U V Patel College of Engineering-Ganpat University

B.Tech. Sem-I (C.E/I.T/C.E-AI.) First Internal Examination.

Subject: (2BS4101) Mathematics for Computer Engineering & Information Technology

Date: 27/02/2023 **Time: 1 hour** **Total marks: 20**

Question-1 Attempt any Five. **(20)**

(1) Find Fourier series for $f(x)=x^2+x$ in the interval $-\pi<x<\pi$

(2) Obtain the Fourier series of $f(x)=\begin{cases}-\pi, & -\pi\le x\le 0\\ x, & 0\le x\le\pi\end{cases}$ and show that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots\ldots=\frac{\pi^2}{8}$

(3) Express function $f(x)=x, 0<x<2$ as a half range sine series and half range cosine series.

(4) Evaluate: (a) $L\{e^{3t}.t.\cos t\}$ (b) $L\left\{\frac{1-e^t}{t}\right\}$

(5) Using Convolution theorem, evaluate $L^{-1}\left\{\frac{s}{(s^2+4)(s^2+9)}\right\}$

(6) Using partial fraction method, evaluate $L^{-1}\left\{\frac{1}{(s+2)^2(s-1)}\right\}$

(7) Find the Laplace transform of periodic square wave function defined by

$$f(t)=\begin{cases}k & \text{if } 0<t<a\\ -k & \text{if } a<t<2a\end{cases} \quad \text{where} \quad f(t+2a)=f(t)$$

End of Paper

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