

(This Question Paper Contains 3 printed page(s)) Roll No.:

Sr. No. of Question paper : 300-A

Unique paper Code : 236651

Name of Course : B. A. Programme

Name/Title of the Paper : FORECASTING (A)

Semester : VI

Duration : 3 hours

Max marks: 38

**Instructions for Candidates**

1. Attempt any Four questions from Q1 to Q6 (7.5 marks each).
2. Q7 is compulsory (8 marks).
3. Statistical Tables and Calculators can be used.
4. Graph paper can be provided.

Q1 (a) Explain the nature of the components of a time series. Indicate their importance in business and forecasting. 3.5

(b) Explain how the Principle of Least Squares is used to estimate trend in a time series. Derive normal equations for fitting of a straight line. 4

Q2 (a) Describe the additive & Multiplicative models for Decomposition of a time series. 3.5

(b) Find the trend for the following time series by the method of moving averages (assume a four yearly cycle). 4

Year	Value	Year	Value
2001	76	2006	88
2002	66	2007	80
2003	69	2008	104
2004	94	2009	98
2005	105	2010	96

Q3 (a) Obtain the normal equations for fitting of a logarithmic curve, by method of least squares 3.5

(b) Below are given the figure of production (in '000 tonnes) of a sugar factory: 4

Year	2000	2001	2002	2003	2004	2005	2006
Production	80	90	92	83	94	99	92

Fit a straight line trend by the method of least squares and show the trend values.

Also show the actual data and trend line on the graph paper.

Q4 (a) What are seasonal variations, how are they different from cyclic variations. 3.5

(b) Calculate seasonal indices of the given data by Link relative method: 4

Quarter	Link Relatives				
	2006	2007	2008	2009	2010
I	-	80	88	80	83
II	120	117	129	125	117
III	133	112	111	115	120
IV	83	89	93	96	79

Q5 (a) What is deseasonalization of data. How is it used for forecasting. 3.5

(b) The following data gives the quarterly sales in lakhs of rupees for the year 2011 to 2014 4

Year	I Quarter	II Quarter	III Quarter	IV Quarter
2011	80	95	80	110
2012	101	104	90	110
2013	100	95	90	100
2014	115	110	100	120

The seasonal indices for this data are

Quarter	I	II	III	IV
Seasonal Indices	99	101	90	110

Deseasonalize the above data using the given indices.

- Q6 (a) Discuss in detail single and double exponential smoothing method for forecasting. 3.5
- (b) Sales for 12 months at a company are as under. 4

Months	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sept	Oct	Nov	Dec
Sales (in Lakhs)	30	34	37	41	47	57	63	72	64	46	42	49

Using single Exponential Smoothing method with  $\alpha = 0.6$  forecast the sales for the month of January of next year assuming that initial forecast for January was 22 lakh Rupees.

- Q7 Write short notes on any two: 4
- (a) Ratio to trend method for finding seasonal Indices. 4 + 4
- (b) Merits and demerits of moving average method.
- (c) Additive and multiplicative decomposition of Time series.