BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
B. Tech. Sem - II Computer Science & Engineering-AI & ML : WINTER : 2024
SUBJECT: MATHEMATICS FOR COMPUTING-II

Day : Saturday
Date : 30/11/2024

W-23929-2024

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 Find Fourier series of $f(x) = x \quad (-\pi < x < \pi)$ **(10)**

OR

Q. 1 Find Fourier series expansion of : $f(x) = e^{-x} \quad (0 \le x \le 2\pi)$ **(10)**

Q. 2 Find Fourier transform of $f(x) = \begin{cases} 1 - x^2 & |x| < 1 \\ 0 & \text{otherwise} \end{cases}$ **(10)**

OR

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

Q. 3 Find Laplace transform of $\frac{\sin t}{t}$ **(10)**

OR

Q. 3 Find inverse Laplace transform of $\frac{1}{(s-1)(s+2)(s+3)}$ **(10)**

Q. 4 Evaluate: $\int_0^1 \int_0^{1-x} x^2 y \, dxdy.$ **(10)**

OR

Q. 4 Solve: $\int_0^1 \int_x^{x^2} (x + y) \, dxdy.$ **(10)**

Q. 5 Find directional derivative of
$\phi = e^{2x-y-z}$ *at* $(0, 0, 0)$ in the direction of $\bar{i} - \bar{j} + \bar{k}$ **(10)**

P. T. O.

OR

Q. 5 Find : $\nabla^2\left(e^r\right)$. (10)

Q. 6 Find the work done in moving a particle once round the ellipse $\frac{x^2}{25}+\frac{y^2}{16}=1,\ z=0$ under the field of force given by (10)

$\bar{F}=\left(2x-y+2z\right)\bar{i}+\left(x+y-z^2\right)\bar{j}+\left(3x-2y+3z\right)\bar{k}$

OR

Q. 6 Evaluate: $\iint_S\left(x^3\,\bar{i}+y^3\,\bar{j}+z^2\,\bar{k}\right)\circ d\bar{s}$ where S is the surface of the sphere (10)

$x^2+y^2+z^2=4$.

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