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**11763/NJ****D-2/2111****APPLIED STATISTICS**

Paper-233

Semester-III

Time Allowed : 3 Hours] [Maximum Marks : 30

**Note :** The candidates are required to attempt **two** questions each from Sections A and B carrying 4 marks each and the entire Section C consisting of 7 short answer type questions carrying 2 marks each.

**SECTION—A**

1. Discuss seasonal variation as one of the components of time series.

2. Fit quadratic trend by the method of least squares :

Squares :	1995	1996	1997	1998	1999
Year					

Production :	2	4	8	14	22
(in thousands)					

3. Discuss various uses of time series.
4. The Data below give the average quarterly prices of a commodity for four years :

Year	Ist Qtr.	IIInd Qtr.	IIIrd Qtr.	IVth Qtr.
2003	40.3	44.8	46	48
2004	50.1	53.1	55.3	59.5
2005	47.2	50.1	52.1	55.2
2006	55.4	59	61.6	65.3

Calculate seasonal variation indices by method of simple averages.

### SECTION—B

5. Define Index number. Discuss its various types.
6. Compute the following quantity indices from the Data given below :
- (i) Laspeyre's index numbers
- (ii) Paasche's.
- (iii) Fisher's quantity index numbers.

Commodity	1990		2000	
	Price	Total value	Price	Total value
A	10	80	11	110
B	15	90	9	108
C	8	96	17	340

7. What do you understand by Cost of living index number? Also discuss main steps in construction of cost of living index number.

8. Write note on Price elasticity of Demand.

### SECTION—C

9. Write short notes on the following :
- (i) What do you understand by irregular component of time series?
- (ii) For the following series of observations, verify that 4-year centred moving average is equivalent to 5-year weighted moving average with weights 1, 2, 2, 2, 1 respectively

Year	Annual Sales
1989	2
1990	6
1991	1
1992	5
1993	3
1994	7

Year	Annual Sales
1995	2
1996	6
1997	4
1998	8
1999	3

(iii) Fit a trend line by the method of free hand for the given Data :

Year :	2000	2001	2002	2003	2004	2005	2006	2007
Sales :	30	46	25	59	40	60	38	65

- (iv) Discuss any two problems in construction of index numbers.
- (v) Prove that Fisher's ideal index number lies between Laspeyre's and Pasche's index numbers.

(vi) Given the Data in the table below where p and q respectively stand for price and quantity and subscripts stand for time period, find x, if the ratio between Laspeyre's (L) and Paasche's (P) index numbers is  $L : P :: 28 : 27$

Commodities		
	A	B
$p_0$	1	1
$q_0$	10	5
$p_1$	2	x
$q_1$	5	2

(vii) State Law of demand and supply and Engel's law.