO4

(OR)

9. (a) An I-section beam 350 mm × 150 mm has a web thickness of 10 mm and a flange thickness of 20 mm. If the shear force acting on the section is 40 kN, find the maximum shear stress developed in the I-section. (7M) CO4

   (b) A rectangular beam 100 mm wide and 250 mm deep is subjected to a maximum shear force of 50 kN. Determine: (7M) CO4

   (i) Average shear stress, Maximum shear stress, and

   (ii) Shear stress at a distance of 25 mm above the neutral axis.

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CE123 (R20)

Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, MAY-2024

Semester II [First Year] (Supplementary)

SOLID MECHANICS-I

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Write the expression for the total elongation of a bar due to its own weight, when the bar is fixed at its upper end and hanging freely at the lower end.	CO1
(b)	Define the term: Proportional limit and elastic limit.	CO1
(c)	Explain the term 'shear stress' and 'complimentary stress' with proper illustrations.	CO1
(d)	Discuss the usefulness of shear force and bending moment diagrams.	CO2
(e)	Define statically determinate and statically indeterminate beams. Give examples for each.	CO2
(f)	Draw the S.F. and B.M. diagrams for a cantilever of length L carrying a uniformly distributed load of w per m length over its entire length.	CO2
(g)	In simple bending, plane transverse sections remain plane after bending; explain this assumption with the help of simple sketch.	CO3
(h)	What is neutral layer? Why stress and strain are zero in the neutral layer?	CO3
(i)	Take the case of channel section, explain symmetrical bending and unsymmetrical bending	CO3
(j)	The shear stress is not maximum at the N.A. in case of a triangular section. Prove this statement.	CO4
(k)	Sketch the typical variation of shear stress across the depth of rectangular T-sections, showing the positions of maximum shear stress.	CO4

(l) Define the term 'polar modulus'. CO4

(m) Make a simple sketch of a shaft subjected to twisting moment. Take a small element on the surface of the shaft and mark directions of principal stresses. CO4

(n) Define shear centre. CO4

UNIT – I

2. (a) A compound bar is made of a central steel plate 50 mm wide and 10 mm thick to which copper plates 10 mm wide and 5 mm thick are connected rigidly on each side. The length at the compound bar at room temperature is 1000 mm. If the temperature is raised by 100°C, determine the stress in each material and the change in length of the compound bar. Assume E_{Steel} = 200 GPa, E_{Cu} = 100 GPa, $\alpha_{Steel} = 12 \times 10^{-6}$ /°C, $\alpha_{Cu} = 18 \times 10^{-6}$ /°C. (7M) CO1

(b) Derive an expression for the total extension of the tapered bar of length L and of circular cross section (diameter D and d), when it is subjected to an axial tensile load 'P'. (7M) CO1

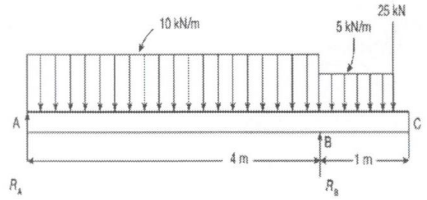
(OR)

3. (a) A steel bar 300 mm long, 50 mm wide and 40 mm thick is subjected to a pull of 300 kN in the direction of its length. Determine the change in volume. Take $E = 2 \times 10^5$ N/mm^2 and $\mu = 0.25$. (7M) CO1

(b) Find the increase in volume of a thin-walled spherical shell, subjected to uniform internal pressure p. Consider the internal radius to be r. (7M) CO1

UNIT – II

4. Draw the shear force and bending moment diagrams of the beam loaded as shown in figure. Also find the point of contraflexure. CO2

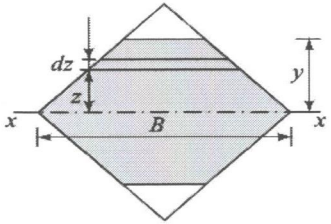


(OR)

5. A simply supported beam AB, 8 m long carrying a point load 3 kN at 2 m from A and a point load 2 kN at 5 m from A and a uniform distributed load of 2 kN/m between the point loads. Determine the position and magnitude of maximum bending moment. Draw the shear force and bending moment diagrams. CO2

UNIT – III

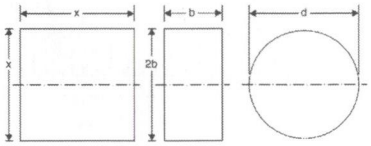
6. (a) Determine the maximum increase possible in moment of resistance of a square beam when bent about its diagonal by cutting its top and bottom edges as shown in figure. (7M) CO3



(b) Prove that relation, $M / I = \sigma / y = E / R$. (7M) CO3

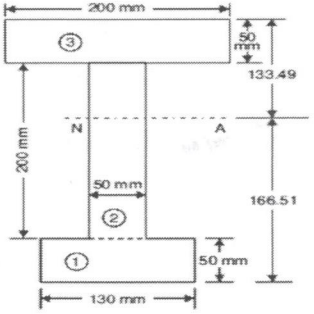
(OR)

7. Three beams have the same length, same allowable bending stress and the same bending moment. The cross-section of the beams are a square, rectangle with depth twice the width and a circle. Find the ratios of weights of the circular and the rectangular beams with respect to square beams. CO3



UNIT – IV

8. The shear force acting on a beam at an I-section with unequal flanges is 50 kN. The section is shown in figure. The moment of inertia of the section about N.A. is 2.849×10^4 mm^4. Calculate the shear stress at the N.A. and also draw the shear stress distribution over the depth of the section. CO4



(OR)

9. A solid circular shaft has a slight taper extending uniformly from one end to the other. The radius at larger end is 1.2 times the radius at smaller end. Find out the error committed, if someone calculates the angle of twist using mean radius of the tapered shaft. CO4

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F-2

Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, NOVEMBER-2023

Semester II [First Year] (Supplementary)

SOLID MECHANICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define shear strain. CO1
   (b) Explain stress-strain diagram for mild steel. CO1
   (c) Define Poisson's ratio. CO2
   (d) Explain about bending moment. CO3
   (e) Explain cantilever beam and its end conditions. CO3
   (f) What is shear force at free end of a cantilever beams with point load at free end? CO3
   (g) Write the assumptions in theory of simple bending. CO4
   (h) Define section modulus. CO4
   (i) What is meant by flexural rigidity? CO4
   (j) Determine the section modulus of rectangular cross section b x d. CO4
   (k) Write the section modulus for solid and hollow circular sections. CO4
   (l) Draw the shear stress distribution for 'T' and 'I' sections. CO4
   (m) Define shear centre. CO4
   (n) What are the assumptions made in the theory of pure torsion? CO5

UNIT – I

2. A tensile load of 50 kN is acting on a rod of diameter 35 mm and of length 6 m. A bore of diameter 25 mm is made centrally on the rod. To what length the rod should be bored so that the total extension will increase 30 % under the same tensile load. Take $E = 2 \times 10^5$ N/mm^2. CO1

(OR)

