22492

24225

3 Hours / 70 Marks Seat No. | | | | | | | | |

Instructions – (1) All Questions are *Compulsory.*

(2) Answer each next main Question on a new page.

(3) Illustrate your answers with neat sketches wherever necessary.

(4) Figures to the right indicate full marks.

(5) Assume suitable data, if necessary.

(6) Mobile Phone, Pager and any other Electronic Communication devices are not permissible in Examination Hall.

Marks

1. Attempt any FIVE of the following **10**

a) Define

i) event

ii) Sample Space

b) What is the probability of getting a sum of 7 when two dice are thrown?

c) If A and B are two events such that
$P(A) = 0.4$, $P(A \cup B) = 0.7$, and $P(A \cap B) = 0.2$ then find $P(B)$

d) A coin is tossed 3 times find the probability getting one head.

e) Verify whether the following function can be regarded as the p.m.f for given the value of X

X	0	1	2	3
P(x)	0.5	0.2	0.18	0.12

f) If $n = 10$ and $\Sigma d^2 = 66$ then find the rank correlation coefficient.

g) Find coefficient of correlation if $b_{xy} = 0.16$ and $b_{yx} = 0.4$

P.T.O.

Marks

2. Attempt any THREE of the following **12**

a) There are three urns containing 3 white and 2 black balls; 2 white and 3 black balls; 1 black and 4 white balls respectively. There is an equal probability of each urn being chosen. One ball is equal probability chosen at random. What is the probability that a white ball is drawn?

b) From a well-shuffled pack of 52 cards, a card is drawn at random. Find the probability of it being either a red king or a black queen.

c) The grade of an exam are normally distributed with mean 500 and S.D.100 Find the probability that a randomly selected score is greater than 620 Given that A (1.2) = 0.3849

d) Find the means of *X* and *Y* variables and the coefficient of correlation between them from the following two regression equations :

$2Y - X - 50 = 0$

$3Y - 2X - 10 = 0.$

3. Attempt any THREE of the following **12**

a) If A and B are two events such that P (A) = ¼, P (B) = 1/2 and $P(A \cap B) = \frac{1}{8}$, find

i) $P(A \cup B)$

ii) $P(A^1 \cap B^1)$

b) Find the expected value E(x) and Variance V(x) of a random variable X having pmf given below

X	–1	0	1	2
P(x)	0.1	0.3	0.4	0.2

c) If X has follows Possion's distribution with parameter m = 5 find :

i) P (x = 3) (e^{-5} = 0.00671)

ii) $P(X \leq 1)$

Marks

d) A radom variable X has the following distribution

X	0	1	2	3	4
P(X = x)	k	2k	4k	2k	k

Find

i) Value of k

ii) $P(X \geq 2)$

4. Attempt any THREE of the following **12**

a) For the following project.

Activity	Time
A (1-2)	3
B (1-3)	4
C (1-4)	6
D (2-5)	5
E (3-6)	6
F (4-7)	5
G (5-8)	4
H (6-8)	7
I (7-8)	7

i) Draw Network diagram

ii) Find the critical path and Project completion time

iii) Identify Critical and non critical activities

b) For the following project.

i) Draw Network diagram

ii) Find the critical path and Project completion time

iii) Identify Critical and non critical activities

Activity	1-2	1-3	2-4	3-5	4-6	5-6
Time (days)	4	5	3	2	2	4

Marks

c) The following table shows the jobs of a network along with their time estimate (Using PERT Algorithm)

Activity	Estimated duration (weeks)		
	Optimistic time (*t*0)	Most likely time (*tm*)	Pessimistic time (*tp*)
1-2	1	2	3
1-3	1	2	3
1-4	1	2	3
2-5	4	9	20
3-5	2	5	14
3-7	3	6	15
5-7	1	2	9
4-6	2	4	6
6-7	3	3	3
7-8	4	4	4

i) Draw network diagram.

ii) Find the expected duration time.

d) For the following project

Activity	A	B	C	D	E	F
Preceding Activity	-	-	A	B	C and D	D
Time (days)	5	7	4	6	3	4

i) Draw Network diagram

ii) Find the critical path and Project completion time

iii) Identify Critical and non critical activities

e) What are the advantages of using PERT/CPM?

Marks

5. Attempt any TWO of the following **12**

a) Calculate Karl Pearson's coefficient of correlation from the following data :

X:	6	8	12	15	18	20	24	28	31
Y:	10	12	15	15	18	25	22	26	28

b) The marks of ten students in two subjects A and B are given in the following table -

Marks in Subject A	3	5	4	8	9	7	1	2	6	10
Marks in Subject B	4	6	3	9	10	77	2	1	5	8

Find the correlation coefficient using Spearman's rank correlation formula-

c) The age in years of fourteen young couples is given below-

Husband (X)	21	25	26	24	22	30	19	24	28	32	31	29	21	21
Wife (Y)	19	20	24	21	22	24	18	22	19	30	27	26	19	18

Obtain the line of regression of age of wife on age of husband.

6. Attempt any TWO of the following **12**

a) Calculate the coefficient of correlation from the following data :

$\Sigma X = 50, \Sigma Y = -30, \Sigma X^2 = 290, \Sigma Y^2 = 300, \Sigma XY = -115, N = 10$

b) Calculate the correlation coefficient from the data given below :

X	1	2	3	4	5	6	7	8	9
Y	9	8	10	12	11	13	14	16	15

c) For 5 pairs of observations the following results are obtained $\Sigma x = 15$, $\Sigma y = 25$, $\Sigma x^2 = 55$, $\Sigma y^2 = 135$, $\Sigma xy = 83$ Find the equation of the lines of regression and estimate the value of X on the first line when $y = 12$ and value of Y on the second line if $x = 8$.
