

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II Computer Science & Engineering-AI & ML : WINTER : 2024
SUBJECT: ENGINEERING MATHEMATICS-II

Day : Saturday
Date : 30/11/2024

W-27700-2024

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) Assume suitable data **WHEREVER** necessary.

Q.1 Solve $(4x+3y+1)dx+(3x+2y+1)dy=0$. (10)
OR

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

Q.2 A resistance of 100 ohms and an inductance of 0.5 henry are connected in series with a battery of 20 volts. Find the current in the circuit when $I=0$ at $t=0$. Also, find the time that elapses before the current reaches on half of its maximum value? (10)

OR

Q.2 A pipe 20 cm in diameter contains steam at 150°C and is protected with a covering 5cm thick material for which $k=0.0025$. If the temperature of the outer of the covering is 40°C , find the temperature half-way through the covering under steady state conditions. (10)

Q.3 Obtain the Fourier cosine series for $f(x)=\sin x$ in $(0,\pi)$. (10)

OR

Q.3 Find the Fourier series for $f(x)=\pi^2-x^2$ in $(-\pi,\pi)$. (10)

Q.4 If $U_n = \int_0^{\pi/4} \tan^n \theta d\theta$. Show that $n(U_{n+1}+U_{n-1})=1$. (10)

OR.

Q.4 Show that $\int_a^b e^{-x^2} dx = \frac{\sqrt{\pi}}{2} (\text{erf}(b) - \text{erf}(a))$. (10)

Q.5 Find the equation of sphere passing through $(0,0,0)$, $(0,-1,1)$, $(-1,2,0)$ and $(1,2,3)$. (10)

OR

Q.5 Find the equation of right circular cone whose vertex is $(0,0,0)$ and axis is the line $\frac{x}{1} = \frac{y}{2} = \frac{z}{3}$ and semi vertical angle is 30° . (10)

Q.6 Evaluate $\iint_R \sqrt{xy(1-x-y)} dx dy$ over the region bounded by $x=0, y=0$ and $x+y=1$. (10)

OR

Q.6 Evaluate $\int_0^a \int_{y^2/a}^y \frac{y}{(a-x)\sqrt{ax-y^2}} dx dy$. (10)
