22ECU412N / 22ECU412

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BA DEGREE EXAMINATION MAY 2025
(Fourth Semester)

Branch – **ECONOMICS**

STATISTICAL METHODS - II

Time: Three Hours | Maximum: 75 Marks

SECTION-A (10 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** marks (10 × 1 = 10)

Module No.	Question No.	Question	K Level	CO
1	1	The index number for the base year is always _____. a. 1000 b. 200 c.100 d. 2000	K1	CO1
	2	A price index computed using the arithmetic mean of price relatives is known as the _____. a. Laspeyres index. b. Paasche index. c. Simple aggregate index d. Fisher's index.	K2	CO1
2	3	The multiplicative time series model is _____. a. Y=T+S+C+I b. Y=T x S x C x I c. Y=T+S d. Y=T x S	K1	CO2
	4	The method of moving average is used to find the _____. a. Secular trend b. Seasonal variation c. Cyclical variation d. Irregular	K2	CO2
3	5	What is the probability of getting an odd number in a single throw of a die? a. 1 b. 5/6 c. 1/2 d. 1/3	K1	CO3
	6	The set that contains all possible outcomes is ____. a. event b. probability c. empty set d. sample space	K2	CO3
4	7	The standard deviation of the Binomial distribution with parameters n and p is _____. a. $\sqrt{np}$ b. $\sqrt{npq}$ c. $\sqrt{qp}$ d. $\sqrt{nq}$	K1	CO4
	8	The shape of the Normal Curve is_____, a. bell-shaped b. flat c. circular d. square	K2	CO4
5	9	In a chi-square goodness of fit test, theoretical frequencies are also called _____ frequencies. a. actual b. expected c. observed d. empirical	K1	CO5
	10	The statistical methods of analysis of variance assume _____. a. equal sample mean b. equal population proportions c. equal population variances d. equal sample proportions	K2	CO5

Cont...

SECTION - B (35 Marks)

Answer ALL questions

ALL questions carry EQUAL Marks (5 × 7 = 35)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td rowspan="3">1</td><td>11.a.</td><td>Calculate the price Index number by (a) Paasche's method (b) Laspeyres method (c) Bowley's method (d) Marshall-Edge worth method.
<table>
<tr><th rowspan="2">Commodity</th><th colspan="2">2006-07</th><th colspan="2">2007-08</th></tr>
<tr><th>Profit (Rs)</th><th>Quantity (Kg)</th><th>Profit (Rs)</th><th>Quantity (Kg)</th></tr>
<tr><td>A</td><td>20</td><td>8</td><td>40</td><td>6</td></tr>
<tr><td>B</td><td>50</td><td>10</td><td>60</td><td>5</td></tr>
<tr><td>C</td><td>40</td><td>15</td><td>50</td><td>10</td></tr>
<tr><td>D</td><td>20</td><td>20</td><td>20</td><td>50</td></tr>
</table></td><td rowspan="3">K5</td><td rowspan="3">CO1</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>11.b.</td><td>Calculate fisher's ideal index from the following data and show how it satisfies the time reversal test and factor reversal test.
<table>
<tr><th rowspan="2">Commodity</th><th colspan="2">2006-07</th><th colspan="2">2007-08</th></tr>
<tr><th>Profit (Rs)</th><th>Value (Rs)</th><th>Profit (Rs)</th><th>Value (Rs)</th></tr>
<tr><td>A</td><td>10</td><td>100</td><td>12</td><td>96</td></tr>
<tr><td>B</td><td>8</td><td>96</td><td>8</td><td>104</td></tr>
<tr><td>C</td><td>12</td><td>144</td><td>15</td><td>120</td></tr>
<tr><td>D</td><td>20</td><td>300</td><td>25</td><td>250</td></tr>
<tr><td>E</td><td>5</td><td>40</td><td>8</td><td>64</td></tr>
<tr><td>F</td><td>2</td><td>20</td><td>4</td><td>24</td></tr>
</table></td></tr>
<tr><td rowspan="3">2</td><td>12.a.</td><td>Explain various components of time series.</td><td rowspan="3">K5</td><td rowspan="3">CO2</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>12.b.</td><td>The following data refers to the production of cloth in million yards during the years 2003-2012. Assuming a four-year cycle, compute the trend value by the method of moving average.
<table>
<tr><td>Year</td><td>2003</td><td>2004</td><td>2005</td><td>2006</td><td>2007</td></tr>
<tr><td>Production (in yards)</td><td>460</td><td>512</td><td>515</td><td>470</td><td>500</td></tr>
<tr><td>Year</td><td>2008</td><td>2009</td><td>2010</td><td>2011</td><td>2012</td></tr>
<tr><td>Production (in yards)</td><td>510</td><td>525</td><td>540</td><td>520</td><td>550</td></tr>
</table></td></tr>
<tr><td rowspan="3">3</td><td>13.a.</td><td>A box contains 8 red, 3 white and 9 blue balls. 3 balls are drawn at random; determine the probability that (a) 2 are red and 1 is white (b) at least one is white (c) one of each color is drawn.</td><td rowspan="3">K5</td><td rowspan="3">CO3</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>13.b.</td><td>State and prove the Addition theorem.</td></tr>
<tr><td rowspan="3">4</td><td>14.a.</td><td>The probability that an evening college student will graduate is 0.4. Determine the probability that out of 5 students (a) none (b) one and (c) at least one will graduate.</td><td rowspan="3">K4</td><td rowspan="3">CO4</td></tr>
<tr><td colspan="2">(OR)</td></tr>
<tr><td>14.b.</td><td>One-fifth percent of the blades produced by a blade manufacturing factory turn out to be defective. The blades are supplied in packets of 10. Using Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades, respectively, in a consignment of 100,000 packets.</td></tr>
</table>

