

Roll No

BE-3001 (EC) (CBGS)**B.E., IV Semester**

Examination, May 2018

Choice Based Grading System (CBGS)**Mathematics - III***Time : Three Hours**Maximum Marks : 70**Note:* i) Attempt any five questions out of eight.

ii) All questions carry equal marks.

1. a) Find the Fourier series to represent the function

✓ $f(x) = x^2$ in $(-\pi, \pi)$.

b) Expand $f(x) = \pi x - x^2, 0 < x < \pi$ in a half range sine series.2. a) Find Fourier sine transform of $\frac{e^{-ax}}{x}$.b) Find the cosine transform of $\frac{1}{x^2 + a^2}$

3. ✓ a) Find Laplace transform of the followings:

i) $2 \sin t \cos t$

ii) $(t^2 + 1)^2$

b) Find Laplace transform of the followings:

i) $t \sin at$

ii) $t^n e^{at}$

4. ✓ a) Evaluate the followings:

i) $L^{-1} \left\{ \frac{3s + 7}{s^2 - 2s - 3} \right\}$

ii) $L^{-1} \left\{ \frac{3s - 2}{s^2 - 4s + 20} \right\}$

b) Using convolution theorem, evaluate

$$L^{-1} \left\{ \frac{1}{(s-1)(s-2)} \right\}$$

5. a) Find the value of k for which the function

$$f(x) = \begin{cases} kx^2, & 0 \leq x \leq 3 \\ 0, & \text{otherwise} \end{cases}$$

is a probability density function. Also, compute $p(1 \leq x \leq 2)$.

- b) A coin is tossed 4 times. What is the probability of getting
- two heads
 - at least two heads
6. a) Use Poisson distribution to find the probability of at most 5 defective fuses in a box of 200 fuses. Experience shows that 2% of such fuses are defective.
- b) Find mean and variance of binomial distribution.

7. a) Use least square method to Dot a straight line to the data

x	1	2	3	4
y	3	7	13	21

- b) Dot a Poisson distribution to the set of observations.

x	0	1	2	3	4
y	122	60	15	2	1

8. a) If there are 3 misprints in a book of 1000 pages, find the probability that a given page will contain
- No misprint
 - More than 2 misprints

b) Find $L\left\{\frac{1-e^t}{t}\right\}$