PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)
BA DEGREE EXAMINATION DECEMBER 2024
(Fourth Semester)
Branch : ECONOMICS
STATISTICAL METHODS-II

Time: Three Hours

Maximum: 50 Marks

SECTION-A (5 Marks)
Answer ALL questions
ALL questions carry EQUAL marks   (5 x 1 = 5)

1. Laspeyre's index formula uses the weights of the
   (i) base year   (ii) current year
   (iii) average of the weights of a number of years   (iv) none of the above

2. A time series is a set of data recorded
   (i) periodically   (ii) at equal time intervals
   (iii) at successive points of time   (iv) all the above

3. A coin is tossed 6 times. Find the number of points in the sample space
   (i) 12   (ii) 16   (iii) 32   (iv) 64

4. Type I error is
   (i) Accept $H0$ when it is true   (ii) Accept $H0$ when it is false
   (iii) Reject $H0$ when it is true   (iv) Reject $H0$ when it is false

5. ANOVA technique originated in the field of
   (i) Industry   (ii) Agriculture   (iii) Medicine   (iv) Genetics

SECTION - B (15 Marks)
Answer ALL Questions
ALL Questions Carry EQUAL Marks   (5 x 3 = 15)

6 a. Describe the uses of index numbers.

OR

   b. From the chain base Index Numbers given below, prepare fixed base index numbers.

X	2007	2008	2009	2010	2011
Y	80	110	120	105	95

7 a. Explain the Utility of Time Series.

OR

   b. Predict the trend value by the method of semi-averages from the following data:

Year	1991	1992	1993	1994	1995	1996
Sales Rs. in (1000)	60	75	81	110	106	117

8 a. Define the concept of probability.

OR

   b. A bag contains 6 white, 4 red, and 10 black balls. 2 balls are drawn at random   find the probability.

9 a. State the procedures followed in testing of a hypothesis.

OR

   b. A random sample of 10 children had mean weight of 14.3 kg and a variance   of 2.1. Test that the mean weight of the children population is 15 kg. ($t_{0.05}$=2.26)

10 a. State the conditions applying Chi-square test.

OR

   b. Expound the uses of analysis of variance in social science research.

SECTION -C (30 Marks)
Answer ALL questions
ALL questions carry EQUAL Marks   (5 x 6 = 30)

11 a. From the following data construct a price index numbers of four commodities by using the aspeyre's meyhod, Paasche's method and Fisher's ideal method

Commodity	Base year		Current Year	
	Price per unit	Expenditure (Rs.)	Price per unit	Expenditure (Rs.)
A	2	40	5	75
B	4	16	8	40
C	1	10	2	24
D	5	25	10	60

OR

11 b.   Prove that fisher's Ideal Index satisfies the Time Reversal test

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

12 a.   Calculate trend value by the method of four-yearly moving averages from the Following date.

Year	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022
Production (in Kgs)	12	25	39	54	70	37	105	100	82	65

OR

b.   Given below are the figures of production of a cement factory:

Year	2014	2015	2016	2017	2018	2019	2020
Production (in Tonnes)	80	90	92	83	94	99	92

i) Fit a straight line trend to these figures by the method of Least squares.
ii) Predict the production of cement for the year 2022.

13 a.   Explain the theorem of probability.

OR

b.   A bag contains 30 balls numbered from 1 to 30. One ball is drawn at random. Find the probability that the number of the ball drawn will be a multiple of (a) 5 or 7, and (b) 3 Or 7.

14 a.   Demonstrate the properties of normal distribution.

OR

b.   Eleven Salesmen executive trainees are assigned selling jobs right after their recruitment. After a fortnight they are withdrawn from their field duties and given a month's training for executive sales. Sales executed by them in thousands of rupees before and after training. In the same period are listed below

Sales (Rs. "000) before training	23	20	19	21	18	20	18	17	23	16	19
Sales (Rs. '000) after training	24	19	21	18	20	22	20	20	23	20	27

Do these data indicate that the training has contributed to their performance?

15 a   Based on information on 1000 randomly selected fields about the tenancy status of the cultivation of these fields and use of fertilizers, collected in an agro-economic survey the following classification was noted:

	Owned	Rented	Total
Using fertilizer	416	184	600
Not using fertilizer	64	336	400
Total	480	520	1000

Would you conclude that owner cultivators more inclined towards the use of fertilizer? (5 per cent of chi-square for one degree of freedom = 3.84)

OR

b   To study the performance of three detergents and three different water temperatures, the following 'whiteness' readings were obtained with specially designed equipment:

Water temperature	Detergent A	Detergent B	Detergent C
Cold water	57	55	67
Warm water	49	52	68
Hot water	54	46	58

Perform a two-way analysis of variance and give your conclusion.

Z-Z-Z   END