B.Sc. DEGREE EXAMINATION,NOVEMBER 2018
II Year III Semester
Allied-Paper
MATHEMATICAL STATISTICS-I

Time : 3 Hours **Max.marks :75**

Section A $(10 \times 2 = 20)$ Marks

Answer any **TEN** questions

1. Define trial.
2. Define equally likely events.
3. Define discrete random variable?
4. Write the properties of distribution.
5. If C is a constant and Y=H(X) is a random variable then E(C.H(X))=C.E(H(X))
6. Define r^{th} moment about the origin.
7. Write any two examples of Bernoulli trials.
8. Write the mean and variance of normal distribution .
9. Write the MGF of gamma distribution.
10. Write the definition of beta distribution of first kind.
11. Define independent events.
12. Define poisson distribution.

Section B $(5 \times 5 = 25)$ Marks

Answer any **FIVE** questions

13. A coin is tossed twice. Find the probability of getting atleast one head.
14. Explain cumulative probability distribution function.
15. Find the mathematical expectation of the product of the points on n dice.
16. Find the rth moment about the origin, the mean and the standard deviation of the distribution whose p.d.f is given by
$$f(x) = \begin{cases} 2(1-x) & for \ \ 0 < x < 1 \\ 0, otherwise \end{cases}$$
17. Derive the mean of gamma distribution.
18. An integer is chosen at random out of the integers from 1 to 100. What is the probability that it is (i) multiple of 5 and (ii) divisible by 7.
19. Write the properties of normal distribution.

Section C $(3 \times 10 = 30)$ Marks

Answer any **THREE** questions

20. A company has three machines M_1, M_2, M_3 which produces 20%, 30% and 50% of the products respectively. Their respective defective percentages are 7, 3 and 5. From these products one is chosen and inspected. It is defective. What is the probability that is has been made by machine M_3.

21. A continuous random variable x has the following pdf
$$f(x) = \begin{cases} 3x^2 \ for \ 0 < x < 1 \\ 0, otherwise \end{cases}$$
Verify that it is a pdf and evaluate the following probabilities.

(i)$P\left(X \le \dfrac{1}{3}\right)$, (ii)$P\left(\dfrac{1}{3} \le X \le \dfrac{1}{2}\right)$

22. If X and Y are independent random variables defined on a sample space S then $E(XY) = E(X)E(Y)$

23. Derive the mode of binomial distribution.

24. Derive the mean and variance of Uniform distribution.

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