

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II Computer Science & Engineering : WINTER: 2025
SUBJECT: ENGINEERING MATHEMATICS-II

Day : Thursday
Date : 20/11/2025

W-27693-2025

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 a neat diagram **WHEREVER** necessary.
- 4) Assume suitable data if **WHEREVER** necessary.

Q.1 Solve $\frac{dy}{dx} = \frac{x+2y-3}{2x+y-3}$. (10)

OR

Solve $(x-y)^2 dx + 2xydy = 0$.

- Q.2 A resistance of 50Ω and an inductance of 0.5h are connected in series with a battery of 20V . Find the current in the circuit when initially current $I=0$. (10)

OR

If the temperature of the body drops from 100°c to 60°c in one minute when the temperature of the surrounding is 20°c , what will be the temperature of the body at the end of the second minute?

- Q.3 Find Fourier cosine series of (10)

$$f(x) = \begin{cases} x & 0 < x < \frac{\pi}{2} \\ \pi - x & \frac{\pi}{2} < x < \pi \end{cases}$$

OR

Find Fourier series for $f(x) = \frac{x^2}{4}$ in $(-\pi, \pi)$.

- Q.4 Find reduction formula for $I_n = \int \sec^n x dx$. (10)

OR

Show that $\int_0^{\frac{\pi}{2}} \frac{e^{-x} - e^{-ax}}{x \sec x} dx = \frac{1}{2} \log \left(\frac{a^2 + 1}{2} \right)$.

- Q.5 Find the equation of right circular cone whose vertex is $(1, -1, 2)$ and axis is the line $\frac{x-1}{2} = \frac{y+1}{1} = \frac{z-2}{-2}$ and semi vertical angle 45° . (10)

OR

Find the equation of sphere passing through $(4, -1, 2)$, $(0, -2, 3)$, $(1, 5, -1)$ and $(2, 0, 1)$.

- Q.6 Evaluate $\int_0^a \int_0^x \int_0^{\sqrt{x+y}} 1 dx dy dz$. (10)

OR

Evaluate $\iint_R y dx dy$ where R is area bounded by $x=0$, $y=x^2$ and $x+y=2$ in the first quadrant.

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