

Final 21-02-2022

Course Code: 1930005

Roll No:

MLRS- R19



# MARRI LAXMAN REDDY INSTITUTE OF TECHNOLOGY AND MANAGEMENT

(AN AUTONOMOUS INSTITUTION)

(Approved by AICTE, New Delhi & Affiliated to JNTUH, Hyderabad)

Accredited by NBA and NAAC with 'A' Grade & Recognized Under Section 2(f) & 12(B) of the UGC act, 1956

II B.Tech I Sem Supplementary Examination, February-2022

## Probability Statistics and Complex Variables

(MECHANICAL)

Time: 3 Hours.

Max. Marks: 70

Note: 1. Answer any FIVE questions.

2. Each question carries 14 marks and may have a, b as sub questions.

- 1 a) The probability density  $f(x)$  of a continuous random variable is given by  $f(x) = k(1 - x^2)$  for  $0 < x < 1$   
 $= 0$  other wise  
Find the value of  $K$  7M CO1 BL3
- b) The probabilities that students A, B, C, D solve a problem are  $1/3$ ,  $2/5$ ,  $1/5$  and  $1/4$  respectively. If all of them try to solve the problem, that is the probability that the problem is solved. 7M CO1 BL3
- 2 A random variable  $X$  has the following probability function 14M CO1 BL3
- |      |   |   |    |    |    |       |        |            |
|------|---|---|----|----|----|-------|--------|------------|
| X    | 0 | 1 | 2  | 3  | 4  | 5     | 6      | 7          |
| P(x) | 0 | K | 2k | 2K | 3K | $K^2$ | $2K^2$ | $7K^2 + K$ |
- Find i)k ii)  $P(X < 6)$  iii) Mean
- 3 a) Out of 800 families with 5 children each how many would you expect to have a) 3 boys b) 5 girls c) either 2 or 3 boys. 7M CO2 BL3
- b) If the probability of a bad reaction from a certain injection is 0.001, determine the chance that out of 2000 individuals more than two will get a bad reaction. 7M CO2 BL3
- 4 Fit a Binomial distribution for the following data and compare the theoretical frequencies with actual ones. 14M CO2 BL5
- |   |   |    |    |    |    |   |
|---|---|----|----|----|----|---|
| x | 0 | 1  | 2  | 3  | 4  | 5 |
| f | 2 | 14 | 20 | 34 | 22 | 8 |
- 5 a) In a sample of 1000 students 500 use ball pens and in another sample of 3500 students 1400 use ball pens. Test the significance between the difference of two proportions at 5% level 7M CO3 BL3
- b) An ambulance service claims that it takes on the average less than 10 minutes to reach its destination in emergency calls. A sample of 36 calls has a mean of 11 min. and the variance of 16 minutes. Test the significance at 0.05 levels 7M CO3 BL3
- 6 In a random sample of 125 cola drinkers, 68 said they prefer thumsup to Pepsi. Test the null hypothesis  $P=0.5$  against the alternative hypothesis  $P > 0.5$ . 14M CO3 BL3

- 7 a) If  $f(z) = u + iv$  is analytic, prove that  $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right) |f(z)|^2 = 4|f'(z)|^2$  7M CO4 BL3
- b) Find most general analytic function whose real part is  
 $u = x^2 - y^2 - x$  7M CO4 BL3
- 8 Using Cauchy's integral formula evaluate  $\oint_C \frac{z dz}{(z-1)(z-3)}$  where C is 14M CO5 BL3  
the circle (i)  $|z| = 4$  (ii)  $|z| = 1.5$

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