

Roll No.

Total No. of Pages : 02

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B.Tech.(ECE) (Sem.-3)

**MATHEMATICS III**

Subject Code : BTAM-303-18

M.Code : 76448

Date of Examination : 24-05-2023

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTIONS TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.

**SECTION-A**

1. Write briefly :

- a) State second shifting theorem of Laplace transform.
- b) Evaluate  $L^{-1}\left(\frac{9}{3s+2}\right)$ .
- c) Find the Fourier coefficient  $a_n$  for the function  $f(x) = x$ .
- d) What is the Inversion formula for Fourier transform?
- e) What is the Z-transform of  $\{^nC_k\}$  where  $0 \leq k \leq n$ ?
- f) State Final value theorem of Z-transform.
- g) What do you mean by mutually exclusive events?
- h) The mean and variance of binomial distribution is 9 and  $\frac{4}{3}$  respectively. Find  $P(X \geq 1)$ .
- i) Define Degrees of Correlation.
- j) Explain the term, "Simple and Composite hypothesis" with examples.

## SECTION-B

2. Find the Laplace transform of the following function of  $t$ ,  $t \geq 0$ .

$$e^{2t} \sin 3t \cos t.$$

3. Evaluate  $L^{-1} \left( \frac{1}{(s^2 + 6s + 13)^2} \right)$

4. Find the Z-transform of  $\left(\frac{3}{4}\right)^n - \left(-\frac{1}{3}\right)^n$ .

5. A bag contains 4 red and 3 black balls. A second bag contains 2 red and 4 black balls. One ball is selected at random. From the selected bag, one ball is drawn. Find the probability that the ball drawn is red.

6. Fit a straight line to the following data considering  $y$  as a dependent variable:

$x$	1.1	2	3	5	6.5
$y$	0	1	2	3	4

## SECTION-C

7. Express  $\sin x$  as a cosine series in  $0 < x < \pi$ .

8. Fit a poisson distribution to the following data:

$x$	0	1	2	3	4
$f$	109	65	22	3	1

9. Apply Convolution theorem to find inverse Laplace transform of  $\left( \frac{1}{s(s^2 + 9)^2} \right)$ .

**NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.**