

I.M.C.A. SEM-VIII (2014 Course) CBCS : SUMMER - 2019

SUBJECT : PROBABILITY & SIMULATION

Day : Thursday
Date : 02/05/2019

S-2019-2144

Time : 10.00 AM TO 01.00 PM
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) Both the sections should be written in **SAME** answer books.
 - 4) Use of non-programmable calculator is **ALLOWED**.
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SECTION – I

- Q.1** A pair of dice is thrown. Find the probability of getting the sum, **(15)**
i) More than 5 .
ii) Multiple of 3 .
iii) Divisible by 3 or 4 .
- Q.2** A product is manufactured by a company for which it has three machines P, Q and R. Machine P produces 70%, Q produces 20% and R produces 10% of the total production. Past experience shows that P produces 7 % defectives, Q produces 5 % defectives and R produces 3 % defectives. At the end of a day from the total production, one unit of production is selected at random and is found to be defective. What is the chance that machine R has produced it ? **(15)**
- Q.3** 6 unbiased coins are tossed simultaneously. Find the probability that there will be **(15)**
i) Exactly 3 Heads,
ii) At least 2 Heads and
iii) Not more than 2 Heads.
- Q.4** What do you mean by Normal Distribution? Explain its properties in brief. **(15)**
- Q.5** A book of 200 pages contains 100 typographical errors. The errors are randomly distributed in the book. A page is selected at random. Find the probability that the page has **(15)**
i) at most one typographical error.
ii) at least 3 typographical errors.
iii) at most 5 typographical errors.
- Q.6** A shopping centre has one cashier who handles all customer's payments. A cashier takes on an average 4 minutes per customer. Customers come to cashier's area on an average of 10 per hour. The management received a large number of customer's complaints and decided to investigate the following questions. Determine **(15)**
i) what is the average length of the waiting line?
ii) the portion of his time is the cashier expected to be idle.
iii) what is average length of time that a customer would have to wait to pay for his purpose?
- Q.7** Write short notes on **ANY THREE** of the following. **(15)**
i) Bernoulli Distribution
ii) Expectations and variables
iii) Chi-Square distribution
iv) Conditional Probability

SECTION – II

- Q.8** a) Write a brief note on Probability spaces. (10)
b) If two coins are tossed and $X =$ Number of heads then find $E(X)$ and $V(X)$. (10)

- Q.9** The past data of demand per week of confectionary sells item and its respective frequency is given below (20)

Demand / Week :	0	5	10	15	20	25
Frequency :	2	11	8	21	5	3

Using the following sequence of random numbers, generate demand for next 10 weeks. Also find the average demand per week.

Random nos. are : 35, 52, 90, 13, 23, 73, 34, 57, 35, 83

- Q.10** Four cards are drawn at random from a pack of 52 cards. Find the probability (20) that,
- i) They are a King, a queen, a jack and an ace.
 - ii) Two are kings & two are jacks.
 - iii) All are clubs.
 - iv) All are red **or** all are blacks.

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