3. The following data refer to a mild steel specimen tested in a laboratory:
   Diameter of the specimen = 30 mm
   Length of the specimen = 250 mm
   Extension under a load of 15 kN = 0.055 mm
   Load at yield point = 125 kN
   Maximum load = 240 kN
   Length of the specimen after failure = 410 mm
   Neck diameter = 18 mm.
   Determine:
   (i) Young's modulus.
   (ii) Yield point.
   (iii) Ultimate stress.
   (iv) Percentage of elongation.
   (v) Percentage reduction in area.
   (vi) Safe stress adopting a factor of safety of 2. CO2

UNIT – II

4. A cantilever beam of length 2 m carries the point loads 200 N, 400 N and 700 N at distances 0.5 m, 1.2 m and 2 m respectively from the fixed end. Draw the SF and BM diagrams for cantilever beam. CO3

(OR)

5. A beam 6 m long is simply supported at the ends and carries a uniformly distributed load of 15 kN/m and three concentrated loads of 10 kN, 20 kN and 30 kN acting respectively at the left quarter point, centre point and right quarter point. Draw the shear force and bending moment diagrams and determine the maximum bending moment. CO3

UNIT – III

6. A timber beam of rectangular section is to support a load of 40 kN uniformly distributed over a span of 4 m when beam is simply supported. If the depth of section is to be twice the breadth, and the stress in the timber is not to exceed 8 N/mm^2, find the dimensions of the cross section. CO4

(OR)

7. A rolled steel Joist of I-Section has flange length of 300 mm wide and 20 mm thick with a web thickness of 20 mm and overall depth of I-Section is 600 mm. If this beam carries a UDL of 40 kN/m over the simply supported beam of span 10 m, find the maximum stress produced in the beam. CO4

UNIT – IV

8. A simply supported beam of span 4.5 m has a cross-section 150 mm x 250 mm of the permissible stress is 12 N/mm^2. Find out the (i) Maximum intensity of uniformly distributed load it can carry (ii) Maximum concentrated (P) applied at 2 m from one end it can carry. CO4

(OR)

9. (a) Derive the shear stress and deflection of a close coiled helical spring with axial load for a circular section. (7M) CO5

   (b) A helical coil spring is made of round steel wire 6.35 mm in diameter. The mean radius of the helix is 31.75 mm; number of complete turns is 12. The spring is close coiled. If C = 84.36 GN/m^2, then find (i) The pull required to extend the spring by 25.4 mm and (ii) The stress in the wire. (7M) CO5

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Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2023

Semester II [First Year] (Regular & Supplementary)

SOLID MECHANICS-I

Time: Three hours | Maximum Marks: 70

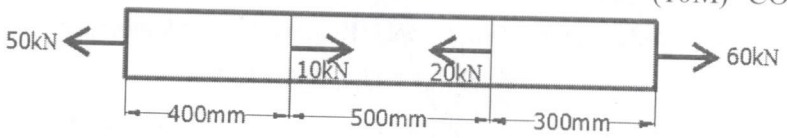
Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Classify the different types stresses. CO1
   (b) Sketch the bar of varying section subjected to axial load. CO1
   (c) Differentiate between Twisting moment and Bending Moment. CO5
   (d) Define yield stress. CO1
   (e) Differentiate between thin and thick cylinder. CO1
   (f) Write the expressions for Hoop Stress and Longitudinal stress in case of thin cylindrical pressure vessel? CO2
   (g) What do you mean by Poisson's ratio? CO1
   (h) Define section modulus. CO4
   (i) What do you mean by principal stress? CO2
   (j) Show the location of neutral axis for a symmetric I-section with help of neat sketch. CO4
   (k) What do you mean by unsymmetric bending? CO4
   (l) What is the difference between zero bending moment and point of contraflexure? CO3
   (m) List the assumptions in bending theory. CO4
   (n) What is shear centre? CO4

UNIT – I

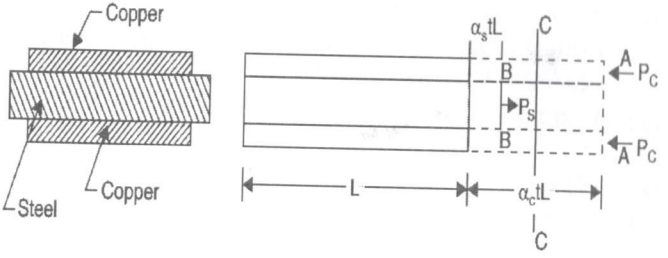
2. (a) Explain the significance of Modulus of Elasticity in assessing the material strength. How do you relate Modulus of elasticity to Bulk modulus? (4M) CO1

(b) Find the maximum stress and total elongation of a bar subjected to loads as shown in figure. The bar has a diameter 30 mm and E for the bar 105 GPa. (10M) CO1



(OR)

3. A compound bar is made of a steel plate 50 mm wide and 10 mm thick to which copper plates of size 40 mm wide and 5 mm thick are connected rigidly on each side as shown in figure. The length of the bar at normal temperature is 1 m. If the temperature is raised by 80°, determine the stresses in each metal and the change in length. Given $\alpha_s = 12 \times 10^{-6}/°C$, $\alpha c = 17 \times 10^{-6}/°C$, $Es = 2 \times 10^5$ N/mm^2, $Ec = 1 \times 10^5$ N/mm^2. CO2

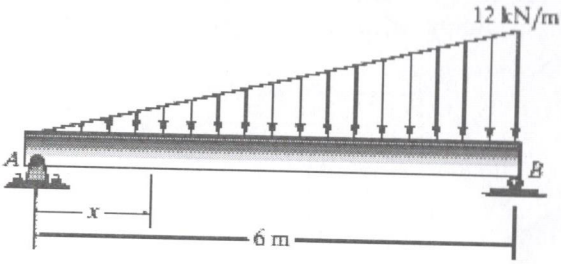


UNIT – II

4. A horizontal beam 10 m long is carrying UDL of 2 kN/m. The beam is supported on two supports 6 m apart. Find the position of supports so that the bending moment as small possible. Also draw the Shear force and Bending moment diagrams. CO3

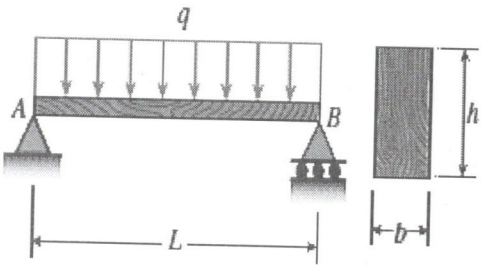
(OR)

5. Determine the reactions at the supports and draw the Shear force & Bending moment diagram for a beam shown in figure. CO3



UNIT – III

6. A simply supported wood beam AB with span length L = 4 m carries a uniform load of intensity q = 5.8 kN/m shown in figure. Calculate the maximum bending stress due to the load 'q' if the beam has a rectangular cross section with width b = 140 mm and height h = 240 mm. CO4

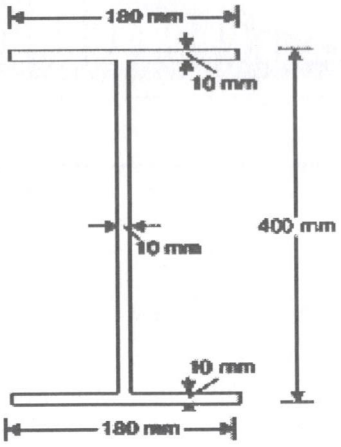


(OR)

