Total No. of printed pages = 6

3 (Sem-5) STS M2 Pr

2017

STATISTICS

(Major Practical)

Paper : 5·6

Full Marks – 75

Pass Marks – 30

Time – Four hours

The figures in the margin indicate full marks for the questions.

GROUP – A

Answer *all* the questions.

1. Construct chain-base index numbers for the year 1998–99 to 2001–2002 from the following data : 8

Year	Index numbers of wholesale prices (1981–82=100)			
	Primary articles (A)	Fuel group (B)	Manufactured product (C)	All commo-dities (D)
1998-99	163·6	156·6	168·6	165·7
1999-00	184·9	175·8	182·8	182·7
2000-01	218·4	199·0	203·5	207·8
2001-02	234·6	227·1	225·6	228·7

[Turn over

Or

The table given below gives the family budget data for a few samples :

Yearly income :	Below 600	600–	750–	1050–
Average number of consumer units : (Per household)	2·60	2·57	2·50	2·48
Average income : (Per consumer unit)	543·1	681·3	861·9	1232·0
Average expenditure on food : (Per consumer)	291·8	331·6	374·4	407·1
Nos. of household	136	179	111	22

Calculate income elasticity of demand for food assuming that demand function has constant elasticity.

2. The total sales of electricity in Great Britain during the years 1964-1974 are given below : 8

Years	Total sales (Gigawatt hours)
1964	140374
1965	151071
1966	156931

Years	Total sales (Gigawatt hours)
1967	161664
1968	173925
1969	185423
1970	193907
1971	199442
1972	206370
1973	220591
1974	231888

[Source : Annual abstract of Statistics.

(i) Find the equation of a Least Square line fitting the data.

(ii) Based on the information given and the equation found in (i), estimate the sales of electricity in 1977.

(iii) Assuming the present trend to continue, in which years would you expect 1965 sales to be doubled ?

Or

Apply the Link Relative method of obtaining a measure of seasonal variation to the following data of import.

Quarter / year	I	II	III	IV
1952	283	258	244	260
1953	210	208	204	241
1954	194	168	159	183
1955	159	162	168	189
1956	184	179	176	197
1957	179	182	182	219
1958	200	204	207	243

3. The following data relate to the investment (Y) and the change in the output (X) : 9

Investment (Y) :	65	57	57	54	66
Change in output :	26	13	16	–7	27

Estimate the regression line $Y = \alpha + \beta x$. Test the hypothesis that $\beta = 0$ against the alternative $\beta < 0$ at 5% level of significance.

Or

The following data were obtained in a sample study :

$\Sigma x = 56$, $\Sigma y = 40$, $\Sigma x^2 = 524$

$\Sigma y^2 = 256$, $\Sigma xy = 364$ and $N = 20$.

Then :

(i) estimate the regression line of x on y.

(ii) compute the value of x corresponding to a value 3 for y.

(iii) compute the mean value of x corresponding to y = 3.

4. (a) Machine 'A' costs Rs. 45,000 and the operating costs are estimated at Rs. 1,000 for the first year, increasing by Rs. 10,000 per year in the second and subsequent years. Machine 'B' costs Rs. 50,000 and operating costs are Rs. 2,000 for the first year, increasing by Rs. 4,000 in the second and subsequent years. If we have a machine of type 'A', should we repalce it with 'B' ? If so, when? Assume that both machines have no resale value and future costs are not discounted. 12

Or

A truck owner finds from his past records that the maintenance cost per year of a truck whose purchase price is Rs. 8,000, is given as follows :

Year :	1	2	3	4	5	6	7	8
Main-tenance cost: (Rs.)	1,000	1,300	1,700	2,200	2,900	3,800	4,800	6,000
Resale : price (Rs.)	4,000	2,000	1,200	600	500	400	400	400

Determine at which time it is profitable to replace the truck ?

(b) Draw network diagram from the following activities and find the critical path and total slack of activities. 13

Job :	A	B	C	D	E	F	G	H	I	J	K
Job time (days)	13	8	10	9	11	10	8	6	7	14	18
Predecessor:		A	B	C	B	E,D	F	E	H	GI	J

GROUP – B

5. Practical notebook. 5

6. Viva voce. 5

7. Internal Assessment. 15