BACHELOR OF TECHNOLOGY (CBCS) (2021-COURSE)
Computer Science & Engineering
B. Tech. Sem - II :SUMMER : 2023
SUBJECT : MATHEMATICS FOR COMPUTING-II

Day : Monday | Time : 10:00 AM-01:00 PM

Date : 22-05-2023 | **S-24024-2023** | Max. Marks : 60

N.B.:

1) All questions are **COMPULSORY**.
2) Figures to the right indicate **FULL** marks.

Q.1 Find the Fourier series of $f(x)=x^2$ *in* $(-\pi,\pi)$. Hence show that $\frac{1}{1^2}+\frac{1}{2^2}+\frac{1}{3^2}+------=\frac{\pi^2}{16}$. **(10)**

OR

Q.1 Find the cosine series of sinx in $(0,\pi)$. Hence show that $1-\frac{1}{3}+\frac{1}{5}-\frac{1}{7}+---=\frac{\pi}{4}$. **(10)**

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

OR

Q.2 If $f_s(\lambda)=\frac{e^{-a\lambda}}{\lambda}$ then find $f(x)$. **(10)**

Q.3 Obtain the Laplace transform of: *i)* $t\sin^3 t$ *ii)* $\frac{1-\cos t}{t}$ **(10)**

OR

Q.3 Find: *i)* $L^{-1}\left(\frac{s}{s^2+4}\right)$ *ii)* $L^{-1}\left(\frac{2s}{(s^2-4)^2}\right)$ **(10)**

Q.4 Evaluate $\iint_R x^{m-1}y^{n-1}dxdy$ where R is area bounded by $x+y=k,\ x=0, y=0$. **(10)**

OR

Q.4 Change the order of following integration $\int_0^1\int_x^{1/x} f(x,y)dxdy$. **(10)**

Q.5 *i)* Find $\nabla^2(e^r)$ where $r=\sqrt{x^2+y^2+z^2}$ *ii)* Find $\nabla.(r^3\bar{r})$. **(10)**

OR

Q.5 *i)* Find $\nabla^2 f(r)$ where $r=\sqrt{x^2+y^2+z^2}$ *ii)* Show that the vector field $\bar{F}=(y^2\cos x+z^2)\bar{i}+2y\sin x\bar{j}+2xz\bar{k}$ is conservative. **(10)**

Q.6 Verify stoke's theorem for $\bar{F}=x^2\bar{i}+xy\bar{j}$ for the surface of a square lamina bounded by $x=-1, x=1,\ y=-1,\ y=1$. **(10)**

OR

Q.6 Find by using the Green theorem $\int_C (xy-y^2)dx+x^2ydy$ along the closed curve bounded by $x=1,\ y=0$ and $y=x$. **(10)**

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