

TIME : 3 hrs.

- Instruction :**
- 1) Attempt any one question from each section.
 - 2) Figures to the right indicate full marks.
 - 3) Statistical tables will be provided on request

Section - I

- Q.1 a) Two cards are drawn from a well-shuffled pack of 52 cards. Find the probability that the cards drawn are
- (i) both black.
 - (ii) one black & one red
 - (iii) One face card.
 - (iv) either a face card or a red card.
- 05
- Q.1 b) Following is the joint probability distribution of x and y.

$x \setminus y$	1	2	3	4
0	—	0.05	0.10	0.12
1	0.14	0.16	0.18	0.10
2	0.10	0.05	—	—

- obtain (i) Marginal probability distributions of x and y
- (ii) Conditional probability distribution of x when $y \leq 2$.
- (iii) Find Cov (x, y).
- 06
- Q.1 c) X and Y are two stochastically independent random variables with means 7 and 4 and variance 9 and 4 respectively.

- Find : - (i) $E(x + y)$
- (ii) $V(x + y)$
- (iii) $E(3x - 2y)$
- (iv) $V(3x - 2y)$
- 04

- Q.2 a) Find mean and variance for the following probability distribution of the random variable X. Also find the distribution of $y = x^2 + 1$ & $E(y)$.

Given

X :	-5	-3	0	2	4
P(x) :	0.05	0.10	0.20	0.40	0.25

05

- Q.2 b) A has won 20 out of 30 games of chess. With B. In a new series of 6 games. What is the probability that A would win :-

- i) Only four games.
 - ii) atleast 5 games.
 - iii) none of the game.
- 05

- Q.2 c) It is known that on an average three accidents take place in the busy streets of Mumabi Everyday. Find the probability that

- (i) No accident will take place tomorrw.
 - (ii) One accident will take place tomorrow.
 - (iii) atleast one accident will take place tomorrow.
- 05

Section - II

- Q.3 a) The amount of bread X (in hundreds of pounds) that a certain bakery is able to sell in a day is found to have a p-d.f

- Q.3 b) The distribution of number of words written per day by a certain writer over a period of one year showed Rectangular distribution over (1000, 2000). Find the chance that on a randomly chosen day of the year he wrote (i) atleast 1200 words. (ii) anywhere from 1250 to 1750 words.
(iii) Also find mean. 0
- Q.3 c) The income of a group of 10,000 persons was found to be normally distributed with mean Rs.8000 and standard deviation Rs.500.
Find :-
(i) Number of persons haivng income between Rs.7500 and Rs.8500
(ii) Number of persons having income less than Rs.7500 0
- Q.4 a) It is found that 10% of the days are foggy in certain district. A sample of 900 days is taken from the meterological records of the district. Find the probability that :-
(i) at least 100 days are foggy.
(ii) not more than 120 days are foggy.
(iii) number of foggy days lie between 80 and 120 0
- Q.4 b) A group of 121 boys obtained mean intelligence quotient (I.Q) of 84, while a group of 81 girls obtained 80. If the s.d of I.Q is given to be 10. Can we conclude that there is a significant difference between their performance?
Use 5% level of significance. 0
- Q.4 c) A survey of 36 married people were of mean age at the time of their marriage as 26 years with a standard deviation of 2.4 years. Find 95% confidence limits for the age at the time of marriage. 0
- d) The following results are obtained at the end of six months of a kind of psychotherapy given to a group of 120 patients and also for another group of 120 patients who were not given the psychotherapy

Psychotherapy		
	Given	Not Given
Condition improved	71	42
Condition not improved	49	78

Can we conclude at 5% level of significance that the psychotherapy is effective? 0

