

BACHELOR OF TECHNOLOGY (C.B.C.S.) (2021-COURSE)

B. Tech. Sem - II COMPUTER :SUMMER- 2022

SUBJECT : MATHEMATICS FOR COMPUTING-II

Day : Tuesday
Date : 26-07-2022

S-24011-2022

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) Use of non-programmable **CALCULATOR** is allowed.
- 4) Assume suitable data if necessary.

Q.1 Obtain Fourier series for $x \sin x$ ($0 \leq x \leq 2\pi$). **[10]**

OR

Q.1 Find Fourier series to represent the function $f(x) = \pi^2 - x^2$ ($-\pi \leq x \leq \pi$). **[10]**

Q.2 Find the Fourier sine transform of $\frac{e^{-ax}}{x}$ and evaluate $\int_0^{\infty} \tan^{-1}\left(\frac{x}{a}\right) \sin x \, dx$. **[10]**

OR

Q.2 Using inverse sine transform, find $f(x)$ if $F_s(\lambda) = \frac{e^{-a\lambda}}{\lambda}$. **[10]**

Q.3 Find the Laplace transform of $\frac{1 - \cos t}{t^2}$. **[10]**

OR

Q.3 Find the inverse Laplace transform of $\frac{4s+5}{(s-1)^2(s+2)}$. **[10]**

Q.4 Evaluate : $\int_0^a \int_0^{\sqrt{a^2-y^2}} \frac{xy \log(x+a)}{(x-a)^2} \, dx \, dy$. **[10]**

OR

Q.4 Evaluate : $\iint_R x^3 y \, dx \, dy$ over positive quadrant of $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$. **[10]**

Q.5 Find $\nabla^4(r^2 \log r)$. **[10]**

OR

Q.5 Find the directional derivative of $\phi = xy^2 + yz^4$ at $(1, -1, 1)$ in the direction of $2\hat{i} - \hat{j} + 3\hat{k}$. **[10]**

Q.6 Verify Green's theorem for the $\vec{F} = 2x^2\hat{i} + 3xy\hat{j}$ over the region of $R: x=0, y=0, x+y=1$. **[10]**

OR

Q.6 Evaluate : $\int_C \vec{F} \cdot d\vec{r}$ for $\vec{F} = (2y+3)\hat{i} + xz\hat{j} - (x-yz)\hat{k}$ **[10]**

Along $x^2 = 2t^2, y = t, z = t^3$ from $t = 0$ to $t = 1$.

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