7. A simply supported beam of span 10 m having T-section is subjected to a udl of intensity 20 kN/m throughout. Plot the bending stress distribution. Dimensions of T-section are: Flange 100 mm x 20 mm; Web 80 mm x 20 mm. CO4

UNIT – IV

8. Draw the shear stress variation diagram for the I-section shown in figure, if it is subjected to a shear force of 100 kN. CO4



(OR)

9. A shaft has to transmit a power of 6 kW at 200 rpm. Design (i) a solid circular shaft and (ii) a hollow circular shaft with a 1.2 ratio of external to internal diameter. The maximum shear stress is limited to 90 MPa and the angle of twist cannot be more than 30° per metre length. Take G = 85 GPa. CO5

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CE123 (R20)

file-2

Hall Ticket Number:

CE123 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2023

Semester II [First Year] (Supplementary)

SOLID MECHANICS - I

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define stress. CO1
   (b) State Hooke's law. CO1
   (c) What is meant by statically indeterminate axially loaded member? CO1
   (d) How do you classify thin pressure vessels? CO2
   (e) Define bulk modulus. CO2
   (f) Mention diagrammatic conventions of beam supports. CO3
   (g) Define (i) Shear force (ii) Bending moment. CO3
   (h) Sketch bending moment diagram for a cantilever of length L subjected to point load P at the free end. CO3
   (i) Differentiate between strength and stiffness. CO4
   (j) State assumptions made in theory of simple bending. CO4
   (k) Define section modulus. CO4
   (l) Distinguish between shear stress and bending stress. CO4
   (m) Define shear centre. CO4
   (n) What is torsional rigidity. CO5

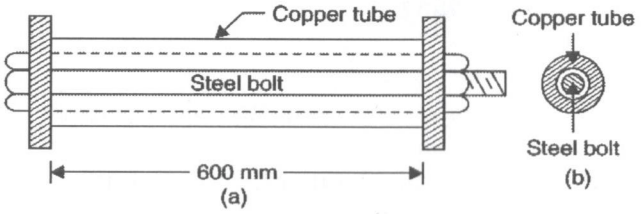
UNIT – I

2. (a) Explain the terms: (4M) CO1
   (i) Factor of safety
   (ii) Poisson's ratio
   (b) Derive the relationship between the three Elastic Moduli. (10M) CO1

(OR)

3. (a) Sketch stress-strain diagram for HYSD steel and indicate the salient points on it. (4M) CO1

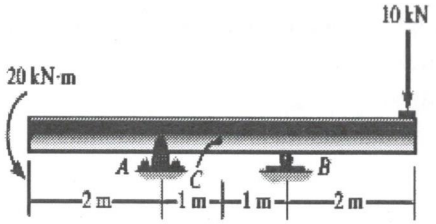
(b) A steel bolt of 20 mm diameter passes centrally through a copper tube of internal diameter 28 mm and external diameter 40 mm as shown in figure. The length of whole assembly is 600 mm. After tight fitting of the assembly, the nut is over tightened by quarter of a turn. What are the stresses induced in the bolt and tube, if pitch of nut is 2 mm? Take $E_s = 2 \times 10^5$ N/mm^2 and $E_c = 1.2 \times 10^5$ N/mm^2. (10M) CO1



UNIT – II

4. (a) Describe the point of contraflexure. What is the significance of it? (4M) CO3

(b) Draw the shear force and bending moment diagrams for a beam shown in figure (10M) CO3



(OR)

5. (a) Derive the relation between bending moment and shear force, shear force and loading. (6M) CO3

(b) A simply supported beam 8 m long is subjected to a u.d.l. of 1 kN/m extending from left end up to the centre of the beam. There is an anticlockwise couple of 10 kN.m acting at a distance of 2.0 m from the right end. Sketch the shear force and bending moment diagram. (8M) CO3

UNIT – III

6. (a) Describe what do you understand by 'the material is homogeneous, isotropic and obeys Hooke's law' which is one of the assumption in theory of simple bending. (4M) CO4

(b) A cast iron beam of I-section with a top flange 80 mm x 20 mm thick, bottom flange 160 mm x 40 mm thick and the web 200 mm deep and 20 mm thick. The beam is freely supported on a span of 5 m. If the tensile stress is not exceeding 20 N/mm^2, find the safe uniformly distributed load the beam can carry. Find also maximum compressive stress. (10M) CO4

(OR)

7. Derive the Bending equation (Flexure formula). CO4

UNIT – IV

8. (a) Draw the shear stress distribution for a beam of Channel section subjected to shear force indicating how it varies at the junctions. (4M) CO4

(b) An I-section has a depth 200 mm, flange width of 120 mm, flange thickness 15 mm and web thickness of 10 mm. The beam is subjected to a shear force 50 kN. Determine the shear stress distribution across the section. Also find % of shear force taken by web. (10M) CO4

(OR)

9. (a) Derive Torsion equation. (7M) CO5

(b) A solid circular shaft transmits 75 kW power at 200 rpm. Estimate the shaft diameter, if the twist in the shaft is not to exceed one degree in 2 m length of shaft and shear strength is not to exceed 50 N/mm^2. Take G = 100 kN/mm^2. (7M) CO5

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CE123 (R20)

file-2

Hall Ticket Number:

CE123(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2022

Semester II [First Year] (Regular & Supplementary)

SOLID MECHANICS-I

Time: Three hours

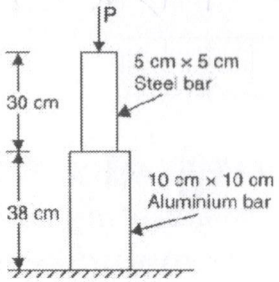
Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is elastic limit? CO1
   (b) Define Poisson's ratio. CO1
   (c) How will you find the stresses and load carried by each member of a composite bar? CO1
   (d) Define shear force and bending moment. CO3
   (e) Explain point of contra flexure. CO3
   (f) Draw the types of beams with neat sketches. CO3
   (g) Define neutral axis. CO4
   (h) Define section modulus. CO4
   (i) State the assumptions made in the theory of simple bending. CO4
   (j) Distinguish between thin and thick pressure vessels. CO2
   (k) Draw the shear stress distribution for rectangular section. CO4
   (l) Define shear centre. CO4
   (m) Define Torsion. CO5
   (n) What are the assumptions made in the theory of pure torsion? CO5

UNIT – I

2. A member formed by connecting a steel bar and Aluminium bar is loaded as shown in figure. Calculate the magnitude of load P that will cause the total length of the member to decrease 0.25 mm. Take E for steel and aluminium is 210 GPa and 70 GPa respectively. CO1



(OR)

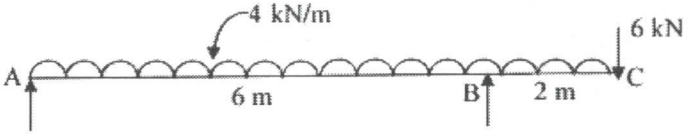
3. A 30 mm aluminum rod 3 m long is subjected to an axial pull of 100 kN. Taking E = 70 GPa and Poisson's ratio 0.3, determine the elongation, change in diameter and volume of the rod. Also, estimate the bulk modulus. CO1

