BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)
B. Tech. Sem - II IT :SUMMER- 2022
SUBJECT : MATHEMATICS FOR COMPUTING-II

Day : Tuesday   Time : 10:00 AM-01:00 PM

Date : 26-07-2022   **S-24111-2022**   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 Obtain Fourier series for the function $f(x) = \left(\dfrac{x-\pi}{2}\right)^2$ in the interval **(10)** $0 \le x \le 2\pi$ and $f(x+2\pi) = f(x)$.

OR

Q.1 Find cosine series for $\sin x$ in the interval $0 < x < \pi$. **(10)**

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

OR

Q.2 Find the Fourier sine transform of $\dfrac{e^{-\alpha x}}{x}$. **(10)**

Q.3 Find the Laplace transform of $\dfrac{\cos\sqrt{t}}{\sqrt{t}}$. **(10)**

OR

Q.3 Find the inverse Laplace transform of $\dfrac{2s^2 - 6s + 5}{s^3 - 6s^2 + 11s - 6}$. **(10)**

Q.4 Evaluate $\iint\limits_{R} \sqrt{xy(1-x-y)}\,dxdy$ where R is the area bounded by **(10)** $x = 0, y = 0$ and $x + y = 1$.

OR

Q.4 Solve $\displaystyle\int_{0}^{1}\int_{1}^{\sqrt{2-y^2}} \dfrac{y\,dxdy}{\sqrt{(2-x^2)(1-x^2y^2)}}$. **(10)**

Q.5 Solve $\nabla^4\left(e^{-r}\right)$. **(10)**

OR

Q.5 Show that $\overline{F} = \left(y^2\cos x + z^2\right)\overline{i} + 2y\sin x\,\overline{j} + 2xz\overline{k}$ is irrotational and find **(10)** scalar field ϕ and such that $\overline{F} = \nabla\phi$.

Q.6 Find the work done by the force $\overline{F} = 3xy\overline{i} - y\overline{j} + 2xz\overline{k}$ in moving a particle **(10)** around the circle $x^2 + y^2 = 4$.

OR

Q.6 Use divergence theorem to evaluate **(10)** $\iint\limits_{S}\left(x^3\overline{i} + y^3\overline{j} + z^3\overline{k}\right)\cdot d\overline{s}$ where S is the surface of $x^2 + y^2 + z^2 = 4$.

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