Day : Saturday

Date : 11-06-2022

S - 10095 - 2022

Time : 2.00 P.M. To 5.00 P.M.

Max. Marks : 100

N.B.

1) Attempt **ANY FOUR** questions from Section – I and **ANY TWO** questions From Section – II.
2) Figures to the **RIGHT** indicate **FULL** marks.
3) Use of non-programmable calculator is allowed.
4) Answer to both the sections should be written in **SAME** answerbook.

SECTION - I

Q.1 Explain the following terms with suitable examples. **(15)**
     i) Independence of an event
     ii) Gamma distributions
     iii) Uniform distributions

Q.2 A pair of dice is thrown. Find the probability of getting the sum **(15)**
     i) more than 4
     ii) divisible by 2
     iii) multiple of 3.

Q.3 Two friends A and B apply for two vacancies at the same post. The probabilities of **(15)** their selection are 1/4 and 1/5 respectively. What is the chance that,
     i) one of them will be selected?
     ii) both will be selected?
     iii) at least one will be selected?

Q.4 Eight unbiased coins are tossed simultaneously. Find the probability that there will **(15)** be,
     i) exactly 5 heads
     ii) not more than 4 heads
     iii) at least 2 heads.

Q.5 A manufacturer of cotton pins knows that 2% of his products are defective. If he **(15)** sells them in a box of 100 pins and guarantees that not more than 5 pins will be defective in a box. Find number of boxes in a consignment of 100 boxes that will be rejected by the customer as they fail to meet the guaranteed quality.
(given : $e^{-2} = 0.1353$)

Q.6 In an intelligent test administered to 1000 students the average score was 42 and **(15)** standard deviation 24. Find the number of students
     i) lying between 30 and 54 marks
     ii) more than 40 marks
     iii) lying between 35 and 45 marks.

Q.7 Write short notes on **ANY THREE** of the following. **(15)**
     i) Central limit theorem
     ii) Queue properties
     iii) Random experiments
     iv) Negative binomial distribution
     v) Conditional probability

SECTION - II

Q.8 **a)** Write a note on : Baye's theorem. **(20)**

b) In a diary the milk is filled in a sachet of 500 gms by machines A, B and C with 25%, 35% and 40% of the total output respectively. It is also found that 5%, 4% and 2% of the sachets have over filling or under filling respectively. A government inspector made a random check and found that the sachet was under filled and booked case against a dairy. What is possibility that it was filled by machine A.

Q.9 **a)** For the following probability distribution obtain E (X) and V (X). **(10)**

X	−2	−1	0	1	2	3
P (X)	0.2	0.3	0.3	0.1	0.02	0.08

b) Describe negative binomial distribution with suitable examples. **(10)**

Q.10 At a bus terminal every bus should leave with driver. At a terminus they keep 2 **(20)** drivers as reserved if any one on scheduled duty is sick and could not come. Following is the probability distribution that driver becomes sick.

No. of sick drivers	0	1	2	3	4	5
Probability	0.30	0.20	0.15	0.10	0.13	0.12

Simulate for 10 days and find utilization of reserved drivers.
Also find how many days and how many buses cannot run because of non-availability of drivers?
Use the following random numbers
30,54,34,72,20,02,76,74,48,22.

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