UNIT – II

4. A simply supported beam of length 12 m, carries the uniformly distributed load of 10 kN/m over a length of 4 m starting from 4 m from the left support. Point loads of 50 kN and 40 kN acts at a distance of 4 m and 8 m from the left support. Draw the S.F and B.M diagrams for the beam. Also calculate the maximum bending moment. CO3

(OR)

5. An overhanging beam is shown in figure. Draw the Shear force and Bending moment diagrams. CO3



UNIT – III

6. (a) Derive the bending equation for pure bending. (7M) CO4
   (b) A simple beam carries a U.D.L of 15 kN/m (including self weight) over its entire span of 4 m. If the permissible stresses for timber are

12 MPa in compression, 10 MPa in tension and 0.8 MPa in shear, design a suitable rectangular beam. Take the width of rectangular beam as one third of the depth. (7M) CO4

(OR)

7. A timber beam of rectangular section is to support a load of 30 kN uniformly distributed over a span of 4 m when beam is simply supported. If the depth of section is to be twice the breadth, and the stress in the timber is not to exceed 8 N/mm^2, find the dimensions of the cross section. CO4

UNIT – IV

8. (a) Derive the relation between average shear stress and the maximum shear stress for a rectangular section and draw the shear distribution diagram. (7M) CO4
   (b) A timber beam 150 mm x 250 mm in cross section is simply supported at its ends and has a span of 3.5 m. The maximum safe allowable stress in bending is 7500 kN/m^2. Find the maximum safe U.D.L. which the beam can carry. What is the maximum shear stress in the beam for the U.D.L. calculated? (7M) CO4

(OR)

9. (a) A solid shaft of 200 mm diameter has the same cross section area as that of the hollow shaft of the same material with inside diameter of 150 mm. Find the ratio of the power transmitted by the two shafts at the same speed. (7M) CO5
   (b) If a solid shaft of 100 mm diameter transmits 110 kW at 200 rpm then, find the maximum intensity of shear stress induced and the angle of twist for a length of 6 m.
   Take C = 8 x 10^4 N/mm^2. (7M) CO5

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file-2

Hall Ticket Number:

CE123(R20)

B.TECH. DEGREE EXAMINATION, FEBRUARY-2022

Semester II [First Year] (Supplementary)

SOLID MECHANICS-I

Time: Three hours | Maximum Marks: 70

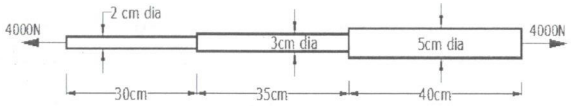
Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define stress. CO1
   (b) What is the principle of super position? CO1
   (c) What is the relation between Young's modulus and rigidity modulus? CO1
   (d) Define Poisson's ratio. CO1
   (e) Find the bending moment for simply supported beam subjected to uniformly distributed load throughout its length. CO3
   (f) What is the relation between bending moment and shear force? CO3
   (g) Draw the sketch of any two types of beams. CO3
   (h) What is section modulus of a rectangular section? CO4
   (i) Define bending stress. CO4
   (j) Define shear stress CO4
   (k) What is the expression for power transmitted by shaft? CO5
   (l) Define bending moment. CO3
   (m) What is torsion equation? CO5
   (n) What is the maximum shear stress in rectangular section? CO4

UNIT – I

2. (a) Develop an expression for relation between modulus of Elasticity and Bulk modulus. (6M) CO1

   (b) An axial pull of 4000 N is acting on a bar consisting of three lengths as shown in figure, if the Young's modulus of the material of the rod is 2×10^5 N/mm^2 , determine stress in each section and total extension in bar. (8M) CO1



(OR)

3. (a) Explain stress-strain curve for mild steel. (8M) CO1

   (b) A cylindrical pipe of diameter 2.5 m and thickness 2.5 cm is subjected to an internal fluid pressure of 1.4 N/mm^2. Determine circumferential stress and longitudinal stress developed in the pipe. (6M) CO1

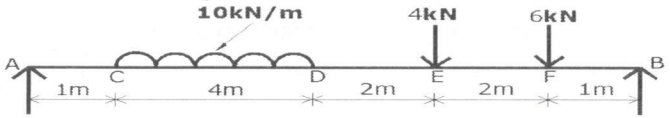
UNIT – II

4. (a) Develop the differential equations of equilibrium for a beam element. (7M) CO3

   (b) Draw the shear force and bending moment diagrams for a cantilever of span 3 m, with a UDL of 10 kN/m on the entire span. (7M) CO3

(OR)

5. Draw shear force and bending moment diagram for the beam shown in figure. CO3



UNIT – III

6. Write the assumptions in theory of simple bending and derive the bending equation. CO4

(OR)

7. A beam of I section has top and bottom flanges 150 mm x 25 mm and web of size 300 mm x 12 mm. It is used as a simply supported beam over a span of 4 m to carry an uniformly distributed load of 80 kN/m over its entire span. Calculate the maximum stress due to bending and sketch the bending stress distribution diagram. CO4

UNIT – IV

8. Develop the expression for the shear stress at a section in a loaded beam. CO4

(OR)

9. (a) A rectangular beam 100 mm wide and 150 mm deep is subjected to a shear force of 30 kN. Determine maximum shear stress and average shear stress. (6M) CO4

   (b) A hollow shaft of external diameter 130 mm transmits 400 kW power at 300 r.p.m. Determine the maximum internal diameter if the maximum stress in the shaft is not to exceed 80 N/mm^2. (8M) CO5

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Hall Ticket Number:

file-2

CE123(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester II [First Year] (Regular)

SOLID MECHANICS-I

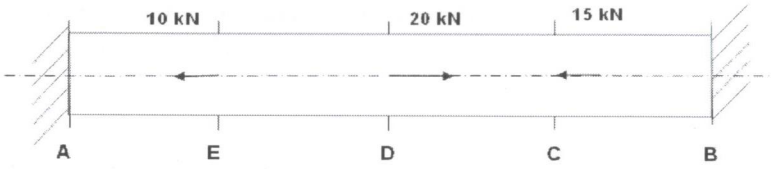
Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Distinguish between 'True Stress-Strain Curve' and 'Engineer's Stress-Strain Curve'. CO1
   (b) State Hooke's law. CO1
   (c) What is the relationship between the modulus of elasticity and modulus of rigidity? CO1
   (d) Why the radial stress is neglected in a thin cylinder? CO2
   (e) What are the stress resultants in a beam? CO3
   (f) Define 'point of inflexion'. CO3
   (g) Sketch the bending moment diagram for a cantilever beam of length L subjected to point load P at the free end. CO3
   (h) Define section modulus. CO4
   (i) State the assumptions made in deriving bending equation. CO4
   (j) Define neutral axis. CO4
   (k) Write the equation for power transmitted by circular shaft. CO5
   (l) Sketch the shear stress distribution across T-section of a beam. CO4
   (m) Explain the term 'shear center'. CO4
   (n) Define torsional rigidity. CO5

UNIT – I

2. A prismatic copper bar of 2 m long is supported by rigid supports at ends A and B. Axial forces 10 kN, 20 kN and 15 kN are applied at E, D and C respectively as shown in figure. Find the displacement of section at C, D and E. Young's modulus of copper is 110 GPa. The segments AE, ED, DC and CB are of same length. The cross-sectional area of copper bar is 250 mm^2. CO1



