Applied Statistics - Part V

12th Standard

Business Maths

Reg.No. : ☐☐☐☐☐☐

I.Answer all the questions.

II.Use blue pen only.

Time : 01:30:00 Hrs

Total Marks : 100

Part-A

5 x 1 = 5

1) Chance variation in the manufactured product is

   (a) controlable   (b) not controlable   (c) both (a) and (b)   (d) none of these

2) The causes leading to vast variation in the specification of a product are usually due to

   (a) random process   (b) assignable causes   (c) non-traceable causes   (d) all the above

3) Variation due to assignable causes in the product occur due to

   (a) faulty process   (b) carelessness of operators   (c) poor quality of raw material   (d) all the above

4) Control charts in statistical quality consist of

   (a) three control lines   (b) upper and lower control limits   (c) the level of process   (d) all the above

5) The range of correlation co-efficient is

   (a) 0 to ∞ (b) $-\infty$ 10 ∞ (c) -1 to 1   (d) none of these

Part-B

5 x 6 = 30

6) Estimate the trend values using the data given below by taking 4-yearly moving average.

Year	1974	1975	1976	1977	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987
Value	12	25	39	54	70	37	105	100	82	65	49	34	20	7

7) Calculate the cost of living index by aggregate expenditure method

Commodity	Quantity	Price(Rs)	
	2000	2000	2003
A	100	8	12.00
B	25	6	7.50
C	10	5	5.25
D	20	48	52.00
E	65	15	16.50
F	30	19	27.00

8) Construct the cost of living index number for 2003 on the basis of 2000 from the following data using family budget method.

Items	Price		Weights
	2000	2003	
Food	200	280	30
Rent	100	200	20
Clothing	150	120	20
Fuel&lighting	50	100	10
Miscellaneous	100	200	20

9) Obtain the two regression equations for the following data.

X :	4	5	6	8	11
Y :	12	10	8	7	5

10) Calculate the 3-yearly Moving Averages of the production figures (in mat. tonnes) given below

Year	1973	1974	1975	1976	1977	1978	1979	1980
Production	15	21	30	36	42	46	50	56

Year	1981	1982	1983	1984	1985	1986	1987
Production	63	70	74	82	90	05	102

Part-C

5 x 10 = 50

11) From the following data, calculate price index number by (a) Laspeyre's method (b) Paasche's method (iii) Fisher's method.

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	2	40	6	50
B	4	50	8	40
C	6	20	9	30
D	8	10	6	20
E	10	10	5	20

12) Calculate Fisher's Ideal Index from the following data and verify that it satisfies both Time Reversal and Factor Reversal test

Commodity	Price		Quantity	
	1985	1986	1985	1986
A	8	20	50	60
B	2	6	15	10
C	1	2	20	25
D	2	5	10	8
E	1	5	40	30

13) Compute Index Number using Fisher's formula and show that it satisfies time reversal test and factor reversal test.

Commodity	Base year		Current year	
	Price	Quantity	Price	Quantity
A	10	12	12	15
B	7	15	5	20
C	5	24	9	20
D	16	5	14	5

14) The following data relate to the life (in hours) of 10 samples of 6 electric bulbs each drawn at an interval of one hour from a production process. Draw the control chart for $\overline{\overline{X}}$ and R and comment.

Sample	No. Life time (in hours)					
1	620	687	666	689	738	686
2	501	585	524	585	653	668
3	673	701	686	567	619	660
4	646	626	572	628	631	743
5	494	984	659	643	660	640
6	634	755	625	582	683	555
7	619	710	664	693	770	534
8	630	723	614	535	550	570
9	482	791	533	612	497	499
10	706	524	626	503	661	754

(Given for n = 6, A_2 = 0.483, D_3 = 0, D_4 = 2.004)

15) The following data shows the value of sample mean $\overline{X}$ and the range R for ten samples of size 5 each. Calculate the values for central line and control limits for mean chart and range chart and determine whether the process is in control

Sample no.	1	2	3	4	5	6	7	8	9	10
Mean $\overline{X}$	11.2	11.8	10.8	11.6	11.0	9.6	10.4	9.6	10.6	10.0
Range (R)	7	4	8	5	7	4	8	4	7	9

(Given for n = 5, A_2 = 0.577, D_3 = 0 D_4 = 2.115)

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