

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II INFORMATION TECHNOLOGY : SUMMER : 2025
SUBJECT: ENGINEERING MATHEMATICS-II

Day : Thursday
Date : 22/05/2025

S-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) Assume suitable data **WHEREVER** necessary.

Q.1 Solve $\frac{dy}{dx} = \frac{y-x+1}{y+x-5}$. (10)

OR

Q.1 $(x^2 + y^2 + 1)dx - 2xydy = 0$. (10)

Q.2 Water at temperature 100°C cools in first 10 minutes to 88°C in a room at temperature 25°C . Find the temperature of water in 20 minutes. (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 series for $f(x) = x \sin x$ in $(-\pi, \pi)$. (10)

OR

Q.3 Find the Fourier series for $f(x) = x^3$ 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 Evaluate $\int_0^1 \frac{dx}{\sqrt{x \log\left(\frac{1}{x}\right)}}$ (10)

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

OR

Q.5 Find the equation of right circular cylinder of radius 2 and equation of axis is $\frac{x-1}{2} = \frac{y-2}{-3} = \frac{z-3}{6}$. (10)

Q.6 Evaluate $\iint_R \frac{xy dx dy}{\sqrt{1-y^2}}$ over the positive quadrant of the circle $x^2 + y^2 = 1$. (10)

OR

Q.6 Evaluate $\int_0^a \int_0^{\sqrt{a^2-y^2}} \frac{xy \log(x+a)}{(x-a)^2} dx dy$. (10)
