



First Semester MBA Degree Examination, Dec.2024/Jan.2025

## Statistics for Managers

Max. Marks: 100

Note: 1. Answer any FOUR full questions from Q.No.1 to Q.No.7.

2. Question No. 8 is compulsory.

3. M : Marks, L: Bloom's level, C: Course outcomes.

4. Use of statistical tables is allowed.

			M	L	C																							
Q.1	a.	What is a measure of dispersion?	03	L2	CO1																							
	b.	Define statistics. Discuss the characteristics of statistics.	07	L2	CO1																							
	c.	1000 students at a college level are graded according to their I.Q. and their economic conditions. Use chi-square test to find out whether there is any association between economic conditions and the level of I.Q. (5% significance = 5.99)	10	L5	CO4																							
		<table><tr><th rowspan="2">Economic Condition</th><th colspan="3">I.Q.</th><th rowspan="2">Total</th></tr><tr><th>High</th><th>Medium</th><th>Low</th></tr><tr><td>Rich</td><td>160</td><td>300</td><td>140</td><td>600</td></tr><tr><td>Poor</td><td>140</td><td>100</td><td>160</td><td>400</td></tr><tr><td>Total</td><td>300</td><td>400</td><td>300</td><td>1000</td></tr></table>	Economic Condition	I.Q.			Total	High	Medium	Low	Rich	160	300	140	600	Poor	140	100	160	400	Total	300	400	300	1000			
Economic Condition	I.Q.			Total																								
	High	Medium	Low																									
Rich	160	300	140	600																								
Poor	140	100	160	400																								
Total	300	400	300	1000																								
Q.2	a.	Interpret the value $r = 0$ , $r = 1$ and $r = +1$ .	03	L3	CO2																							
	b.	The following table gives the number of days in a 50 day period during which automobile accidents occurred in a city.	07	L4	CO3																							
		<table><tr><td>Number of accidents</td><td>0</td><td>1</td><td>2</td><td>3</td><td>4</td></tr><tr><td>No. of days</td><td>21</td><td>18</td><td>7</td><td>3</td><td>1</td></tr></table>	Number of accidents	0	1	2	3	4	No. of days	21	18	7	3	1														
Number of accidents	0	1	2	3	4																							
No. of days	21	18	7	3	1																							
		Fit a Poisson distribution.																										
	c.	Fit a regression line $y = a + bx$ by the method of least square:	10	L3	CO2																							
		<table><tr><td>Income (x) (Rs. '000)</td><td>41</td><td>65</td><td>50</td><td>57</td><td>96</td><td>94</td><td>110</td><td>30</td><td>79</td><td>65</td></tr><tr><td>Expenditure (y) (Rs. '000)</td><td>44</td><td>60</td><td>39</td><td>51</td><td>80</td><td>60</td><td>84</td><td>34</td><td>55</td><td>48</td></tr></table>	Income (x) (Rs. '000)	41	65	50	57	96	94	110	30	79	65	Expenditure (y) (Rs. '000)	44	60	39	51	80	60	84	34	55	48				
Income (x) (Rs. '000)	41	65	50	57	96	94	110	30	79	65																		
Expenditure (y) (Rs. '000)	44	60	39	51	80	60	84	34	55	48																		
Q.3	a.	What are the 4 possibilities of errors in "hypothesis"?	03	L5	CO4																							
	b.	Find the value of mode from the data given below:	07	L3	CO2																							
		<table><tr><th>Weight (kgs)</th><th>No. of students</th><th>Weight (kgs)</th><th>No. of students</th></tr><tr><td>93-97</td><td>2</td><td>113-117</td><td>14</td></tr><tr><td>98-102</td><td>5</td><td>118-122</td><td>6</td></tr><tr><td>103-107</td><td>12</td><td>123-127</td><td>3</td></tr><tr><td>108-112</td><td>17</td><td>128-132</td><td>1</td></tr></table>	Weight (kgs)	No. of students	Weight (kgs)	No. of students	93-97	2	113-117	14	98-102	5	118-122	6	103-107	12	123-127	3	108-112	17	128-132	1						
Weight (kgs)	No. of students	Weight (kgs)	No. of students																									
93-97	2	113-117	14																									
98-102	5	118-122	6																									
103-107	12	123-127	3																									
108-112	17	128-132	1																									
	c.	Calculate the median, $Q_1$ and $Q_3$ quartile, 6 <sup>th</sup> deciles and 75 <sup>th</sup> percentiles from the following data:	10	L3	CO2																							
		<table><tr><td>Age (yrs)</td><td>10-14</td><td>15-19</td><td>20-24</td><td>25-29</td><td>30-34</td><td>35-39</td></tr><tr><td>No. of person</td><td>5</td><td>10</td><td>15</td><td>20</td><td>10</td><td>5</td></tr></table>	Age (yrs)	10-14	15-19	20-24	25-29	30-34	35-39	No. of person	5	10	15	20	10	5												
Age (yrs)	10-14	15-19	20-24	25-29	30-34	35-39																						
No. of person	5	10	15	20	10	5																						

