

BACHELOR OF TECHNOLOGY (CBCS - 2023)
B. Tech. Sem-II COMPUTER SCIENCE & ENGINEERING : SUMMER : 2024
SUBJECT: ENGINEERING MATHEMATICS-II

Day : Tuesday
Date : 21/05/2024

S-27693-2024

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

OR

Q.1 Solve $(x^3 + y^3)dx - xy^2dy = 0$. (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 body of temperature 100°C is placed in room whose temperature is 25°C and cools to 50°C in one minutes, What will be its temperature after a further interval of 5 minutes. (10)

Q.3 Show that, if $0 < x < \pi$, $\cos x = \frac{8}{\pi} \sum_{m=1}^{\infty} \frac{m}{4m^2-1} \sin 2mx$ (10)

OR

Q.3 Find the Fourier series for $f(x) = \frac{x^2}{4}$ in $(-\pi, \pi)$. (10)

Q.4 If $f(x) = \int_0^x (x-t)^2 G(t) dt$ then prove that $\frac{d^3 f}{dx^3} = 2G(x)$. (10)

OR

Q.4 Prove that $\operatorname{erf}_c(-x) + \operatorname{erf}_c(x) = 2$.

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 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 is 45° . (10)

Q.6 Evaluate $\iint_R y dx dy$ over the region bounded by $x=0$, $y=x^2$ and $x+y=2$ in the first quadrant. (10)

OR

Q.6 Evaluate $\int_0^1 \int_0^{\sqrt{1-y^2}} \frac{\cos^{-1} x}{\sqrt{(1-x^2-y^2)(1-x^2)}} dx dy$. (10)
