

[This question paper contains 4 printed pages.]

**Sr. No. of Question Paper : 5448**

**D**

**Your Roll No.....**

Unique Paper Code : 236651

Name of the Course : **B.A. (Programme) (Operational Research)**

Name of the Paper : FORECASTING (A)

Semester : VI

Duration : 3 Hours

Maximum Marks : 38

**Instructions for Candidates**

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt **Five** questions in all
3. Attempt any **Four** questions from **Q1** to **Q6** (7.5 marks each)
4. **Q7** is compulsory (8 marks).
5. Statistical Tables and Calculators can be used.
6. Graph paper can be provided.

1. (a) Describe seasonal variations. Mention the various methods of studying seasonal variations. Discuss in detail the ratio to moving average method to calculate seasonal indices. (3.5)

(b) Define a time series; describe its important components with examples from real life. (4)

2. Why are moving averages calculated in analysing a time series? How is the period of a moving average determined?

Determine the period of the moving average for the following data and calculate moving averages for that period :

*P.T.O.*

Year	Value
1	115
2	105
3	100
4	165
5	124
6	145
7	125
8	135
9	110
10	156
11	139
12	148
13	118

(7.5)

3. (a) Explain the Method of Double Exponential Smoothing for forecasting a time-series data. (3.5)

(b) Using single exponential smoothing forecast for the year 2010 from the following data –

Period :	2002	2003	2004	2005	2006	2007	2008	2009
Demand :	30	36	37	33	38	40	34	39

Where forecast for the first period is 35 and  $\alpha = 0.5$ . (4)

4. British Oil Company has the following sales figures. (7.5)

Year	2006	2007	2008	2009	2010	2011	2012	2013
Sales	238.3	252.0	251.2	278.9	318.5	361.0	439.1	547.9

[In million dollars]

- (i) Plot the series on a graph paper.
- (ii) Fit a straight line trend to it.
- (iii) Plot a second degree polynomial trend on the same graph.

Which is a better fit and why ?

Also find the estimated values in both the cases. Forecast the sales for 2014.

5. Using the ratio to trend method, determine the quarterly seasonal indices :

Year / Quarter	I	II	III	IV
1	65	60	61	63
2	70	58	56	60
3	68	63	68	67
4	65	59	56	62
5	60	55	51	58

(7.5)

6. The demand for a particular item during ten months of a year is as given below. The manager is considering how well the exponential smoothing serves as an appropriate technique in forecasting the demand of this item. She is testing two values of smoothing constant  $\alpha = 0.5$  and  $\alpha = 0.8$ . Calculate :

(i) Forecasted values for each of the given  $\alpha$  values assuming the initial forecast as 200. (7.5)

(ii) Monthly average demand for each of these series of estimates and suggest which of them is most appropriate :

Month	Demand
1	213
2	200
3	198
4	207
5	220
6	232
7	210
8	215
9	212
10	220

7. Compute the seasonal indices by the 'Link Relatives' method for the adjoining data relating to the average quarterly price (Rs. Per kg.) of a commodity for five years :

Year / Quarter	2007	2008	2009	2010	2011
I	30	35	31	31	34
II	26	28	29	31	36
III	22	22	28	25	26
IV	36	36	32	35	33

(8)