

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 Regular End Examination, March 2021

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) For any three events A, B and C and $P(C) > 0$ then verify that 7M CO BL

$$P(A \cup B / C) = P(A / C) + P(B / C) - P(A \cap B / C).$$
- b) If A and B two independent event in a sample space S then prove that A and \bar{B} also independent. 7M CO BL
- 2 In a bolt factory machines A, B, C manufacture 20%, 30% and 50% of the total of their output and 6%, 3% and 2% are defective. A bolt is drawn at random and found to be defective. Find the probabilities that it is manufactured from (i) Machine A (ii) Machine B 14M CO BL
- 3 a) The distribution of the typing mistakes committed by a typist is given below assuming the distribution to be Poisson, find the expected frequencies. 7M CO BL
- | | | | | | | |
|--------|-----|----|----|----|---|---|
| x | 0 | 1 | 2 | 3 | 4 | 5 |
| $f(x)$ | 125 | 95 | 49 | 20 | 8 | 3 |
- b) Show that area under the normal curve is unity. 7M CO BL
- 4 Define Type-1 & Type-2 errors. In a certain industrial facility, accidents occur infrequently. It is known that the probability of an accident on any given day is 0.005 and accidents are independent of each other. (a) What is the probability that in any given period of 400 days there will be an accident on one day? (b) What is the probability that there are at most three days with an accident? 14M CO BL
- 5 a) A distributor of bean seeds determines from extensive test that 10% of large batch of seeds will not germinate. He sells the seeds in packets of 200 and guarantees 90% germination. Determine the probability that a particular packet will violate the guarantee. 7M CO BL
- b) Weights in kg. of 10 students are given as 38, 40, 45, 53, 47, 43, 55, 48, 52, 49. Can we say that variance of the distribution of weights of all students from which the above sample was taken is equal to 20 square kg. 7M CO BL
- 6 Show that $e^x(x \cos y - y \sin y)$ is harmonic function. Find the analytic for which $e^x(x \cos y - y \sin y)$ is imaginary part. 14M CO BL

Final
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FN

- 7 a) Prove that $\left(\frac{\partial^2}{\partial x^2} + \frac{\partial^2}{\partial y^2}\right)|f(z)|^p = p^2|f(z)|^{p-2}|f'(z)|^2$ where $W = f(z)$ is analytic function. 7M CO BL
- b) Expand $f(z) = \frac{1}{z^2 - z - 6}$ about $z = 1$. 7M CO BL
- 8 Evaluate $\int_C \frac{z^2 - 2z}{(z+1)(z-i)^2} dz$ where C is $|z| = 3$ by using Residue theorem. 14M CO BL

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