SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN
(AUTONOMOUS)
(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)
Chromepet, Chennai — 600 044.
B.Com.(ISM) END SEMESTER EXAMINATIONS NOVEMBER -2023
SEMESTER - IV
20UBIAT4004 - Business Mathematics and Statistics -II

Total Duration : 2 Hrs 30 Mins. Total Marks : 60

Section B

Answer any **SIX** questions $(6 \times 5 = 30$ Marks)

1. If $A = \begin{pmatrix} -1 & -5 \\ -2 & 3 \end{pmatrix}$ then show that $A^{-1} = 1/13 \begin{pmatrix} 3 & 5 \\ 2 & -1 \end{pmatrix}$
2. Classify the Methods of Constructing Index Numbers.
3. Assuming that trend is absent, determine if there is any seasonally in the data given below:

Year	**Ist Quater**	**2nd Quater**	**3rd Quater**	**4th Quater**
2006	3.7	4.1	3.3	3.5
2007	3.7	3.9	3.6	3.6
2008	4.0	4.1	3.3	3.1
2009	3.3	4.4	4.0	4.0

   What are the seasonal indices for various quarters?
4. In a hospital 480 female and 520 male babies were born in a week. Do these figures confirm the hypothesis that male and female are born in equal number?
5. Two numbers are in the ratio 3:4. If 6 be added to each term of the ratio that the new ratio will be 4:5. Find the numbers.
6. Calculate the weighted price index from the following data:

Materials required	**Units**	**Quantity required**	**Price during**	
			2008 (Rs.)	**2009 (Rs.)**
Cement	100 lb.	500 lb.	5	8
Timber	c.ft.	2,000 c.ft	9.5	14.2
Steel sheets	Cwt.	50 cwt.	34	42.2
Bricks	Per '000	20,000	12	24

Contd...

7. In an anti-malarial campaign in a certain area, quinine was administered to 812 persons out of a total population of 3,248. The number of fever cases is shown below:

Treatment	**Fever**	**No fever**	**Total**
Quinine	20	792	812
No Quinine	220	2,216	2,436
Total	240	3,008	3,248

Discuss the usefulness of quinine in checking malaria.

8. Two samples are drawn from two normal population, from the following data test whether the two samples have the same variance at 5% level:

Sample 1:	60	65	71	74	76	82	85	87		
Sample 2:	61	66	67	85	78	63	85	86	88	91

Section C

Answer any **THREE** questions $(3 \times 10 = 30$ Marks)

9. Compute the inverse of a Matrix

$$\begin{pmatrix} 1 & 0 & -4 \\ -2 & 2 & 5 \\ 3 & -1 & 2 \end{pmatrix}$$

10. The monthly cost of running a boarding house is partly constant and partly proportional to the number of members. When there are 40 members, the expenses are just met and when there are 60 members, there is a profit of Rs.500 per month. Find the minimum number of members if the profit is to be not less than Rs.1,000 per month. Assume that every member pays the same charge.

11. Construct index numbers of price from the following data by applying:
    i) Laspeyres method
    ii) Paasche method
    iii) Bowleys method
    iv) Fishers ideal method and
    v) Marshall-Edgeworth method.

Commodity	**2006**		**2007**	
A	2	8	4	6
B	5	10	6	5
C	4	14	5	10
D	2	19	2	13

12. Explain the need and components of time series.

13. A tea company appoints four salesmen A, B, C and D observes their sales in three seasons – summer, winter, and monsoon. The figures (in lakhs) are given in the following table:
    (i) Do the salesmen significantly differ in performance?
    (ii) Is there significant different between the seasons?

Seasons	**Salesmen**				**Season's Total**
	A	**B**	**C**	**D**	
Summer	36	36	21	35	128
Winter	28	29	31	32	120
Monsoon	26	28	29	29	112
Salesmen Total	90	93	81	96	360

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