(OR)

3. A thin cylindrical shell of 800 mm inner diameter, 10 mm wall thickness and 3 m long with closed ends, is subjected to an internal fluid pressure of 3 MPa. Determine the change in inner diameter, change in length and change in storage capacity of the cylindrical shell. Young's modulus and Poisson's ratio of shell material are 200 GPa and 0.25 respectively. CO2

UNIT – II

4. A prismatic beam AEDCB is supported by a hinge at left end A and a roller at C. It is subjected to a concentrated load of 100 kN at E and a couple of 30 kN-m clockwise at D in addition to the 20 kN/m uniformly distributed load on the overhang CB. Draw the shear force and bending moment diagrams by indicating all salient values. AE = 2 m, ED = 1.5 m, DC = 1.5 m and CB = 2 m. CO3

(OR)

5. A prismatic concrete pole of length 'L' and self-weight of 'w' per unit run, has to be lifted with a crane by placing one crane hook at left end and the other crane hook at 'a' distance from right end. The pole remains horizontal during the lift. Find the value of 'a' so that the maximum bending moment is as small as possible. Draw the shear force and bending moment diagrams by indicating all salient values. CO3

UNIT – III

6. The cross section of a beam is symmetrical I-section consisting of 200 mm x 50 mm flanges and 50 mm x 300 mm web. The allowable stress in bending is 120 MPa. Determine the moment of resistance of the beam cross section. Find the magnitude of compressive and tensile forces on the cross section of beam. Also find the location of these forces on the cross section of beam. CO4

(OR)

7. The cross section of a 2 m long cast iron beam consists of 150 mm x 25 mm top flange, 25 mm x 225 mm web and 250 mm x 50 mm bottom flange. The allowable bending stresses are 100 MPa in compression and 25 MPa in tension. Determine the safe load on the beam when it is used as CO4
   (i) Cantilever beam subjected to uniformly distributed load over the entire span.
   (ii) Simply supported beam subjected to uniformly distributed load over the entire span.

UNIT – IV

8. A simply supported beam of 4 m span carries 8 kN/m uniformly distributed load over the entire span. The cross section of a beam is symmetrical I-section consisting of 250 mm x 50 mm flanges and 50 mm x 300 mm web. Draw the variation of flexural shear stress on cross section of beam at critical section by indicating all salient values. CO4

(OR)

9. A circular shaft transmits 300 kW power at 120 rpm. The allowable shear stress of shaft material is 70 MPa. The maximum torque in the shaft exceeds its mean value by 15%. Determine the required diameter of solid circular shaft. If this solid circular shaft is replaced with a hollow circular shaft of same material having the inner diameter as two-thirds of its outer diameter, find the required diameter of a hollow circular shaft. What is the percentage saving of material? Compare the torsional stiffness and torsional rigidity of the above two shafts. CO5

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Hall Ticket Number:

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, SEPTEMBER-2024

Semester II [First Year] (Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) How many bytes are required to store integer and character data type? CO1
   (b) What is unary operator? Give the syntax. CO1
   (c) What is meant by structured programming? CO1
   (d) What is the advantage of function prototype declaration? CO2
   (e) How to initialize 2 – D character array? CO2
   (f) Differentiate syntax error and logical error. CO2
   (g) Give any formatted input output functions in C. CO3
   (h) What is dynamic memory allocation? CO3
   (i) What do you mean by call by value? CO3
   (j) What is command line argument? CO4
   (k) What is disadvantages of conditional 'goto' statement? CO4
   (l) What is the nested for loop? CO4
   (m) What is self-referential structure? CO4
   (n) What is the use of fseek ( )? CO4

UNIT – I

2. (a) Describe different steps in software development life cycle. (7M) CO1
   (b) What is the difference between a variable and a constant? What are the rules to declare identifiers and also specify types of constants? (7M) CO1

(OR)

3. (a) Explain bitwise, relational and logical operators with example. (7M) CO1
   (b) Describe about standard input and standard output functions used in with syntax. (7M) CO1

UNIT – II

4. (a) What is character array? Explain about initialization, accessing, and printing the character array elements. (7M) CO2
   (b) Write a C program to find the biggest of given three numbers using nested if statement. (7M) CO2

(OR)

5. (a) Compare and contrast between the statements for, while and do-while loops. (7M) CO2
   (b) If a 5-digit number is input through the keyboard, write a C program to print the sum of its individual digits. (7M) CO2

UNIT – III

6. (a) What is mean by function argument, function call and return value? (7M) CO3
   (b) Write C program to find the factorial of given number using recursion. (7M) CO3

(OR)

7. (a) What is a pointer variable? How is a pointer variable different from an ordinary Variable and also specify pointer arithmetic. (7M) CO3
   (b) Write a program using pointers to compute the sum of all elements stored in an array. (7M) CO3

UNIT – IV

8. (a) What is structure? Explain array of structures with example. (7M) CO4
   (b) Write a program to store and print name, address, department and marks using structure. (7M) CO4

(OR)

9. (a) Describe different modes of file and also specify various file operations. (7M) CO4
   (b) Write a C program to copy the contents of one file to another file. (7M) CO4

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Hall Ticket Number:

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2024

Semester II [First Year] (Regular)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Define Hardware.	CO1
(b)	Write program development steps.	CO1
(c)	List any four data types in C.	CO1
(d)	Draw the flow chart for while loop.	CO2
(e)	Write the syntax of nested if statement in C.	CO2
(f)	What is a string?	CO2
(g)	Write the syntax and example for strlen() function in C.	CO3
(h)	What is a user defined function?	CO3
(i)	Write a C program to convert degrees Centigrade to degrees Fahrenheit.	CO3
(j)	How can we represent a 3 x 3 matrix using an array?	CO4
(k)	What is the difference between '&' and '*' w.r.t. pointer?	CO4
(l)	What is free() function?	CO4
(m)	What is union in C?	CO4
(n)	What are the modes of operations on a file?	CO4

UNIT – I

2. (a) Explain about software development life cycle in detail. (7M) CO1
   (b) Write a C program using basic input/output functions. (7M) CO1

(OR)

3. (a) What are the relational and logical operators in C? Explain with examples. (7M) CO1
   (b) Implement a C program to demonstrate about the basic data types used in C. (7M) CO1

UNIT – II

4. (a) Demonstrate the use of if-else statement with a suitable example. (7M) CO2
   (b) Develop C programs for Fibonacci series. (7M) CO2

(OR)

5. (a) Distinguish between while loop and do-while loop in C. (7M) CO2
   (b) Demonstrate how Bubble sort is implemented using a C program. (7M) CO2

UNIT – III

6. (a) Explain the different categories of functions with examples. (4M) CO3
   (b) Implement recursive functions for the following tasks: (10M) CO3
   (i) Factorial of a number
   (ii) GCD of two numbers

(OR)

