BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II Information Technology : WINTER: 2025
SUBJECT: ENGINEERING MATHEMATICS-II

Day : Thursday
Date : 20/11/2025

W-27742-2025

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 $50\,\Omega$ 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 $\int_0^\infty \frac{e^{-x}-e^{-ax}}{x\sec x}dx=\frac{1}{2}\log\left(\frac{a^2+1}{2}\right)$.

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 $\int_0^a\int_0^x\int_0^{\sqrt{x+y}} 1\,dxdydz$. **(10)**

OR

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

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