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

Day : Tuesday | Time : 10:00 AM-01:00 PM
Date : 21/05/2024 | **S-27693-2024** | Max. Marks : 60

N. B. :

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.
3) Use of non-programmable calculator is **ALLOWED**.
4) Assume suitable data, if necessary.

Q. 1 Find the Fourier series of (10)

$$f(x)=\begin{cases}\cos x & -\pi < x < 0\\ \sin x & 0 < x < \pi\end{cases}$$

OR

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

Q. 2 Find the Fourier cosine transform of $f(x)=2e^{-5x}+5e^{-2x}$. (10)

OR

Find inverse Fourier cosine transform of $\frac{\sin a\lambda}{\lambda}$. (10)

Q. 3 Find the inverse Laplace transform of $\frac{s^2}{(s+a)^3}$. (10)

OR

Find the Laplace transform of $t\int_0^t e^{-2t}\sin t\,dt$. (10)

Q. 4 Change the order of $\int_1^2\int_y^{y^2} f(x,y)\,dx\,dy$. (10)

OR

Evaluate $\int_0^{\infty}\int_0^1 \frac{dx\,dy}{1+yx^2}$. (10)

Q. 5 Find $\nabla^2 e^r$ where $r=\sqrt{x^2+y^2+z^2}$. (10)

OR

Show that $\overline{F}=(6xy+z^3)\bar{i}+(3x^2-z)\bar{j}+(3xz^2-y)\bar{k}$ is irrotational. Find the scalar ϕ such that $\overline{F}=\nabla\phi$. (10)

Q. 6 Using Green's theorem evaluate $\int_c (xy-x^2)dx+y^2dy$ along the curve c formed by $y=0$, $x=1$, $y=x$. (10)

OR

Evaluate $\iint_s (4xz\bar{i}-y^2\bar{j}+yz\bar{k}).d\bar{s}$ over the cube bounded by the planes $x=0$, $x=2$, $y=0$, $y=2$, $z=0$, $z=2$. (10)

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