7. (a) What are the operators used for pointers? Consider the following statements, let m and n are declared as integers and p1 and p2 as pointers to integers, then find out the errors if any in each of the following statements and explain the reasons also. (7M) CO3

```
p1 = &m;
p2 = n;
m = p2 - p1;
*p1 = &n;
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(b) Illustrate call by value and call by reference with an example C program. (7M) CO3

UNIT – IV

8. (a) Differentiate structure and union with an example. (7M) CO4

(b) Write a C program to copy contents of one file to another file. (7M) CO4

(OR)

9. (a) Write a program to read employee details of an organization such as employee number, experience, salary using structures and display the employee details on console. (7M) CO4

(b) What are different file handlings functions available? Explain in detail. (7M) CO4

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Hall Ticket Number:

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, MAY-2024

Semester II [First Year] (Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define Software. CO1
   (b) What is a Token? CO1
   (c) List any four keywords in C. CO1
   (d) Draw the flow chart for for loop. CO2
   (e) Write the syntax for switch statement in C. CO2
   (f) What is an array? CO2
   (g) Write the syntax and example for strcpy () function in C. CO3
   (h) What is a predefined function? CO3
   (i) Write a C program to convert given centimetres to meters. CO3
   (j) How can we represent a two-dimensional matrix using array? CO4
   (k) Define a pointer in C. CO4
   (l) What is malloc() function? CO4
   (m) Write student 'Name, Roll.No., Department' details using structure. CO4
   (n) What if fopen() function? CO4

UNIT – I

2. (a) Draw the Block Diagram of Computer and list the characteristics. (7M) CO1
   (b) Write a C Program to find the size of each data type using sizeof() function. (7M) CO1

(OR)

3. (a) What are the arithmetic operators used in C? Explain with example. (7M) CO1
   (b) Explain the structure of C programming. (7M) CO1

UNIT – II

4. (a) Write about nested if-else statement using a flow chart and example. (7M) CO2
   (b) Implement a C program to find the greatest of three numbers using ternary operator. (7M) CO2

(OR)

5. (a) What are the different looping statements used in C? Explain with suitable example. (7M) CO2
   (b) Write a C program to add two matrices using arrays. (7M) CO2

UNIT – III

6. (a) What is the difference between call by value and call by reference? (7M) CO3
   (b) Explain the concept of storage classes in C. (7M) CO3

(OR)

7. (a) Mention the importance of pointers used in C programming with a suitable example. (7M) CO3
   (b) Write a C program to demonstrate the function malloc (). (7M) CO3

UNIT – IV

8. (a) What you meant by structure definition? (4M) CO4
   (b) Define a structure type personal that would contain person name, date of joining and salary. Write a program to initialize one person data and display the same. (10M) CO4

(OR)

9.	(a)	Illustrate about C preprocessor directives.	(4M)	CO4
	(b)	Write a C program to create a file and write contents, save and close the file.	(10M)	CO4

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Hall Ticket Number:

F-2

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, NOVEMBER-2023

Semester II [First Year] (Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define software. CO1
   (b) What is the special symbol allowed in a variable name? CO1
   (c) List out types of programming language. CO1
   (d) Define array. CO2
   (e) What is the use of goto statement? CO2
   (f) List the three types of loops in C. CO2
   (g) Define function. CO3
   (h) What is the meaning of using extern before function declaration? CO3
   (i) Define the syntax for pointer declaration with an example. CO3
   (j) Define union with an example. CO4
   (k) Explain the use of a member in the structures with an example. CO4
   (l) List the different modes in files. CO4
   (m) Contract between opening and closing a data file with an example. CO4
   (n) Define unformatted data files. CO4

UNIT – I

2. (a) With a neat sketch of block diagram of computer, explain the function of various unit. (7M) CO1

(b) Develop a C program where a and b are two integer variables whose values are 20 and 23 respectively. Write a program to evaluate the following arithmetic expressions. (i) a + b (ii) a – b (iii) a * b (iv) a / b (v) a % b (7M) CO1

(OR)

3. (a) Discuss various operators available in C. (7M) CO1
   (b) Discuss input/output functions with an example. (7M) CO1

UNIT – II

4. (a) Build a program to find the transpose of a matrix. (7M) CO2
   (b) Contrast between continue and break statement with an example. (7M) CO2

(OR)

5. (a) Develop a C program for the given scenario: A Fibonacci sequence is defined as follows: The first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a program to generate the first N terms of the sequence. (7M) CO2
   (b) Discuss various types of array declarations in C with an example. (7M) CO2

UNIT – III

6. (a) Design a recursive function to compute factorial of a given number. (7M) CO3
   (b) What is Dynamic Memory Allocation and list out its types with an example? (7M) CO3

(OR)

7. (a) Explain the pointer declarations and passing pointers to a function with suitable example. (7M) CO3
   (b) Explain different ways of passing arguments to function with suitable examples. (7M) CO3

UNIT – IV

8. (a) Define a structure to store employee's data with the following specifications: Employee-Number, Employee-Name, Basic pay, Date of Joining. (7M) CO4
   (b) Explain the relation between structures and pointers, structure and functions with suitable examples. (7M) CO4

(OR)

9. (a) Develop a C program which copies one 'text file' to another 'text file' using command line arguments (7M) CO4
   (b) Write a short notes on self referential structure, user defined data types and unions. (7M) CO4

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Hall Ticket Number:

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, JULY-2023

Semester II [First Year] (Regular & Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) List out the characteristics of a computer. CO1
   (b) Define hardware. CO1
   (c) State the rules for naming a variable. CO1
   (d) Name the Input/Output functions. CO1
   (e) How to use goto statement? CO2
   (f) Write the syntax for do-while loop. CO2
   (g) Show the process of initializing an array. CO2
   (h) Which function is used to compare two strings only to n characters? CO2
   (i) Where do we use recursion? CO3
   (j) What does the return type 'void' indicate? CO3
   (k) How to declare pointer to a pointer? CO3
   (l) Define union in C. CO4
   (m) What is the use of bitfields? CO4
   (n) Show the syntax for opening a file in read mode. CO4

UNIT – I

2. (a) Classify the data types in C language and describe each data type. (8M) CO1
   (b) Show the structure of a C program and explain each component in the structure. (6M) CO1

(OR)

3. (a) Illustrate the implementation of type qualifiers with examples. (6M) CO1
   (b) Name the operators in C and interpret the usage of each operator. (8M) CO1

UNIT – II

4. (a) Define an array. Examine the procedure for declaring, initializing and accessing the elements in an array. (7M) CO2
   (b) Using switch statement, create a C program to perform arithmetic operations on the variables. The symbol of the operator should be given as input and result after processing the operation should be displayed as the output. (7M) CO2

(OR)

5. (a) Demonstrate the mechanism of looping statements with examples. (7M) CO2
   (b) Develop a program to check and display whether the given string is a palindrome or not without using string handling functions. (7M) CO2

UNIT – III

6. (a) List out the storage classes and discuss the features of each storage class. (6M) CO3
