

**M.C.A. SEM - IV (CHOICE BASED CREDIT SYSTEM 2011 &
2012 COURSE) : WINTER - 2017**

SUBJECT: PROBABILITY & SIMULATION

Day: **Wednesday**
Date: **15/11/2017**

W-2017-1702

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) Answers to both the sections should be written in **SEPARATE** answer book.
- 4) Use of non- programmable **CALCULATOR** is allowed.

SECTION-I

- Q.1** Describe the following distributions **(15)**
i) Normal distribution ii) Gamma distribution
iii) t- distribution
- Q.2** If $P(A) = \frac{3}{8}$, $P(B) = \frac{5}{8}$, $P(A \cup B) = \frac{3}{4}$ **(15)**
find: i) $P(A/B)$ ii) $P(B/A)$
Show whether A and B are independent.
- Q.3** In a Normal distribution 31% of the items are under 45, and 8% are over 64. **(15)**
Find the mean and standard deviation of the distribution.
- Q.4** a) Explain Poisson distribution along with its areas of applications. **(07)**
b) If X follows Poisson distribution such that **(08)**
 $P(X = 2) = 9P(X = 4) + 90P(X = 6)$,
find the mean and variance of X .
- Q.5** At a certain petrol pump, customers arrive in a Poisson process with an average **(15)**
time of 5 minutes between arrivals. The mean time taken to service a customer
is 2 minutes.
i) What is average queue length of the system?
ii) What is average length of the queue?
iii) What is average waiting time of customer who has to wait in the
queue?
- Q.6** Write short notes on any **THREE** of the following: **(15)**
a) Central limit theorem
b) Queue types and their examples
c) Chi- square distribution
d) Application areas of simulation

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SECTION-II

- Q.7** A company manufactures around 200 cars depending upon the availability of raw materials and other situations. The daily production has been varying from 196 cars to 204 cars, whose probability distribution is given below: **(20)**

Production per day	196	197	198	199	200	201	202	203	204
Probability	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

The finished cars are transported in a specially designed three storeyed lorry that can accommodate only 200 cars. Simulate the process for next 15 days and answer:

- i) what will be the average number of cars waiting in the factory?
- ii) what will be the average number of empty spaces on the lorry?

Use following Random numbers:

82, 89, 78, 24, 53, 61, 18, 45, 04, 23, 50, 77, 27, 54, 10.

- Q.8 a)** Three cards are drawn from a well- shuffled pack of 52 playing cards. What is the probability that: **(10)**

- i) all the three drawn cards are number cards?
- ii) all the three drawn cards are picture cards?

- b)** A coin is tossed six times. What is the probability of obtaining 5 or 6 heads? **(10)**

- Q.9 a)** Fit a Poisson distribution to the following: **(10)**

X	0	1	2	3	4	5
f	02	14	36	14	22	12

- b)** There are 3 bags and they contain 10 black and 15 white balls, 5 black and 25 white balls, 15 black and 15 white balls respectively. A white balls is drawn from one of the bags. Find out the probability that it came from:

- i) the first bag
- ii) the third bag

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