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FYBA Sem-II Set B

Statistics Paper I

51678

Page No.....

Q. No.		Marks
Q. 1		
A) 1)	$r=1$ indicates perfect positive correlation	(2)
2)	If a point $(\bar{x}, \bar{y})$ lies on both the regression lines then then its a point of intersection	(2)
3)	Least square method is used to fit linear as well as non-linear curves to the data.	(2)
4)	The observations in the time series are related to each other.	(2)
5)	Fisher's index number is called as ideal index number	(2)
B)		
1)	No correlation	(2)
2)	Prediction of value within the range of the data	(2)
3)	Seasonal variations	(2)
4)	Simple average, Ratio to trend, Ratio to Moving average & Link Relative	(2)
5)	Paasche's Q.I.N. := $\frac{\sum P_1 Q_1}{\sum P_0 Q_1} \times 100$	(2)

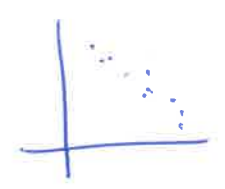
2

Q.No.  
2

Q. No.  
1)

Scatter diagram - Definition

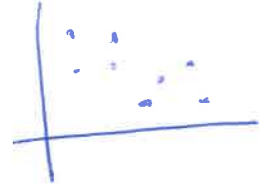
Any 4 diagrams from the foll.



Strong -ve



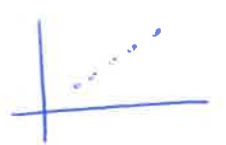
Perfect -ve



weak -ve



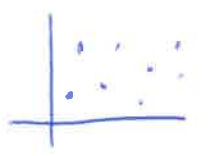
strong +ve



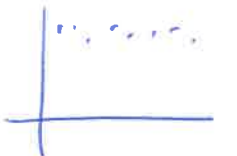
Perfect +ve



weak +ve



No-relation



No-relation



Non-linear

Marks

(2)

(2/diagram)

2) Definition & Formula for correlation

1) Perfect :  $r = 1$  or  $-1$

(2)

2) Negative : weak, moderate, Perfect

(2)

(2)

3) Positive : weak, moderate, perfect

(2)

4) No :  $r = 0$

(2)

Q.No.  
2

Q. No.

3)  $\text{Cov}\left(\frac{x-a}{c}, \frac{y-b}{d}\right) = \frac{1}{cd} \text{Cov}(x, y)$

Derivation -

$$r_{xy} = \frac{\text{Cov}(x, y)}{\text{SD}(x)\text{SD}(y)} = \pm r_{uv}$$

Marks

(5 Marks)

(5 marks)

4) ~~3~~  $y = a + bx + cx^2$

$$s^2 = \sum (y - a - bx - cx^2)^2$$

\* Minimizing conditions

$$\frac{\partial s^2}{\partial a} = 0, \quad \frac{\partial s^2}{\partial b} = 0, \quad \frac{\partial s^2}{\partial c} = 0$$

(2 marks)

(3)

ii)  $y = ab^x \therefore \log y = \log a + x \log b$

Put  $\bar{z} = \log y$  ;  $A = \log a$  ;  $B = \log b$

then  $\bar{z} = A + Bx$  & use method to fit linear curve

$$a = \text{antilog } A, \quad b = \text{antilog } B$$

(1)

(1)

(2)

(1)

(4)

Page No.....

Q.3

Q. No.

Marks

1) Time:  $t_1, t_2, \dots, t_n$ ; y values:  $y_1, y_2, \dots, y_n$

$$\text{First M.A.} = \frac{y_1 + y_2 + \dots + y_m}{m}$$

$$\text{Second M.A.} = \frac{y_2 + y_3 + \dots + y_{m+1}}{m}$$

$$\text{Third M.A.} = \frac{y_3 + y_4 + \dots + y_{m+2}}{m}$$

Advantages: (Any 2)

~~etc~~

Disadvantages: (Any 2)

2) Additive Model

Multiplicative Model

Uses of Time Series (Any 4)

3) Seasonal variation

Definition

Diagram

Examples

Cyclical Variation

Definition

Diagram

Examples

(6)

(2)

(2)

(3)

(3)

(4)

(2)

(2)

(1)

(2)

(2)

(1)

(5)

Page No.....

Q.3 Q. No.

1) Fitting of straight line:  $y_t = a + bt$   
 $S^2 = \sum (y_t - a - bt)^2$

$$\frac{ds^2}{da} = 0$$

$$\frac{ds^2}{db} = 0$$

Fitting of Parabolic Curve:  $y_t = a + bt + ct^2$

$$S^2 = \sum (y_t - a - bt - ct^2)^2$$

$$\frac{ds^2}{da} = 0$$

$$\frac{ds^2}{db} = 0$$

$$\frac{ds^2}{dc} = 0$$

Marks

(1)

(1)

(1)

(1)

(2)

(2)

(2)

Q. No.		Marks
Q.4 1)	i) Shifting of base Meaning, Reasons Formula	<del>(2)</del> (3) (2)
	ii) Splicing Description Formulae	(2) (3)
2)	i) $P_{01}^F$ , $P_{02}^F$ (Formulae) Verification	(2)
	$P_{01}^F \times P_{00}^F = 100^2$	(3)
	ii) $P_{01}^F$ $Q_{01}^F$ Formulae	(2)
	$\frac{P_{01}^F}{100} \times \frac{Q_{01}^F}{100} = \frac{\sum P_1 Q_1}{\sum P_0 Q_0} \quad (\text{Derive})$	(3)

Q.4

Q. No.

3)

Definition - Cost of Living index number

Methods of Construction:

1) Aggregate Expenditure

2) Family Budget

Marks

(2)

(4)

(4)

4)

Calculate  $p_0q_0, p_0q_1, p_1q_0, p_1q_1$ 

(4)

Laspeyres's I.N. =  $p_{01} = 123.9$ 

(2)

Paasche's I.N. = 124

(2)

Fisher's I.N. =  $\sqrt{L \times P} = 123.949$ 

(2)

Marshall-Edgeworth's I.N. =  $\frac{\sum p_1q_0 + \sum p_0q_1}{\sum p_0q_0 + \sum p_0q_1}$ 

(3)

Q. No.	Marks
Q.5.	
1) i) Spurious ii) Coeff. of determination	(2½) (2½)
2) Method: (In case of ties $\sum d^2$ needs to be corrected by adding c.f. to $2d^2$ ) Formula: $R = 1 - \frac{6(\sum d^2 + cf)}{n(n^2 - 1)}$ where $cf = \frac{m(m^2 - 1)}{12}$ m is no. of times the rank is repeated.	(2) (3)
3) Secular trend - long term, types, graphs Seasonal variation - short term, graphs (Any 3 diff.)	(5)
4) Methods of measurements of trend. i) Graphical - Meaning & diagram	(2½)
5) ii) Semi-average - Meaning & Method explanation. Index number uses (Any 5)	(2½) (5)
6) Real Income - Definition Formula & Method	(2) (3)
7) Types of weighted index numbers 1) Weighted aggregative: Meaning, Formula (details explained) 2) Weighted average Price relative: Meaning, Formula (details explained)	(2½) (2½)