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Total No. of Questions: 18

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B.Tech.(ECE) (2018 Batch) (Sem.-3) MATHEMATICS III Subject Code : BTAM-303-18 M.Code : 76448

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**

## Write briefly :

- 1. Find Laplace of  $(\cos t) u_1(t)$
- 2. Find L ( $e^t t^2$ )
- 3. Find  $a_n$  if  $f(x) = x^3$ , where  $x \in (-2, 2)$ .
- 4. Discuss behavior of Fourier series near a point of discontinuity of

$$f(x) = \begin{cases} 1, & -\pi < x < 0\\ -1, & 0 \le x \le \pi \end{cases}$$

- 5. Find  $Z \{ \sin(n+1) \theta \}$
- 6. Find relationship between Laplace and Fourier Transform.
- 7. Two cards are drawn one after the other from a well shuffled deck of 52 cards. Find the probability that both are spade, if the first card is not replaced.
- 8. If X is Poisson variate satisfies P(X = 1) = 0.5 P(X = 2), find mean and variance.
- 9. Define F-test
- 10. Discuss method to fit Parabola.

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### **SECTION-B**

11. State convolution theorem and find  $L^{-1}\left(\frac{6s}{(s^2 - 16)^2}\right)$ 

- 12. Find the Fourier sine series of the function  $f(x) = \sin 3x$ ,  $0 \le x \le \pi$ .
- 13. Solve difference equation  $y_{n+2} 2y_{n+1} + y_n = n, y_0 = 1, y_1 = 1$ .
- 14. In a distribution, 12% of the item are under 30 and 85% are under 60. Find the mean and standard deviation of the distribution.
- 15. Two independent sample have 28 and 19 pair of observations with correlation coefficient 0.55 and 0.75 respectively. Are these values consistent with the hypothesis that both the samples are drawn from the same population?

#### **SECTION-C**

- 16. Using Laplace transform to solve the initial value problem  $u_{tt} = u_{xx}$ , 0 < x < 1, t > 0, subject to u(x, 0) = 0,  $u_t(x, 0) = \sin 3\pi x$ ,  $u(0, t) = \sin t$ , u(1, t) = 0.
- 17. Using convolution  $F^{-1}\left(\frac{1}{6+5i\omega-\omega^2}\right)$ .
- 18. Find correlation coefficient of the following bivariate frequency distribution data :

	59-62	63-66	67-70	71-74	75-78
90-109	2	1			
110-129	7	8	4	2	
130-149	5	15	22	7	1
150-169	<u>2</u>	122	63	19	5
170-189		7	28	32	12
190-209		2	10	20	7
210-229			1	4	2

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.

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