180023

VCD/ FY B.Sc (PMS) Sem-II Statistics-I(Descriptive Statistics-II) 100 Marks 3 HRS

Note: (i) All questions are compulsory.
(ii) Figures to the right indicate marks.
(iii) Scientific calculators are allowed.
(iv) Mixing of sub-questions is not allowed.

Q1. Attempt all sub questions: **[20 marks]**

(A) State TRUE or FALSE and correct if necessary. (10)

i) While calculating Spearman's rank correlation coefficient, ties are ignored.
ii) The regression line of x on y is $y = 4x + 10$, then expected value of x is 2 when y is 2.
iii) 'Increase in sales of ice creams during summers' is an example of secular trend.
iv) Fisher's index number does not satisfy time reversal test.
v) Analysis of time series cannot predict irregular component.

(B) Answer the following: (10)

i) State 2 properties of correlation coefficient.
ii) State any two methods of measuring seasonal variations.
iii) Explain the term 'value index number'.
iv) State the relation between regression coefficient and correlation coefficient.
v) State one advantage of time series analysis.

Q2. Attempt any two sub questions: **[20 marks]**

a) i) What is scatter diagram? Illustrate its interpretation by drawing different types of scatter diagrams. (06)

ii) Explain direct and inverse correlation using examples. (04)

b) Find the equation of two regression line for the given data. Also, find the probable value of (i) y when x = 12, (ii) x when y = 10 (10)

x	1	2	3	4	5
y	2	5	3	8	7

c) i) Find Karl Pearson's correlation coefficient for the following data: (06)

x	14	8	10	11	9	13	5
y	14	9	11	13	11	12	4

ii) If $\sum d^2 = 10$ *and* $n = 8$, then find Spearman's rank correlation coefficient. (04)
(There are no ties in ranks)

Q3. Attempt any two sub questions: **[20 marks]**

a) i) What is time series? Describe the various components of time series with suitable examples. (05)

ii) Find four yearly moving average for the following data: (05)

Year	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Sales (in thousands)	60	69	81	86	78	93	102	107	100	109

b) Fit straight line trend by the method of least squares for the following data representing production in thousand units. Plot the data and the trend line on a graph paper. Hence or otherwise estimate the trend for the year 2007. (10)

Year	1999	2000	2001	2002	2003	2004	2005
Production	14	15	17	16	17	20	23

c) Find the seasonal component of the following time series using Ratio to moving average method. (10)

Season / Year	I	II	III	IV
2003	107	120	114	113
2004	109	123	115	112
2005	110	122	113	114
2006	108	125	117	113

Q4. Attempt any two sub questions: **[20 marks]**

a) For the following data, calculate price index numbers for 2005 by (10)
i) Laspeyre's method ii) Paasche's method iii) Fisher's method
iv) Dorbisch Bowley's method v) Marshall Edgeworth's method

Commodity	Price in 2000	Quantity in 2000	Price in 2005	Quantity in 2005
A	2	50	15	35
B	5	12	10	2
C	1	10	5	10

b) i) Write a short note on cost of living index number and splicing of index no. (05)

ii)The cost of living index number is given as 172. Find the missing index. (05)

Group	Index	Weight
Food	221	35
Clothing	168	14
Fuel & Lighting	199	15
Rent	?	8
Miscellaneous	161	20

c) (i) Describe various steps involved in the construction of index number. (06)

(ii) For the following data, index number calculated by simple aggregate method was 160. Find the price of commodity R in base year. (04)

Commodity	Base Year Price	Current Year Price
P	18	30
Q	6	12
R	?	18
S	24	36

Q5. Attempt any four sub questions: **[20 marks]**

a) The regression equation of x on y is $8x + 5y = 150$ and the regression equation of y on x is $x + 10y = 200$. Find i) mean of x and y ii) regression coefficients and correlation coefficient. (05)

b) Find Spearman rank correlation coefficient for the following data: (05)

x	86	72	53	31	82	72	86	89	86	47
y	90	74	67	49	74	81	57	81	90	70

c) Find the seasonal component of the following time series using method of Simple Average. (05)

Season / Year	I	II	III	IV
2003	55	53	57	51
2004	56	55	60	53
2005	57	56	61	54

d) Explain what is meant by- (05)

i) Fixed base index number

ii) Chain base index number

iii) Shifting of base with reference to index number

e) Explain freehand curve method & method of semi average for trend estimation. (05)

f) The following table gives per capita income and cost of living index for India From 1939 to 1947. Deflate the per capita income with reference to the cost of living index. (05)

Year	Per capita income	Cost of living index no. (base 1939)
1939	67	100
1940	70	105
1941	78	117
1942	112	160
1943	139	217
1944	139	216
1945	137	219
1946	143	242
1947	160	258

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