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Paper Code : BS-M301 Mathematics III

UPID : 003572

Time Allotted : 3 Hours *Full Marks :70*

The Figures in the margin indicate full marks.
Candidate are required to give their answers in their own words as far as practicable

Group-A (Very Short Answer Type Question)

1. Answer *any ten* of the following : [1 x 10 = 10]

(i) Write one use of Chi square test.

(ii) A random variable is uniformly distributed over the interval 2 and 10. Its variance will be .....

(iii) If x+4y+3=0 and 4x+9y+5=0 be the two regression lines then the expectation of y is ___

(iv) Find the mean of 21,32,43,54,65,76,87,98.

(v) If two fair coins are tossed, then the probability that we get at least one tail is .....

(vi) If random variable X has a binomial distribution with parameters 4 and 1/3, then P(X=1) =.....

(vii) Two variables x and y are related as 3x+4y=5 then correlation co efficient of x and y is .....

(viii) The first moment about 4 of the set of numbers 2,4,6,8 is

(ix) If P(A)=0.2, P(B)=0.3 then what is the value of P(AUB) if A and B are independent?

(x) The probability density function of a random variable is f(x)=k(2x-1) , where 0≤x≤2. Then the value of the parameter k is .....

(xi) Which probability distribution has the same expected value and variance?

(xii) A random variable X has a Poisson distribution such that P(1)=P(2). Then the Standard Deviation of X is .....

Group-B (Short Answer Type Question)

Answer *any three* of the following : [5 x 3 = 15]

2. A box contains 2 red & 3 green balls. Two balls are drawn from the box without replacement. [5]
a) If the 1st ball is green then what is the probability that the 2nd ball is also green?
b) What is the probability that the 2nd ball is Red where the first ball can have any colour?

3. Find the mean and standard deviation of the following distribution: [5]

Class-interval	4-6	6-8	8-10	10-12	12-14	14-16
Frequency	13	111	182	105	19	7

4. Find the skewness for the following distribution: [5]

x	55-58	58-61	61-64	64-67	67-70
f(x)	12	17	23	18	11

5. Obtain the Rank correlation coefficient from the following two series of observation: [5]

X	62	58	68	45	81	60	68	48	50	70
Y	68	64	75	50	64	80	75	40	55	64

6. A population consist of 5 numbers (2, 3, 6, 8, 11). Consider all possible samples of size two which can be drawn with replacement from this population. Calculate S.E of sample means. [5]

Group-C (Long Answer Type Question)

Answer *any three* of the following : [15 x 3 = 45]

7. (a) In a college there are 900 girl students out of total 2000 students. If a random group of 10 students are taken, then what is the probability that 4 girl students are selected? [5]

   (b) Probability that a target can be hit is 0.2. What is the probability that the target will be hit on 6th shot? [5]

   (c) A biased coin, with 0.6 probability of getting a head, is tossed repeatedly. What is the probability that the 6th head appears on the 15th toss? [5]

8. (a) Fit a linear trend equation to the following series on production: [5]
   Year: 1961. 1962. 1963. 1964. 1965. 1966
   Production :. 21. 37. 48. 56. 62. 69

   (b) Fit a parabolic curve of second degree to the data given below and estimate the value for 1986 and comment on it: [5]

Year :	1973.	1974.	1975.	1976.	1977
Sales(in 1000 Rs.) :.	10.	12.	13.	10.	8

   (c) The mean life time of a sample of 100 electric bulbs produced by a manufacturing company is estimated to be 1570 hours with a standard deviation of 120 hours. If u be the mean life time of all the bulbs produced by the company, test the hypothesis u=1600 hours against the alternative hypothesis u= 1600 hours, using a level of significance 0.05. [5]

9. (a) Calculate correlation coefficient between X and Y: [7]
   X: 155 157 153 151 159 162 158
   Y: 118 129 125 124 129 133 127

   (b) Calculate Pearson's coefficient of correlation from the following table using 44 and 26 are are as the origins or X and Y respectively. [8]
   X: 43 44 46 40 44 42 45 42 38 40 42 57
   Y: 29 31 19 18 19 27 27 29 41 30 26 10

10. (a) Show that the mean of the Binomial distribution with p probability of success and n trials is np. [7]

    (b) Find the mean and variance of a Poisson variate. [8]

11. (a) The number of telephone calls arriving on an internal switch board of an office is 90 per hour. Find the probability that at the most 1 to 3 calls in a minute on the board arrive. [5]

    (b) Six dice are thrown together at a time, the process is repeated 729 times. How many times do you expect at least three dice to have 4 to 6? [5]

    (c) Probability distribution of blood types in India is given in the table [5]

Types:	O	A	B	AB
Probability:	0.3712	0.2288	0.3226	0.0774

    A random sample of 10 is considered from Indian population. What is the probability that there will be 4 Os, 3 As, 2 Bs and 1 AB blood types, respectively?

*** END OF PAPER ***