FYBA
17/4/18
2 to 5
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Stats - I

33887

Q.P.Code: 33887

DURATION: 3 HOURS **MARKS**: 100

N.B.: 1. All questions are compulsory.
2. Use of scientific calculator is allowed.
3. Graph paper is provided on request.

Q.1	**(a)**	**Correct the following if necessary.**	**10**
	(i)	b_{yx} is the regression coefficient of x on y.	02
	(ii)	Coefficient of determination is equal to Karl Pearson's correlation coefficient.	02
	(iii)	Equation of Power curve is $y = a\, b^x$.	02
	(iv)	Seasonal variations are those which complete within a period of one year.	02
	(v)	Fisher index number do not satisfies factor reversal test.	02
	(b)	**Answer in one sentence.**	**10**
	(i)	Define "Spearman's rank correlation coefficient".	02
	(ii)	What is the point of intersection of two regression equations?	02
	(iii)	Give one example of cyclic fluctuation.	02
	(iv)	State the formulae of regression coefficients y on x and x on y.	02
	(v)	How to calculate value index number?	02
Q.2		**Attempt any Two.**	**20**
	(a)	Prove Spearman's rank correlation coefficient. Also explain the case of repeated ranks.	10
	(b)	(i) Write down the two regression equations. Show that they are identical when r = -1 or +1	04
		(ii) The data for 25 years on sales(Y) and advertisement expenditure (X) of a particular product yielded the following values (Rs. Lakhs). $\sum x = 125, \sum y = 100, \sum x^2 = 650\ \sum y^2 = 460$ $\sum xy = 508$. Find the following: (p) Regression equation of Y on X; (q) Regression equation of X and Y.	06
	(c)	Define product moment correlation coefficient between two variables. Also discuss effect of shift of origin and change of scale on product moment correlation coefficient.	10
	(d)	For a set of 50 pair of values $\bar{x} = 10, \bar{y} = 6, \sigma_x = 3, \sigma_y = 2, \rho_{xy} = 0.3$ Later a pair (10, 6) is added to the list, determine the revised value of the correlation coefficient.	10
Q.3		**Attempt any Two.**	**20**
	(a)	Define time series. Explain various components of time series in detail.	10
	(b)	Explain Moving average method. Also state its merits and demerits.	10
	(c)	(i) Explain estimation of seasonal variation by ratio to trend method.	06

(ii) Explain the difference between additive and multiplicative models of analyzing time series. 04

(d) For the following data, fit a straight line trend by method of least squares. Calculate trend values and plot observed values and trend values on a graph. 10

Year	2011	2012	2013	2014	2015	2016	2017
Demand	77	88	94	85	91	98	90

Q.4 **Attempt any Two.** **20**

(a) Explain what is meant by (i) fixed base index number (ii) chain base index number with their merits and demerits. 10

(b) Why Fisher's index number is ideal index number? Explain. 10

(c) Write note on (i) Cost of living index number and (ii) Splicing on index number series. 10

(d) (i) Write short notes on Deflating 05

(ii) Calculate chain base index numbers for the following data: 05

Year	2010	2011	2012	2013	2014	2015	2016	2017
Price	40	48	50	46	52	56	60	63

Q.5 **Attempt any four.** **20**

(a) Explain :(i) Laspeyre's index number; (ii) Paasche's index number; 05

(b) Explain ratio to moving average method of time series. 05

(c) Compute the number of pairs of observations in a data set, if it is known that the sum of squares of the differences in ranks is 119 and the rank correlation is equal to -5/12. 05

(d) Derive the normal equations, required to fit a quadratic curve. 05

(e) State formulae for computing Dorbisch and Bowley's index number; Edgeworth and Marshall index number and Fisher's index number. 05

(f) Discuss the main problems in the construction of cost of living index number. 05

(g) Define following with example: (i) correlation; (ii) regression. 05

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