



MBA
(SEM I) THEORY EXAMINATION 2023-24
BUSINESS STATISTICS AND ANALYTICS

TIME: 3HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt all questions in brief.

2 x 10 = 20

Qno.	Question	Marks	CO															
a.	Define the relationship between Q.D., S.D. and M.D.	2	1															
b.	Define Kelly's Coefficient of Skewness in terms of Percentiles & Deciles with direction.	2	1															
c.	What is Aggregate Expenditure Method for construction of Cost of Living Index Number?	2	2															
d.	Construct an index for the year 2023 taking 2022 as base by Simple Average of Price Relatives Method by using A.M. for taking average:- <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th>Items</th> <th>Price in 2022 (Rs.)</th> <th>Price in 2023 (Rs.)</th> </tr> </thead> <tbody> <tr> <td>A</td> <td>30</td> <td>40</td> </tr> <tr> <td>B</td> <td>50</td> <td>60</td> </tr> <tr> <td>C</td> <td>70</td> <td>80</td> </tr> <tr> <td>D</td> <td>90</td> <td>100</td> </tr> </tbody> </table>	Items	Price in 2022 (Rs.)	Price in 2023 (Rs.)	A	30	40	B	50	60	C	70	80	D	90	100	2	2
Items	Price in 2022 (Rs.)	Price in 2023 (Rs.)																
A	30	40																
B	50	60																
C	70	80																
D	90	100																
e.	Show that the geometric mean of both regression coefficients is known as correlation.	2	2															
f.	Calculate the Mean of Binomial Distribution.	2	3															
g.	What is the chance that leap year, selected at random, will contain 53 Wednesdays?	2	3															
h.	What is meant by Type I and Type II errors?	2	4															
i.	What is t-test?	2	4															
j.	What is meant by Business Analytics?	2	5															

SECTION B

2. Attempt any three of the following:

a.	Define the term "Statistics" and discuss its uses in business and trade. Also point out its limitations.	10	1
b.	What is meant by Time Series? Discuss its main Components and explain briefly the Additive & Multiplicative Models of Time Series.	10	2
c.	Explain the terms Correlation and Regression. Discuss their utility in economic analysis.	10	3
d.	What is meant by Poisson Distribution? Discuss its Characteristics.	10	4
e.	Discuss the Applications of Business Analytics.	10	5

SECTION C

3. Attempt any one part of the following:

a.	"Our managers can improve their managerial decisions to a great extent, if they are adequately familiar with the basic tools of Statistics." Explain.	10	1																							
b.	Goals scored by two teams A and B in a football season were as shown in adjoining table. By calculating the Coefficient of Variation in each case, find, which team may be considered more consistent? <table border="1" style="width: 100%; margin-top: 5px;"> <thead> <tr> <th rowspan="2">Number of goals scored in a match</th> <th colspan="2">Number of matches</th> </tr> <tr> <th>Team A</th> <th>Team B</th> </tr> </thead> <tbody> <tr> <td>0</td> <td>15</td> <td>20</td> </tr> <tr> <td>1</td> <td>10</td> <td>10</td> </tr> <tr> <td>2</td> <td>07</td> <td>05</td> </tr> <tr> <td>3</td> <td>05</td> <td>04</td> </tr> <tr> <td>4</td> <td>03</td> <td>02</td> </tr> <tr> <td>5</td> <td>02</td> <td>01</td> </tr> </tbody> </table>	Number of goals scored in a match	Number of matches		Team A	Team B	0	15	20	1	10	10	2	07	05	3	05	04	4	03	02	5	02	01	10	2
Number of goals scored in a match	Number of matches																									
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4. Attempt any one part of the following:

a.	With the help of the following data fit a straight line trend by the Method of Least Squares and estimate the trend of sales for the next two years:-	10	2														
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Year</td> <td style="width: 10%;">2018</td> <td style="width: 10%;">2019</td> <td style="width: 10%;">2020</td> <td style="width: 10%;">2021</td> <td style="width: 10%;">2022</td> <td style="width: 10%;">2023</td> </tr> <tr> <td>Sales (Rs. Lakhs)</td> <td>120</td> <td>140</td> <td>150</td> <td>170</td> <td>190</td> <td>200</td> </tr> </table>	Year	2018	2019	2020	2021	2022	2023	Sales (Rs. Lakhs)	120	140	150	170	190	200		
Year	2018	2019	2020	2021	2022	2023											
Sales (Rs. Lakhs)	120	140	150	170	190	200											
b.	Discuss the Time Reversal Test and Factor Reversal Test in case of Laspeyre's and Fisher's Index Number with respect to Price and Quantity.	10	2														