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Q.4	a.	List out the assumptions of 'F' test.	03	L5	CO4																																
	b.	Estimate the trend values using the data given by taking a four yearly moving average: <table><tr><td>Year</td><td>Value</td><td>Year</td><td>Value</td></tr><tr><td>2007</td><td>12</td><td>2014</td><td>100</td></tr><tr><td>2008</td><td>25</td><td>2015</td><td>82</td></tr><tr><td>2009</td><td>39</td><td>2016</td><td>65</td></tr><tr><td>2010</td><td>54</td><td>2017</td><td>49</td></tr><tr><td>2011</td><td>70</td><td>2018</td><td>34</td></tr><tr><td>2012</td><td>87</td><td>2019</td><td>20</td></tr><tr><td>2013</td><td>105</td><td>2020</td><td>07</td></tr></table>	Year	Value	Year	Value	2007	12	2014	100	2008	25	2015	82	2009	39	2016	65	2010	54	2017	49	2011	70	2018	34	2012	87	2019	20	2013	105	2020	07	07	L4	CO3
Year	Value	Year	Value																																		
2007	12	2014	100																																		
2008	25	2015	82																																		
2009	39	2016	65																																		
2010	54	2017	49																																		
2011	70	2018	34																																		
2012	87	2019	20																																		
2013	105	2020	07																																		
	c.	Compute quartile deviation and mean deviation from median for the following data: <table><tr><td>Height in inches</td><td>No. of students</td><td>Height in inches</td><td>No. of students</td></tr><tr><td>58</td><td>15</td><td>63</td><td>22</td></tr><tr><td>59</td><td>20</td><td>64</td><td>22</td></tr><tr><td>60</td><td>32</td><td>65</td><td>10</td></tr><tr><td>61</td><td>35</td><td>66</td><td>8</td></tr><tr><td>62</td><td>33</td><td></td><td></td></tr></table>	Height in inches	No. of students	Height in inches	No. of students	58	15	63	22	59	20	64	22	60	32	65	10	61	35	66	8	62	33			10	L3	CO2								
Height in inches	No. of students	Height in inches	No. of students																																		
58	15	63	22																																		
59	20	64	22																																		
60	32	65	10																																		
61	35	66	8																																		
62	33																																				
Q.5	a.	List the conditions for the use of probable error.	03	L3	CO2																																
	b.	What is hypothesis? Explain the characteristics of a good hypothesis.	07	L5	CO4																																
	c.	Fit a straight line trend for the following data by the least square method. Also find production for the year 2024. <table><tr><td>Year</td><td>2016</td><td>2017</td><td>2018</td><td>2019</td><td>2020</td></tr><tr><td>Production of steel (m tones)</td><td>12</td><td>20</td><td>28</td><td>32</td><td>50</td></tr></table>	Year	2016	2017	2018	2019	2020	Production of steel (m tones)	12	20	28	32	50	10	L3	CO2																				
Year	2016	2017	2018	2019	2020																																
Production of steel (m tones)	12	20	28	32	50																																
Q.6	a.	List out the components of time series.	03	L3	CO2																																
	b.	The number of workers employed, the mean wage (in Rs) per month and standard deviation (in Rs.) in each section of a factory are given below. Calculate mean wage and standard deviation of all the workers taken together. <table><tr><td>Section</td><td>No. of workers employed</td><td>Mean wages (in Rs.)</td><td>Standard deviation (in Rs.)</td></tr><tr><td>A</td><td>50</td><td>11,130</td><td>600</td></tr><tr><td>B</td><td>60</td><td>11,200</td><td>700</td></tr><tr><td>C</td><td>90</td><td>11,150</td><td>800</td></tr></table>	Section	No. of workers employed	Mean wages (in Rs.)	Standard deviation (in Rs.)	A	50	11,130	600	B	60	11,200	700	C	90	11,150	800	07	L3	CO2																
Section	No. of workers employed	Mean wages (in Rs.)	Standard deviation (in Rs.)																																		
A	50	11,130	600																																		
B	60	11,200	700																																		
C	90	11,150	800																																		
	c.	Calculate Karl Pearson's coefficient of correlation from the following data and interpret the value: <table><tr><td>Roll no. of students</td><td>1</td><td>2</td><td>3</td><td>4</td><td>5</td></tr><tr><td>Marks in A/C</td><td>48</td><td>35</td><td>17</td><td>23</td><td>47</td></tr><tr><td>Marks in statistics</td><td>45</td><td>20</td><td>40</td><td>25</td><td>45</td></tr></table>	Roll no. of students	1	2	3	4	5	Marks in A/C	48	35	17	23	47	Marks in statistics	45	20	40	25	45	10	L3	CO2														
Roll no. of students	1	2	3	4	5																																
Marks in A/C	48	35	17	23	47																																
Marks in statistics	45	20	40	25	45																																
Q.7	a.	Where $r = 0.9704$ and $N = 8$ , what is the probable error?	03	L3	CO2																																
	b.	Find Spearman's rank correlation coefficient from the following data: <table><tr><td>X</td><td>50</td><td>66</td><td>34</td><td>21</td><td>15</td><td>79</td><td>42</td></tr><tr><td>Y</td><td>31</td><td>64</td><td>53</td><td>41</td><td>17</td><td>73</td><td>29</td></tr></table>	X	50	66	34	21	15	79	42	Y	31	64	53	41	17	73	29	07	L3	CO2																
X	50	66	34	21	15	79	42																														
Y	31	64	53	41	17	73	29																														



