TOTAL PAGES: 2

22STU102N

PSG COLLEGE OF ARTS & SCIENCE
(AUTONOMOUS)

BSc DEGREE EXAMINATION MAY 2026
(First Semester)

Branch - **STATISTICS**

TIME SERIES AND INDEX NUMBERS

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 term for time series pattern characterized by upward or downward movement in data points over time is called a. Seasonality b. Trend c. Autocorrelation d. Cyclical variation	K1	CO1
	2	Trend is measured using ---------- method. a. Moving average b. Link relative c. Simple average d. Chain relative	K2	CO1
2	3	The secular trend is measured by the method of semi-average when a. Time series based on yearly value b. Time series consists of even number c. Trend is linear d. None of these	K2	CO2
	4	The best method for finding out seasonal variation is: a. Ratio to trend method b. Ratio to moving average method c. None of these d. Simple average method	K2	CO2
3	5	Index numbers are ----------. a. Indicators which reflects the changes b. Study the price rise c. Economic fluctuations d. National Income.	K1	CO3
	6	In the chain base method, the base period is a. Constant b. Fixed c. None of these d. Changed	K2	CO3
4	7	Name the test for Ideal Index numbers ---------- a. Mathematical test b. Time reversal test c. Regular test d. Uniform test	K1	CO3
	8	Weight in Laspeyres price index number is known as ____ ? a. Quantity during the current year b. Quantity in the base year c. Price during the current year d. Price in the base year	K2	CO4
5	9	What does National Income denotes ---------- a. Primary data b. Price rise c. Financial data d. Total value of goods and Services	K1	CO5
	10	Which of the following is NOT a method used to measure national income? a. Output Method b. Income Method c. Expenditure Method d. Productivity method	K2	CO5

SECTION - B (35 Marks)
Answer **ALL** questions
ALL questions carry **EQUAL** Marks (5 × 7 = 35)

Module No.	Question No.	Question	K Level	CO
1	11.a.	Define Time Series. Also explain the components of time series?	K3	CO1
		(OR)		
	11.b.	Calculate **5 yearly moving average** for the following data.

Year	2008	2009	2010	2011	2012	2013	2014
Coal Production	50	36	43	44	38	38	32

Year	2015	2016
No.of failures	38	41

Cont...

<table>
<tr><td rowspan="3">2</td><td>12.a.</td><td colspan="5">Define and discuss the ratio to moving averages with an example.</td><td rowspan="3">K3</td><td rowspan="3">CO2</td></tr>
<tr><td colspan="6">(OR)</td></tr>
<tr><td>12.b.</td><td colspan="5">Calculate seasonal indices for the following data.
<table><tr><td>Quarters/Year</td><td>Q1</td><td>Q2</td><td>Q3</td><td>Q4</td></tr><tr><td>1999</td><td>40.3</td><td>44.8</td><td>46</td><td>48</td></tr><tr><td>2000</td><td>50.1</td><td>53.1</td><td>55.3</td><td>59.5</td></tr><tr><td>2001</td><td>47.2</td><td>50.1</td><td>52.1</td><td>55.2</td></tr><tr><td>2002</td><td>55.4</td><td>59</td><td>61.6</td><td>65.3</td></tr></table></td></tr>
<tr><td rowspan="3">3</td><td>13.a.</td><td colspan="5">Identify the uses Index numbers.</td><td rowspan="3">K3</td><td rowspan="3">CO3</td></tr>
<tr><td colspan="6">(OR)</td></tr>
<tr><td>13.b.</td><td colspan="5">Construct the chain index number with 2012 prices as base from the following table.
<table><tr><td>Commodity</td><td colspan="5">Average wholesale price (in Rs)</td></tr><tr><td></td><td>2012</td><td>2013</td><td>2014</td><td>2015</td><td>2016</td></tr><tr><td>A</td><td>20</td><td>16</td><td>28</td><td>35</td><td>21</td></tr><tr><td>B</td><td>25</td><td>30</td><td>24</td><td>36</td><td>45</td></tr><tr><td>C</td><td>20</td><td>25</td><td>30</td><td>24</td><td>30</td></tr></table></td></tr>
<tr><td rowspan="3">4</td><td>14.a.</td><td colspan="5">On a certain date the Ministry of Labour retail price index was 204.6. Percentage increases in price over some basic period were : Rent 65 , Clothing 220, Fuel and Light 110, Miscellaneous 125. What was the percentage increase in the food group? Given that the weights of the different items in the group were as follows :
Food 60 , Rent 16 , Clothing 12, Fuel and Light 8 , Miscellaneous 4.</td><td rowspan="3">K5</td><td rowspan="3">CO4</td></tr>
<tr><td colspan="6">(OR)</td></tr>
<tr><td>14.b.</td><td colspan="5">Explain about chain base method and the steps involved in the construction of chain indices.</td></tr>
<tr><td rowspan="3">5</td><td>15.a.</td><td colspan="5">Describe about the Nation income.</td><td rowspan="3">K2</td><td rowspan="3">CO5</td></tr>
<tr><td colspan="6">(OR)</td></tr>
<tr><td>15.b.</td><td colspan="5">Illustrate the Product method of Estimation of National Income.</td></tr>
</table>

SECTION -C (30 Marks)

Answer **ANY THREE** questions

ALL questions carry **EQUAL** Marks (3 × 10 = 30)

<table>
<tr><th>Module No.</th><th>Question No.</th><th>Question</th><th>K Level</th><th>CO</th></tr>
<tr><td>1</td><td>16</td><td>Write a detailed note on the concept of least square method of estimating trend.</td><td>K3</td><td>CO1</td></tr>
<tr><td>2</td><td>17</td><td>Calculate Seasonal Variation for the following data of sales in thousands of rupees of a firm by the Ratio-to-trend Method.
<table><tr><td>Year/Quarter</td><td>I</td><td>II</td><td>III</td><td>IV</td></tr><tr><td>2011</td><td>30</td><td>40</td><td>36</td><td>34</td></tr><tr><td>2012</td><td>34</td><td>52</td><td>50</td><td>44</td></tr><tr><td>2013</td><td>40</td><td>58</td><td>54</td><td>48</td></tr><tr><td>2014</td><td>54</td><td>76</td><td>68</td><td>62</td></tr><tr><td>2015</td><td>80</td><td>92</td><td>88</td><td>82</td></tr></table></td><td>K3</td><td>CO2</td></tr>
<tr><td>3</td><td>18</td><td>Discover the problems involved in the construction of Index numbers.</td><td>K4</td><td>CO3</td></tr>
<tr><td>4</td><td>19</td><td>Compute price index and quantity index numbers for the year 2005 with 2000 as base year, using
i)Laspeyre's Method ii) Paache's Method, and iii) Fisher's Method.
<table><tr><td rowspan="2">Commodity</td><td colspan="2">Quantity (units)</td><td colspan="2">Expenditure (Rs)</td></tr><tr><td>2000</td><td>2005</td><td>2000</td><td>2005</td></tr><tr><td>A</td><td>100</td><td>150</td><td>500</td><td>900</td></tr><tr><td>B</td><td>80</td><td>100</td><td>320</td><td>500</td></tr><tr><td>C</td><td>60</td><td>72</td><td>150</td><td>360</td></tr><tr><td>D</td><td>30</td><td>33</td><td>360</td><td>297</td></tr></table></td><td>K3</td><td>CO4</td></tr>
<tr><td>5</td><td>20</td><td>Elaborate on estimation methods of National Income.</td><td>K4</td><td>CO5</td></tr>
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