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Total No. of Pages : 02

Total No. of Questions : 11

M.Sc. (Mathematics) (2018 Batch) (Sem.-3)

MATHEMATICAL STATISTICS

Subject Code : MSM-303-18

M.Code : 76674

Time : 3 Hrs.

Max. Marks : 70

INSTRUCTIONS TO CANDIDATES :

1. SECTION-A is COMPULSORY consisting of FIVE questions carrying TWO marks each.
2. SECTION - B & C. have THREE questions each.
3. Attempt any FOUR questions from SECTION B & C carrying FIFTEEN marks each.
4. Select atleast TWO questions from SECTION - B & C each.

SECTION-A

1. Explain the term “lack of memory”.
2. What t -distribution approaches normal distribution?
3. Define the term level of significance.
4. If A and B are events such that $P(A) \neq 0$, $P(B) \neq 0$ and A is independent of B, then prove that B is independent of A.
5. State Markov’s Theorem.

SECTION-B

6. a) A random variable X is distributed at random between the values 0 and 1 so that its probability density function is $f(x) = kx^2(1-x^3)$ where k is constant. Find the value of k . Using this value of k , find its mean and variance.
- b) X_1, X_2, \dots, X_n be a sequence of mutually independent random variables with common distribution suppose X_k assumes only positive integral values and $E(X_k) = m$ exist; $k = 1, 2, \dots, n$. and $S_n = X_1 + X_2 + \dots + X_n$ then show that

$$E\left(\frac{S_m}{S_n}\right) = \frac{m}{n}$$

7. a) X_1 and X_2 are independent random variables, then prove that

$$\phi_{X_1+X_2}(t) = \phi_{X_1}(t) \phi_{X_2}(t)$$

- b) Find the moment generating function of the random variable whose moments are

$$\mu'_r = (r+1)! 2^r$$

8. a) State and prove multiplicative theorem of probability for independent events.
- b) Two computers A and B are to be marketed. A salesman who is assigned the job of finding customers for them has 60% and 40% chances respectively of succeeding in case of computers A and B. The two computers can be sold independently. Given that he was also able to sell at least one computer, what is the probability that computer A has been sold?

SECTION-C

9. Define binomial distribution. Obtain mean deviation about mean of binomial distribution and mode of binomial distribution.
10. Explain how you will use hyper geometric model to estimate the number of fish in a lake.
11. a) Define chi-square distribution. Obtain its M.G.F.
- b) Prove that a linear combination of independent normal variates is also a normal variate.

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.