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Paper Code : BS-M301 Mathematics III

UPID : 003465

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) What is the order of following differential equation, $(d^2y / dx^2)^3 + y = 0$?

   (II) Who provided the definition for probability?

   (III) If the probability of hitting an object is 0.8, find the variance.

   (IV) The partial differential equation by eliminating arbitrary constants a and b from $z=(x^2+a)(y^2+b)$ is _____ .

   (V) A bag contains 6 red 2 green 5 blue and balls. Two balls are picked at random. What is the probability that both are green?

   (VI) Find the mean of tossing 4 coins.

   (VII) If P(x) = 0.8 and x = 3, then find the value of E(x).

   (VIII) The general solution of non-linear partial differential equation $p = e^q$ is _____

   (IX) The Mean of a constant 'x' is.....

   (X) The probability of event equal to zero is called ----------

   (XI) Eliminating arbitrary constants a, b and c from z=ax+by+ct , the partial differential equation formed is _____ .

   (XII) An event is very unlikely to happen. Its probability is closest to ----------

Group-B (Short Answer Type Question)

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

2. A box contains 7 red balls and 14 black balls. Two balls are drawn at random without replacement. What is the probability that both are black? [5]

3. Average marks obtained by a class of 70 students was found to be 65. Later it was found that the marks of one student was wrongly recorded as 85 in place of 58. Find the correct mean. [5]

4. Two urns contain respectively 2 red, 5 black, 7 green and 1 red, 4 black, 9 green balls. One ball is drawn from each urn. Find the probability that both the balls are of the same colour. [5]

5. The number of observations of two groups are in the ratio 2:1 and their A.M. are 8 and 128 A.M of the respectively. Find the A.M. of the combined group. [5]

6. A and B throw alternatively with a pair of dice. A wins if he throws 8 before B throws 5 and B wins if he throws 5 before A throws 8. Find the probability that A wins. [5]

Group-C (Long Answer Type Question)

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

7. (a) A random variable X has the density function $F(x)= a/(x^2+1)$, $-\infty<x<\infty$, then Find a [5]

   (b) Find the probability that X^2 lies between 1/3 and 1 [5]

   (c) Find the distribution function of X [5]

8. In a large lot of electric bulbs, the mean life and standard deviation of bulbs are 360 hours and 90 hours respectively. A simple of 625 bulbs is chosen. It is found that the mean life and standard deviation of bulbs in the sample are 355 hours and 90 hours respectively. Can we conclude that the sample is drawn from the given population? Test at 5% level of significance. If we assume that the population is normal and its mean is unknown, find the 98% confidence limits of the mean. [15]

9. (a) One card is drawn at random from the pack of 52 cards. Find the Probability that it is an honor card. [5]

   (b) Find the Probability that It is a face card. [5]

   (c) Find the probability of getting a numbered card. [5]

10. Fit a Poisson distribution for the following data and test the goodness of fit at 5% level of significance [15]

X :	0	1	2	3	4	5
F(x) :	110	170	130	60	23	7

11. Solve $y^2r-2ys+t = p+6y$ [15]