5	15.a.	In a survey of 200 boys, of which 75 were intelligent, 40 had educated fathers, while 85 of the unintelligent boys had uneducated fathers. Does this data support the hypothesis that educated fathers have intelligent boys?	K4	CO5
		(OR)		
	15.b.	Two random samples drawn from a normal population are Sample I: 20, 16, 26, 27, 23, 22 Sample II: 27, 33, 42, 35, 32, 34 Sample I: 18, 24, 22 Sample II: 38, 28, 41, 43, 45 Test whether the two populations have the same variance.		

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks $(3 \times 10 = 30)$

Module No.	Question No.	Question	K Level	CO
1	16	Compute the cost-of-living index number using both the Aggregate expenditure method and family budget method from the following information. Wheat: 200, 1.00, 1.2 Rice: 50, 3.00, 3.5 Pulses: 50, 4.00, 5.00 Ghee: 20, 20.00, 30.00 Sugar: 40, 2.5, 5.00 Oil: 50, 10.00, 15.00 Fuel: 60, 2.00, 2.50 Clothing: 40, 15.00, 18.00	K4	CO1
2	17	Fit a straight-line trend by the method of least squares to the following data: Year: 1987, 1988, 1989, 1990, 1991 Earnings (Rs. Lakhs): 38, 40, 65, 72, 69 Year: 1992, 1993, 1994 Earnings (Rs. Lakhs): 60, 87, 95	K5	CO2
3	18	State and prove the Multiplication theorem of probability.	K6	CO3
4	19	Below are given the gain in weights (in lbs.) of pigs fed on two diets A and B. Gain in weight. Test if the two diets differ significantly as regards their effect on increase in weight. Diet A: 25, 32, 30, 34, 24, 14, 32, 24, 30, 31 Diet B: 44, 34, 22, 10, 47, 31, 40, 30, 32, 35 Diet A: 35, 25 Diet B: 18, 21, 35, 29, 22	K4	CO4
5	20	To study the performance of three detergents and three different water temperatures, the following whiteness readings were obtained with specially designed equipment. Perform a two-way analysis of variance using a 5% level of significance ($F_{.05} = 6.94$). Cold Water: 57, 55, 67 Warm Water: 49, 52, 68 Hot Water: 54, 46, 58	K4	CO5

Z-Z-Z

END