

Reg. No.:



Name:

University of Kerala

W6914

Third Semester FYUGP Degree Examination, November 2025

Discipline Specific Core Course

STATISTICS

UK3DSCSTA202 - QUANTITATIVE DATA ANALYTICS -III

Academic Level: 200-299

2024 Admission

Time: 2 Hours(120 Mins)

Max. Marks: 56

Part A.6 Marks:Time 5 Minutes.(Cognitive Level :Remember(RE)/Understand(UN)) Objective Type.1 mark each, Answer all questions

Qn No.	Question	CL	CO
1	Give an example of statistic following t distribution.	RE	1
2	The distribution of the square of a standard normal variate is -----	RE	1
3	The <i>Chi-square test for independence</i> is used to Options : A)Compare means of two samples B)Determine association between two categorical variables C)Estimate population proportion D)Test homogeneity of variances	UN	2
4	Define a statistic with an example.	UN	1
5	In a Laspeyres' price index, what quantities are used as weights? Options : A)Average of base and current period quantities B)Current period quantities C)No quantities are used as weights D)Base period quantities	UN	3
6	Degrees of freedom for a paired t-test with n pairs of observations is Options : A) n B) $n-1$ C) $2n-1$ D) $2n$	UN	2

Part B.10 Marks.Time:20 Minutes (Cognitive Level:Understand(UN)/Apply(AP))Two-three sentences.2 marks each.Answer all questions

Qn No.	Question	CL	CO
7	Distinguish between parameter and statistic	UN	1

Qn No.	Question	CL	CO
8	Distinguish between one tailed test and two tailed test	UN	1
9	If Laspeyre's price index is 100 and Paasche's price index is 144 then determine the Fisher's index number.	AP	3
10	A sample of size 64 is taken from a normal population with mean 70 and standard deviation 8, write down the distribution of its sample mean.	AP	2
11	A coin is tossed 200 times and got head in 80 times. Construct the null and alternative hypotheses to test whether the coin is an unbiased one. Conduct the test at 5% level of significance.	AP	2

Part C.16 Marks. Time: 35 Minutes. (Cognitive Level : Apply (AP) / Analyse (AN)) Short Answer. 4 marks each, Answer all 4 questions, choosing among options * within each question

Qn No.	Question	CL	CO
12	A) A psychologist wants to compare before and after scores of 12 patients given a certain therapy. Which small-sample test is suitable and how would you apply it? OR B) It is desired to examine whether the IQ of students from two different groups are of the same level on the average. Suggest a suitable test procedure (sample size of groups are 5 and 7)	AP	2, 1
13	A) A certain stimulus administered to each of 12 patients resulted in the following increases of blood pressure. 5, 2, 8, -1, 3, 0, 6, -2, 1, 5, 0, 4. Apply t test to test whether the stimulus in general will be accompanied by an increase in blood pressure OR B) The following observations came from a normal population 47, 49, 63, 45, 53. Test whether the mean of the distribution is 55.	AP	2, 2
14	A) On inspection of random sample of 500 items produced by a machine, 30 are found to be defective. Does this justify the assumption that the machine is producing 2% defective items on an average?	AN	2, 2

Qn No.	Question	CL	CO																
	OR B) The following table provides data with regard to the stature of the fathers and their first sons at the age of 25 years. Analyze the data to verify whether there is any relation between the statures of fathers and their sons <table><tr><td></td><td colspan="2">Stature of father</td></tr><tr><td>Stature of son</td><td>Tall</td><td>Short</td></tr><tr><td>Tall</td><td>8</td><td>2</td></tr><tr><td>short</td><td>7</td><td>6</td></tr></table>		Stature of father		Stature of son	Tall	Short	Tall	8	2	short	7	6						
	Stature of father																		
Stature of son	Tall	Short																	
Tall	8	2																	
short	7	6																	
15	A) Calculate Paasches price index number for the following data <table><tr><td>Item</td><td>2020 Price(p0)</td><td>2023 Price(p1)</td><td>2023 Quantity(q1)</td></tr><tr><td>Smart Phone</td><td>20,000</td><td>25,000</td><td>150</td></tr><tr><td>Tablet</td><td>15,000</td><td>14,000</td><td>80</td></tr><tr><td>Head phones</td><td>5,000</td><td>6000</td><td>250</td></tr></table> OR B) Discuss the advantages and limitations of index numbers.	Item	2020 Price(p0)	2023 Price(p1)	2023 Quantity(q1)	Smart Phone	20,000	25,000	150	Tablet	15,000	14,000	80	Head phones	5,000	6000	250	AN	3, 4
Item	2020 Price(p0)	2023 Price(p1)	2023 Quantity(q1)																
Smart Phone	20,000	25,000	150																
Tablet	15,000	14,000	80																
Head phones	5,000	6000	250																

Part D.24 Marks.Time: 60 Minutes.(Cognitive Level :Analyse(AN)/Evaluate(EV)/Create(CR)) Long Answer 6 Marks each.Answer all 4 questions choosing among options * within each question

