314316

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) Use of Non-programmable Electronic Pocket Calculator is permissible.

(7) 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) Two dice are thrown. What is probability of getting

(i) Double six

(ii) Sum of 8 or more dots.

(b) A random variable is uniformaly distributed over time interval 2 to 10. Find its variance.

(c) Give any two objectives of Network analysis.

(d) For the bivariate data r = 0.3, Cov (X, Y) = 18, $\sigma_x = 3$, find $\sigma_{y.}$

(e) If $\sum d^2 = 66$ and n = 10, then find the rank correlation coefficient.

(f) Find the coefficient of correlation and obtain the equation of the line of regression for the given data :

x	6	2	10	4	8
y	9	11	5	8	7

(g) Two lines of regression are given by $8x - 10y + 66 = 0$ and $40x - 18y = 214$. If $\sigma^2_x = 9$, find :

(i) Mean values of x and y

(ii) Coefficient of correlation between x and y.

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

(a) A fair two dice are thrown. Find the probability that number on the upper face of the first die is 3 or sum of the numbers on their upper faces is 6.

(b) If $P(A) = 1/3$, $P(B) = 2/5$ and $P(A \cup B) = 8/15$, find :

(i) $P(A/B)$ (ii) $P(A' \cap B')$

(c) Find the probability distribution of X :

X	1	2	3	4	5	6
F(X)	0.2	0.37	0.48	0.62	0.85	1

(i) Find $P(X \leq 3)$, $P(2 < X < 5)$

(ii) Find $P(X \leq 5)$, $P(X > 3)$

(d) Explain three time estimates in PERT.

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

(a) Two digits numbers are to be made using the digits 3, 5, 6 and 8 without repetition of digits. Find the probability of the following events :

(i) The number is odd.

(ii) The number is divisible by 9.

(b) For the probability distribution :

X	1	2	3	4	5
P (X = *x*)	0.2	0.4	0.1	0.1	0.2

Find : E(X), $E(X^2)$, Var(X)

(c) State Fulkerson's rule for numbering of events in a network diagram.

(d) If for a bivariate data :

$\bar{x} = 10$, $\bar{y} = 12$, v(X) = 9, $\sigma_y = 4$ and r = 0.6, estimate y when $x = 5$.

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

(a) Find Spearman's Rank Co-efficient of correlation to the following data :

x	10	12	18	18	15	17	40
y	15	19	25	30	25	25	30

(b) If X has Bernoulli distribution with n = 20, P = 1/10, find the mean E(X) and Variance V(X).

(c) Explain latest start time and latest finish time. How are this determined ?

(d) Find the rank correlation coefficient between *x* and y variables :

x	10	20	35	14	18	21	16
y	13	25	18	19	20	26	27

(e) If the correlation coefficient between *x* and y is 0.6, covariance is 27 and variance of y is 25, find the variance of *x*.

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

(a) If a continuous random variable X follows exponentially distributed with parameter 2, find the value of K, there exists $P(X > K)/P(X \leq K) = a$.

(b) Draw the AON (Activity On Arrow Network) diagram as well as Arrow diagram :

Activity	Immediate Predecessor	Activity	Immediate Predecessor
A	–	G	B, C
B	–	H	C
C	–	I	E, F
E	A	J	G, H
F	A, B	K	H

(c) In a partially destroyed laboratory record of an analysis of regression data of the following data are legible :

Variance of X = 9, Regression equations :

$8x - 10y + 66 = 0$ and $40x - 18y = 214$

(i) The mean values of x and y.

(ii) Correlation coefficient between x and y.

(iii) Standard deviation of y.

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

(a) The following table gives the aptitude test scores and productivity indices of 10 workers selected at random :

(i) Obtain the two regression equations and

(ii) Obtain the line of regression to predict X for Y = 75

X	60	62	65	70	72	48	53	73	65	82
Y	68	60	62	80	85	40	52	62	60	81

(b) Find the equation of line of regression of Y on X and X on Y for the following data :

$n = 10$, $\Sigma(x_i - \bar{x})(y_i - \bar{y}) = 1220$.

$\sigma_x^2 = 130$, $\sigma_y^2 = 165$. Estimate Y For X = 40.

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

x	11	10	9	8	7	6	5
y	20	18	12	8	10	5	4