	c.	8 coins are tossed at a time 256 times. Find the expected frequencies (getting head) using binominal model. Also obtain the values of the mean and standard deviation of the theoretical distribution.	10	L4	CO3																														
Q.8		Apply the method of link relatives to the following data and calculate seasonal indices. <table border="1"> <thead> <tr> <th>Year</th><th>2016</th><th>2017</th><th>2018</th><th>2019</th><th>2020</th></tr> </thead> <tbody> <tr> <td>I</td><td>6.0</td><td>5.4</td><td>6.8</td><td>7.2</td><td>6.6</td></tr> <tr> <td>II</td><td>6.5</td><td>7.9</td><td>6.5</td><td>5.8</td><td>7.3</td></tr> <tr> <td>III</td><td>7.8</td><td>8.4</td><td>9.3</td><td>7.5</td><td>8.0</td></tr> <tr> <td>IV</td><td>8.7</td><td>7.3</td><td>6.4</td><td>8.5</td><td>7.1</td></tr> </tbody> </table>	Year	2016	2017	2018	2019	2020	I	6.0	5.4	6.8	7.2	6.6	II	6.5	7.9	6.5	5.8	7.3	III	7.8	8.4	9.3	7.5	8.0	IV	8.7	7.3	6.4	8.5	7.1	20	L4	CO2
Year	2016	2017	2018	2019	2020																														
I	6.0	5.4	6.8	7.2	6.6																														
II	6.5	7.9	6.5	5.8	7.3																														
III	7.8	8.4	9.3	7.5	8.0																														
IV	8.7	7.3	6.4	8.5	7.1																														

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