Qn No.	Question	CL	CO																														
16	A) A school counselor wants to know whether there is any association between student's preferred study method and their grade level. The counselor surveys 200 students and records their responses. Analyze the data and check whether there is any significant relation between study method and grade level	AN	2, 2																														
<table><tr><th>Study method</th><th>Grade 9</th><th>Grade 10</th><th>Grade 11</th><th>Grade 12</th><th>Total</th></tr><tr><td>Group study</td><td>15</td><td>20</td><td>25</td><td>30</td><td>90</td></tr><tr><td>Studying alone</td><td>20</td><td>15</td><td>25</td><td>10</td><td>70</td></tr><tr><td>Online resources</td><td>10</td><td>10</td><td>10</td><td>10</td><td>40</td></tr><tr><td>Total</td><td>45</td><td>45</td><td>60</td><td>50</td><td>200</td></tr></table>				Study method	Grade 9	Grade 10	Grade 11	Grade 12	Total	Group study	15	20	25	30	90	Studying alone	20	15	25	10	70	Online resources	10	10	10	10	40	Total	45	45	60	50	200
Study method	Grade 9	Grade 10	Grade 11	Grade 12	Total																												
Group study	15	20	25	30	90																												
Studying alone	20	15	25	10	70																												
Online resources	10	10	10	10	40																												
Total	45	45	60	50	200																												

Qn No.	Question	CL	CO																																																										
	OR B) A study is conducted to examine whether a new training program improves the maximum vertical jump height (in inches) of college basketball players. A random sample of 20 players is selected. Each player’s vertical jump is recorded before the training program and again after one month of training. The data are as follows: Test, at the 5% level of significance, whether the training program has a significant effect on the players’ vertical jump performance. <table><tr><td>Player</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td><td>6</td><td>7</td><td>8</td><td>9</td><td>10</td></tr><tr><td>Before Training</td><td>24</td><td>27</td><td>22</td><td>28</td><td>25</td><td>23</td><td>26</td><td>21</td><td>29</td><td>24</td></tr><tr><td>After Training</td><td>26</td><td>29</td><td>25</td><td>30</td><td>27</td><td>24</td><td>28</td><td>23</td><td>31</td><td>26</td></tr></table>	Player	1	2	3	4	5	6	7	8	9	10	Before Training	24	27	22	28	25	23	26	21	29	24	After Training	26	29	25	30	27	24	28	23	31	26																											
Player	1	2	3	4	5	6	7	8	9	10																																																			
Before Training	24	27	22	28	25	23	26	21	29	24																																																			
After Training	26	29	25	30	27	24	28	23	31	26																																																			
	A) Compute Fishers Index number from the following data. <table><tr><td rowspan="2">commodities</td><td colspan="2">Base year</td><td colspan="2">Current year</td></tr><tr><td>Price</td><td>Quantity</td><td>Price</td><td>Quantity</td></tr><tr><td>A</td><td>4</td><td>3</td><td>6</td><td>2</td></tr><tr><td>B</td><td>6</td><td>4</td><td>6</td><td>4</td></tr><tr><td>C</td><td>7</td><td>2</td><td>9</td><td>2</td></tr><tr><td>D</td><td>2</td><td>3</td><td>1</td><td>5</td></tr></table> OR B) 17 The following table gives the prices and quantities of four commodities in two years. Calculate Laspeyres’ price index, Paasche’s price index and Fisher’s price index <table><tr><td rowspan="2">Commodity</td><td colspan="2">Price in Rupees per unit</td><td colspan="2">Quantity of units</td></tr><tr><td>Base year</td><td>Current year</td><td>Base year</td><td>Current year</td></tr><tr><td>W</td><td>15</td><td>18</td><td>20</td><td>22</td></tr><tr><td>X</td><td>25</td><td>30</td><td>10</td><td>8</td></tr><tr><td>Y</td><td>10</td><td>12</td><td>25</td><td>30</td></tr><tr><td>Z</td><td>5</td><td>6</td><td>30</td><td>28</td></tr></table>	commodities	Base year		Current year		Price	Quantity	Price	Quantity	A	4	3	6	2	B	6	4	6	4	C	7	2	9	2	D	2	3	1	5	Commodity	Price in Rupees per unit		Quantity of units		Base year	Current year	Base year	Current year	W	15	18	20	22	X	25	30	10	8	Y	10	12	25	30	Z	5	6	30	28	EV	3, 3
commodities	Base year		Current year																																																										
	Price	Quantity	Price	Quantity																																																									
A	4	3	6	2																																																									
B	6	4	6	4																																																									
C	7	2	9	2																																																									
D	2	3	1	5																																																									
Commodity	Price in Rupees per unit		Quantity of units																																																										
	Base year	Current year	Base year	Current year																																																									
W	15	18	20	22																																																									
X	25	30	10	8																																																									
Y	10	12	25	30																																																									
Z	5	6	30	28																																																									
18	A) A sample of size 8 from a normal population with SD 3 is 6, 8, 11, 5, 9, 11, 10, 12. Examine whether the mean of population is 7. OR B) An IQ test was administered to 5 persons before and after they were trained.The results are as follows conclude whtether there is any change in IQ after the training programme	EV	2, 2																																																										

Qn No.	Question						CL	CO																		
	<table><tr><td>Candidate</td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td></tr><tr><td>IQ Before training</td><td>110</td><td>120</td><td>123</td><td>132</td><td>125</td></tr><tr><td>IQ After training</td><td>120</td><td>118</td><td>125</td><td>136</td><td>121</td></tr></table>						Candidate	A	B	C	D	E	IQ Before training	110	120	123	132	125	IQ After training	120	118	125	136	121		
Candidate	A	B	C	D	E																					
IQ Before training	110	120	123	132	125																					
IQ After training	120	118	125	136	121																					
19	A) Explain various steps involved in testing a statistical hypothesis, in detail. OR B) A) The marks obtained by 8 students in Statistics before and after coaching are: Before: 50, 60, 55, 62, 58, 53, 56, 54 After: 52, 63, 56, 65, 60, 54, 57, 55 Test whether the coaching was effective at 5% level						CR	1, 2																		