   (b) Construct a C program to show various functions used for dynamic memory allocation. (8M) CO3

(OR)

7. (a) Analyze the functionality of passing arguments to a function. (8M) CO3
   (b) Interpret the operations performed on pointers with examples. (6M) CO3

UNIT – IV

8. (a) Categorize and describe the preprocessor directives with syntax. (7M) CO4
   (b) Examine the task of using pointers in structures with an example. (7M) CO4

(OR)

9. (a) Develop a C program to copy the content of one file into another file. (7M) CO4
   (b) Differentiate the implementation of a structure and a union in C. (7M) CO4

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file-2

Hall Ticket Number:

CE/CH/EC/EE124 (R20)

B.TECH. DEGREE EXAMINATION, JANUARY-2023

Semester II [First Year] (Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:

(a)	Show the block diagram of a computer.	CO1
(b)	Define software.	CO1
(c)	Name any eight keywords in C.	CO1
(d)	How to use conditional operator?	CO1
(e)	Why do we need arrays?	CO2
(f)	Label the syntax for while statement.	CO2
(g)	Where continue statement can be used?	CO2
(h)	Which function is used to concatenate n characters of a string to another string?	CO2
(i)	Classify the functions.	CO3
(j)	List out the storage classes.	CO3
(k)	How to declare a pointer for an array?	CO3
(l)	Define a structure in C.	CO4
(m)	What is a self-referential structure?	CO4
(n)	Show the syntax for opening a file in write mode.	CO4

UNIT – I

2. (a)	How to develop a C program? Show the software development life cycle.	(7M)	CO1
(b)	Name the data types in C and explain the utilization of each data type.	(7M)	CO1

(OR)

3. (a) List out the operators used in C and describe each operator with syntax and example. (8M) CO1
   (b) Classify the constants used in C and discuss the usage of each constant. (6M) CO1

UNIT – II

4. (a) Illustrate the functionality of any four string handling functions. (8M) CO2
   (b) Analyze the utilization of break, continue and goto statement. (6M) CO2

(OR)

5. (a) Develop a C program to perform multiplication on the given matrices. (8M) CO2
   (b) Demonstrate the mechanism of branching statements with examples. (6M) CO2

UNIT – III

6. (a) Examine the implementation of call by value and call by reference. (8M) CO3
   (b) Interpret various functions used for dynamic memory allocation. (6M) CO3

(OR)

7. (a) Define recursion. Design a C program to find the factorial of a given number using recursion. (7M) CO3
   (b) Inspect the process of passing pointers to a function and arrays. (7M) CO3

UNIT – IV

8. (a) Write a C program to merge the contents of two files into single file. (7M) CO4
   (b) Outline the differences between a structure and union with an example. (7M) CO4

(OR)

9. (a) Analyze the procedure for passing the structures to functions. (7M) CO4

   (b) Illustrate the implementation of command line arguments with syntax. (7M) CO4

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file-2

Hall Ticket Number:

CE/CH/EC/EE124(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2022

Semester II [First Year] (Regular & Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) What is a C Token? CO1
   (b) Define Type Qualifiers. CO1
   (c) List the types of Input/Output Function. CO1
   (d) What is the use of Switch statement in the C program? CO2
   (e) Contrast between Single and Multidimensional Array. CO2
   (f) What is Branching? CO2
   (g)
```
#include <stdio.h>
int main()
{
printf("%d", main);
return 0;
}
```
   What is the output of the code? CO3
   (h) List the types of dynamic memory allocations. CO3
   (i) Define Recursion. CO3
   (j) Define Structures with an example. CO4
   (k) What are User-Defined Data types? CO4
   (l) What are the Pre-processor Directives in C? CO4
   (m) Contrast between Reading and Writing a Data File with an example. CO4
   (n) Which functions are used to access file randomly? CO4

UNIT – I

2. (a) Explain a typical Software Development Life Cycle with the various phases in a neat diagram (7M) CO1

   (b) Develop a C program for the Scenario, Mr. Gupta deposited Rs.1000 in a bank. The bank gives simple interest at the rate of 15% per annum. Write a program to determine the amount in Mr. Gupta's account at the end of 5 years. (Use the formula I = P T R / 100) (7M) CO1

(OR)

3. (a) Discuss various Data Types of Programming Language. (7M) CO1

   (b) Discuss computer characteristics and the three main concepts of structured programming. (7M) CO1

UNIT – II

4. (a) Develop a C program using switch statement, which takes two integer operands and one operator as input from the user, performs the operation and then prints the result. (Consider the operators +,-,*, /, %.) (7M) CO2

   (b) Discuss various types of String handling functions with an example. (7M) CO2

(OR)

5. (a) Create a C program for adding two matrices and storing the resultant in the other matrix. (7M) CO2

   (b) Discuss various types of Branching statements in C with an example. (7M) CO2

UNIT – III

6. (a) Develop a C program to determine whether the given string is palindrome or not using functions. (7M) CO3

(b) Contrast between call-by-value and call-by-reference with a suitable example. (7M) CO3

(OR)

7. (a) Explain the usage of Storage classes in C with an example. (7M) CO3

(b) Develop a C program to read list of student names and perform the following operations using functions. (7M) CO3

(i) to print list of names
(ii) to sort them in ascending order
(iii) to print the list after sorting

UNIT – IV

8. (a) Develop a C program to accept the elements of the structure as: Employee-name, Basic pay. Display the same structure along with the DA, CCA and Gross salary for 5 employees.
Note: DA = 51% of Basic pay, CCA = Rs.100 consolidated. (7M) CO4

(b) Distinguish between Structure and Union with suitable examples. (7M) CO4

(OR)

9. (a) Develop a C program to reverse the first N characters of a given text file.
Note: The file name and N are specified through command line. (7M) CO4

(b) Write short notes on pre-processor directives and Unformatted data files. (7M) CO4

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file-2

Hall Ticket Number:

CE/CH/EC/EE124(R20)

B.TECH. DEGREE EXAMINATION, FEBRUARY-2022

Semester II [First Year] (Supplementary)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Define software. CO1
   (b) List out the characteristics of a computer. CO1
   (c) Develop a C program to find the given character is digit or not with the help of ternary operator. CO1
   (d) Distinguish between break statement and continue statement. CO2
   (e) What is the use of goto statement? CO2
   (f) Define an array. CO2
   (g) Contrast numeric arrays and strings. CO2
   (h) Define recursion. CO3
   (i) Distinguish auto and register storage classes. CO3
   (j) Define null pointer. CO3
   (k) Contrast structure and union. CO4
   (l) What are self-referential structures? CO4
   (m) What are the operations that can be performed on a file? CO4
   (n) List the pre-processor directives available in C. CO4

UNIT – I

2. (a) 'C is structured programming language'. Justify the statement. (7M) CO1
   (b) Distinguish between explicit type conversion and implicit type conversion with examples. (7M) CO1

(OR)

3. (a) Discuss various operators available in C with examples. (7M) CO1
   (b) Discuss various input/output functions in C with examples. (7M) CO1

UNIT – II

4. (a) Develop a C program to check whether a given character is an upper case letter or a lower case letter or a digit or a special symbol. (7M) CO2
   (b) Develop a C program for multiplication table of a number from 1 to a given range. (7M) CO2

(OR)

5. (a) Create a C program to insert a new integer value at a specified position into an already existing array of 'n' integer values. (7M) CO2
   (b) Discuss about string handling functions with examples. (7M) CO2

