# BACHELOR OF TECHNOLOGY (CBCS - 2023)
## B. Tech. Sem-II INFORMATION TECHNOLOGY : SUMMER : 2024
## SUBJECT: ENGINEERING MATHEMATICS-II

Day : Tuesday
Date : 21/05/2024

S-27742-2024

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.

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**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 $100^0$c is placed in room whose temperature is $25^0$c and cools to $50^0$c in one minutes, What will be its temperature after a further interval of 5 minutes. **(10)**

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

**OR**

**Q.4** Prove that $erf_c(-x)+erf_c(x)=2$. **(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 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 $45^0$. **(10)**

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

**OR**

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

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