

Note: Q.No. 1 is compulsory. Attempt two questions from each section. All questions carry equal marks.

Q.No.1. Write short note on any five of the following. (3x5=15)

- (i) Define relative frequency distribution. (ii) Write the relation between moments about mean and raw moments. (iii) Describe random experiment (iv) Write any three properties of expectation. (v) Write mean and variance of Hypergeometric probability distribution. (vi) Define standard normal distribution. Also write its P.D.F (vii) Describe the regression coefficient. (viii) Throw light on signal and noise.

SECTION -1

Q.No.2(a) Write any three properties of AM. (3,12)

(b) Two candidates "X" and "Y" obtained the following score in 10 papers in an examination. Which of the candidate showed more consistent performance?

X	58	48	77	82	50	72	61	60	77	48
y	42	47	87	70	75	70	57	50	83	66

Q.No.3 (a) Numerically show that time reversal test is satisfied by Fisher's index number. (15)

value		Quantity	
2001	2008	2001	2008
509	900	110	150
320	510	85	115
160	290	58	80
350	320	32	35

Q.No.4 (a) Just decide which curve is suitable to the following data. (3,12)

X	1	2	3	4	5
Y	10	14	21	31	44

(b) Find two regression coefficients in each of the following cases.

(i) $\bar{x} = 50$, $\bar{y} = 240$, $\sum f(x - \bar{x})^2 = 2810$, $\sum f(x - \bar{x})(y - \bar{y}) = 990$, $\sum f(y - \bar{y})^2 = 530$, $n = 11$

(ii) $\text{Cov}(x, y) = 40.15$, $\text{Var}(x) = 74.04$, $\text{Var}(y) = 32.41$, $n = 12$, $\bar{x} = 47.75$, $\bar{y} = 53.6$

(iii) $n = 284$, $\sum fu = 104$, $\sum fu^2 = 238$, $\sum fv = 224$, $\sum fv^2 = 400$, $\sum fuv = 164$, $\bar{x} = 64$, $\bar{y} = 116$

Q.No.5 (a) Define secular trend with examples. (3,12)

(b) Find seasonal indices by ratio to trend method by fitting a least square line to the annual averages taking origin at the centre of 1998.

Year	Quarters			
	i	ii	iii	iv
1998	72	66	35	42
1999	78	70	40	49
2000	90	80	45	50

SECTION -2

Q.No.6 (a) One integer is chosen at random from the numbers 1, 2, 3, ..., 50. (6,9)

What is the probability that chosen number is divisible by 6 or by 8.

(b) A continuous random variable 'x' has the probability density function as

$$f(x) = K(2-X)(X-5) \quad ; \quad 2 \leq X \leq 5$$

$$= 0 \quad ; \quad \text{other wise}$$

Find the value of 'K', mean and variance.

Q.No.7 (a) Find mean and variance of binomial distribution. (7,8)

(b) A home owner plants 6 bulbs selected at random from a box containing

4 tulip bulbs and 5 daffodil bulbs. What is the probability that he planted

- (i) no tulip bulb (ii) 4 daffodil bulbs

Q.No.8 (a) If 'x' ~ N(47.6 ; 256), then find Q_1 , D_5 and P_{75} (9,6)

(b) A coin is tossed 200 times. find the probability of getting,

- (i) less than 90 heads (ii) more than 100 heads (iii) exactly 120 heads.