UNIT – III

6. (a) Distinguish between call by value and call by reference with examples. (7M) CO3
   (b) Design a recursive function to find greatest common divisor of given two numbers. (7M) CO3

(OR)

7. (a) Define pointer. Explain how to access a value using pointer. Give an example. (7M) CO3
   (b) What is dynamic memory allocation? Discuss about dynamic memory allocation functions with suitable examples. (7M) CO3

UNIT – IV

8. (a) Distinguish between structure and array. (7M) CO4
   (b) Develop a C program using array of structures to read and display 'n' number of student's details consisting of name, roll number and gender. (7M) CO4

(OR)

9. (a) Discuss about various sequential file accessing functions. (7M) CO4
   (b) Create a program that copies the contents of one file to another using command line argument. (7M) CO4

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Hall Ticket Number:

file-2

CE/CH/EC/EE124(R20)

B.TECH. DEGREE EXAMINATION, OCTOBER-2021

Semester II [First Year] (Regular)

PROGRAMMING FOR PROBLEM SOLVING

Time: Three hours | Maximum Marks: 70

Answer Question No.1 compulsorily. (14 x 1 = 14)
Answer One Question from each unit. (4 x 14 = 56)

1. Answer the following:
   (a) Write the differences between algorithm and flowchart. CO1
   (b) Write a short note on type casting. CO1
   (c) Explain sizeof() with example. CO1
   (d) What is the result of the operation 23>>3? CO2
   (e) How switch case works without break statement? CO2
   (f) What is multi-dimensional array? CO2
   (g) What is pointer to pointer? CO3
   (h) Discriminate puts() and gets(). CO3
   (i) Define pointer array. CO3
   (j) Differentiate between break and continue statements. CO4
   (k) How can you compare two strings? CO4
   (l) How to represent self-referential structures? CO4
   (m) Define Union. How to represent a union? CO4
   (n) Write about different error handling functions on files. CO4

UNIT – I

2. (a) Discuss about Bitwise operators with examples. (7M) CO1
   (b) What is constant? Explain different constants in C. (7M) CO1

(OR)

3. (a) Discuss about increment and decrement operators with examples. (7M) CO1
   (b) Write detailed notes on C data types. (7M) CO1

UNIT – II

4. (a) Draw the flow chart for solving the following problem:
   Your library need your help. Given the expected and actual return dates for a library book, the algorithm calculates the fine (if any). The fee structure is as follows: (7M) CO2

(i) If the book is returned on or before the expected return date, no fine will be charged i.e. fine = 0.

(ii) If the book is returned after the expected return *day* but still within the same calendar month and year as the expected return date, fine = Rs. (15*number of days late).

(iii) If the book is returned after the expected return *month* but still within the same calendar year as the expected return date, fine = Rs. (50*number of months late).

(iv) If the book is returned after the calendar year in which it was expected, there is a fixed fine of Rs.1000.

(b) The absolute distance between two integers x_1 and x_2 is given by $| x_2 - x_1 |$. Write a program which sorts an array *x[ ]* of n integers in ascending order of their absolute distances with a given number *z*. For example, given *x[ ] = {9, 1, 12, 4, 2}* and *z = 6*, the sorted array will be *x[ ] = {4, 9, 2, 1, 12}*. Note that 4 is closest to 6, and 12 is farthest from 6, in terms of absolute distances. (7M) CO2

(OR)

5. (a) Draw the flowchart for solving the following problem: The algorithm reads the following two parameters – (i) Type of the vehicle, *('M' or 'm' for motorbike, 'C' or 'c' for car, and 'B' or 'b' for Bus)* and (ii) Number of hours that a vehicle spent in the parking lot. The algorithm should compute the parking charge based on the following parking rates – Rs.5, Rs.10 and Rs.50 per hour respectively for motorbike, car and bus. (7M) CO2

(b) Given an array of integers. Find a peak element in it. An array element is peak if it is NOT smaller than its neighbors. For corner elements, we need to consider only one neighbor. For example, for input array {5, 10, 20, 15}, 20 is the only peak element. For input array {10, 20, 15, 2, 23, 90, 67}, there are two peak elements: 20 and 90. Write a program to print all the peak elements in a given array. (7M) CO2

UNIT – III

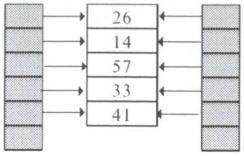
6. (a) Given 3-angles as parameters, Write a function to check whether they form a triangle or not

(A+B [illegible] 80). If yes check whether triangle is scalen, equilateral, isoceless or right angled triangle. (7M) CO3

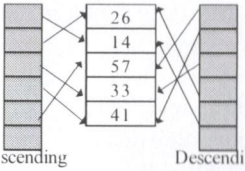
(b) Write a function to print the first *n* numbers of the series 1, 2, 4, 7, 11, ... The series starts with 1 and the difference between two consecutive numbers is 1 initially and increases by 1 then onwards. Also print the sum of these n numbers. (7M) CO3

(OR)

7. (a) Write a program that reads integers from the keyboard and places them in an array. The program then will sort the array into ascending and descending order and print the sorted list. The program must not change the original array or create any other integer array. Hint: The solution to this problem requires two pointer arrays shown in the following figure. The first pointer array is rearranged so that it points to the data in ascending sequence. The second pointer array is rearranged so that it points to the data in descending sequence. (i) By using the original array we must be in a position to print the given values (ii) By using the first pointer array we need to display the values in ascending order and similarly (iii) by using the second pointer array we need to display the values in descending order. (7M) CO3



Before Sorting



After Sorting

(b) In mathematics, a Kaprekar number is a nonnegative integer whose square can be split into two equal parts that add up to the original number again. For instance, 45 is a Kaprekar number, because $45^2 = 2025$ and $20+25 = 45$. Write a function to find all Kaprekar numbers within a given range. (7M) CO3

UNIT – IV

8. (a) You are given with three text files namely: file1.txt, file2.txt and file3.txt. Write a C-program to copy the contents of file1 to file2, file2 to file3 and file3 to file1. (7M) CO4

Example: Before execution:

file1.txt	*file2.txt*	*file3.txt*
NITW	IITH	IITTP
Warangal	Hyderabad	Tirupati

After Execution:

file1.txt	*file2.txt*	*file3.txt*
IITTP	NITW	IITH
Tirupati	Warangal	Hyderabad

(b) A railway employee is paid 1200/- (rupees) per day for regular 8 hours of work. Any hours over that are paid overtime rate of 100/- per hour. From the employee's gross pay (total pay per month), 2% is deducted for professional tax, 10% for provident fund and 5% for income tax. However, the employee will get 2% (of the gross pay) for the education of a child. Write a program to create a structure of employee and read data of 'N' employees as follows: (7M) CO4

(i) the number of extra hours (which the employee worked during a month).

(ii) the number of children the employee has.

The program should output the 'N' employees gross pay (total pay earned by the employee by working) and net take-home pay (after deductions and earning for child education). Assume all months have 30 days.

(OR)

9. (a) Write a program to create a *structure 'student'* with the member variable number, name, marks and branch. Read sixty students details. Then your program should display the names of the students who got more than 60 marks of CSE branch with name 'Aditya'. (7M) CO4

(b) Two files FILE1.txt and FILE2.txt contain sorted lists of integers. Write a program to produce a third file DATA.txt which holds a single sorted, merged list of these two lists. (7M) CO4

Example:

File1.txt	File2.txt	DATA.txt
1	3	1
5	6	3
8	9	5
		6
		8
		9

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