BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - II Computer Science & Engineering AI & ML : SUMMER : 2025
SUBJECT: MATHEMATICS FOR COMPUTING-II

Day : Thursday
Date : 22/05/2025

S-23929-2025

Time : 10:00 AM-01:00 PM
Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Draw neat and labelled diagrams **WHEREVER** necessary.
4) Assume suitable data, if necessary.

Q. 1 Obtain Fourier series expansion for function $f(x) = \left(\frac{\pi - x}{2}\right)^2$ in the interval $0 \le x \le 2\pi$ and $f(x + 2\pi) = f(x)$. **(10)**

OR

Q. 1 Find the Fourier expansion for $f(x) = \frac{x^2}{4}$ $(0 \le x \le 2\pi)$. **(10)**

Q. 2 Find the Fourier cosine transform of $f(x) = e^{-x} + e^{-3x}$. **(10)**

OR

Q. 2 Find the Fourier sine transform of $f(x) = \begin{cases} x & 0 \le x \le 1 \\ 2 - x & 1 \le x \le 2 \\ 0 & x > 2 \end{cases}$ **(10)**

Q. 3 Obtain the Laplace transform of $t^2 \sin 3t$. **(10)**

OR

Q. 3 Find the inverse Laplace transform of $\frac{1}{(s+4)(s-3)}$. **(10)**

Q. 4 Evaluate $\int_0^1 \int_x^{\sqrt{x}} (x^2 + y^2)\, dx\, dy$. **(10)**

OR

Q. 4 Solve $\int_0^1 \int_0^y xye^{-x^2}\, dx dy$. **(10)**

Q. 5 Find the directional derivative of $\phi = xy^2 + yz^3$ at $(2, -1, 1)$ in the direction of $\bar{i} - 3\bar{j} + 3\bar{k}$ **(10)**

OR

Q. 5 Evaluate $\nabla \cdot (r^3\, \bar{r})$. **(10)**

Q. 6 Find work done by $\bar{F} = (x^2 - yz)\,\bar{i} + (y^2 - zx)\,\bar{j} + (z^2 - xy)\bar{k}$ in taking a particle from $(1, 1, 1)$ to $(3, -5, 7)$. **(10)**

OR

Q. 6 Verify Green's theorem for the field $\bar{F} = x^2\,\bar{i} + xy\,\bar{j}$ over the region R enclosed by $y = x^2$ and $y = x$. **(10)**

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