EASTERN UNIVERSITY, SRI LANKA
THIRED EXAMINATION IN SCIENCE 2001 / 2002
(APRIL' 2002)
FIRST SEMESTER

ST 301 - TIME SERIES

Answer All Questions

Time : Two Hours

Q1. (a) (i) Explain clearly what is meant by trend of a time series.

   (ii) What are the different methods for determining trend in a time series?

   (b) Explain how the 'principle of least squares' used to estimate trend in a time series.

   (c) Fit a straight line trend by least square method to the following data and estimate the production for the year 1993.

Year	1985	1986	1987	1988	1989	1990
Production ('000 Tons)	75	83	109	129	134	148

Q2. (a) (i) What do you understand by seasonal variations? What are the methods used to determine them?

   (ii) Enumerate the steps you take in computing seasonal indices by the link relative method.

   (b) Calculate the seasonal variation indices by the method of link relatives for the following figures.

Quarterly Figures For Five Years

Quarter	Year				
	1993	1994	1995	1996	1997
I	45	48	49	52	60
II	54	56	63	65	70
III	72	63	70	75	84
IV	60	56	65	72	66

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Q3. (a) Explain how you will decide about the type of the trend to be fitted to a given time series data. Describe any one method of fitting trend by,

(i) Modified exponential curve,

(ii) Logistic curve,

(iii) Gompertz curve.

(b) Given the three selected points u_1, u_2 and u_3 corresponding to $t_1 = 2$, $t_2 = 30$ and $t_3 = 58$ as follows:

$$t_1 = 2 \qquad u_1 = 55.8$$
$$t_2 = 30 \qquad u_2 = 138.6$$
$$t_3 = 58 \qquad u_3 = 251.8$$

Fit the logistic curve by the method of selected points. Also obtain the trend values for $t = 5, 18, 25, 35, 46, 50, 60, 66, 70$.

Q4. (a) Explain what is meant by deseasonalising data.
(b) Demand figures (tones) from 1994 to 1996 are given below.

Year	Quarter1	Quarter 2	Quarter3	Quarter4
1994	218	325	273	248
1995	444	585	445	385
1996	660	852	623	525

(i) Plot the original data.
(ii) Can you observe seasonality in the data?
(iii) Deseasonalise data by using an appropriate moving average.
(iv) Fit a least square line for deseasonalised data.