Total No. of Questions : 8] *[Total No. of Printed Pages : 2*

Roll No .....

BE-3001(CS)-CBGS

B.E., III Semester

Examination, December 2020

Choice Based Grading System (CBGS)

Mathematics - III

Time : Three Hours

Maximum Marks : 70

Note: i) Attempt any five questions.

ii) All questions carry equal marks.

1. Find Fourier series expansion of the function $f(x) = |x|, -\pi < x < \pi$.

2. Find Fourier sine transform of $e^{-|x|}$. Hence, evaluate

$$\int_0^\infty \frac{x \sin mx}{1+x^2} dx.$$

3. Find the Fourier transform of

$$f(x) = \begin{cases} 1-x^2, & |x| \le 1 \\ 0, & |x| > 1 \end{cases}$$

4. Evaluate $\int_0^\infty t e^{-3t} \sin t \, dt$

5. Suppose a continuous random variable X has density function.

$$f(x)=\begin{cases} k(1-x^2) & for \quad 0<n<1 \\ 0, & elsewhere \end{cases}$$

i) Find k

ii) Find $P(0.1 < n < 0.2)$

iii) $P(x > 0.5)$.

6. Find mean and variance of a continuous random variable X where density function is given by

$$f(x)\begin{cases} \frac{1}{4}e^{\frac{-x}{4}}, & \text{for} \quad n>0 \\ 0, & otherwise \end{cases}$$

7. Find the Fourier series for $f(x)=\begin{cases} -\pi, & -\pi<x<0 \\ x, & 0<x<\pi \end{cases}$

and deduce that $\frac{1}{1^2}+\frac{1}{3^2}+\frac{1}{5^2}+\ldots=\frac{\pi^2}{8}$

8. a) Explain Poisson and Normal distribution.

b) Fit a second degree parabola to the following data:

x:	0	1	2	3	4
y:	1	1.8	1.3	2.5	6.3

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