5. Attempt any one part of the following:

a.	Calculate the Coefficient of Correlation between the ages of husbands and wives from the following table:-	10	2																																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">Age of wives (Years)</th> <th colspan="5">Ages of husbands (Years)</th> </tr> <tr> <th>20-30</th> <th>30-40</th> <th>40-50</th> <th>50-60</th> <th>60-70</th> </tr> <tr> <td>15-25</td> <td>5</td> <td>9</td> <td>3</td> <td>-</td> <td>-</td> </tr> <tr> <td>25-35</td> <td>-</td> <td>10</td> <td>25</td> <td>2</td> <td>-</td> </tr> <tr> <td>35-45</td> <td>-</td> <td>1</td> <td>12</td> <td>2</td> <td>-</td> </tr> <tr> <td>45-55</td> <td>-</td> <td>-</td> <td>4</td> <td>16</td> <td>5</td> </tr> <tr> <td>55-65</td> <td>-</td> <td>-</td> <td>-</td> <td>4</td> <td>2</td> </tr> </table>	Age of wives (Years)	Ages of husbands (Years)					20-30	30-40	40-50	50-60	60-70	15-25	5	9	3	-	-	25-35	-	10	25	2	-	35-45	-	1	12	2	-	45-55	-	-	4	16	5	55-65	-	-	-	4	2		
Age of wives (Years)	Ages of husbands (Years)																																											
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55-65	-	-	-	4	2																																							
b.	Calculate the two Regression Equations for the following data and also find out the value of Y for X = 15.	10	2																																									
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">X</td> <td style="width: 10%;">6</td> <td style="width: 10%;">2</td> <td style="width: 10%;">10</td> <td style="width: 10%;">4</td> <td style="width: 10%;">8</td> </tr> <tr> <td>Y</td> <td>9</td> <td>11</td> <td>5</td> <td>8</td> <td>7</td> </tr> </table>	X	6	2	10	4	8	Y	9	11	5	8	7																															
X	6	2	10	4	8																																							
Y	9	11	5	8	7																																							

6. Attempt any one part of the following:

a.	In a factory manufacturing electric cars, machines P, Q and R manufactures 30%, 30% and 40% of the total production of electric cars. Of their output 4%, 5% and 10% of the electric cars are defective. If one electric car is selected at random, and it is found to be defective, what is the probability that it is manufactured by machine R?	10	3														
b.	2000 students appeared in an examination. Distribution of marks is assumed to be normal with mean 30 and standard deviation 6.25. How many students are expected to get marks (i). Less than 35 (ii). Above 50 and (iii). Between 20 and 40. Given:-	10	3														
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 10%;">Z</td> <td style="width: 10%;">0.50</td> <td style="width: 10%;">0.70</td> <td style="width: 10%;">0.80</td> <td style="width: 10%;">1.00</td> <td style="width: 10%;">1.60</td> <td style="width: 10%;">3.2</td> </tr> <tr> <td>Area</td> <td>0.1915</td> <td>0.2734</td> <td>0.2881</td> <td>0.3413</td> <td>0.4452</td> <td>0.4999</td> </tr> </table>	Z	0.50	0.70	0.80	1.00	1.60	3.2	Area	0.1915	0.2734	0.2881	0.3413	0.4452	0.4999		
Z	0.50	0.70	0.80	1.00	1.60	3.2											
Area	0.1915	0.2734	0.2881	0.3413	0.4452	0.4999											

7. Attempt any one part of the following:

a.	Following consistency table presents the analysis of eye colour and hair colour of 300 people. Test; is there any association between hair colour and eye colour? You can assume χ^2 value = 9.29 for 4 degrees of freedom at 5% level of significance.	10	4																												
	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th rowspan="2">Eye Colour</th> <th colspan="3">Hair Colour</th> <th rowspan="2">Total</th> </tr> <tr> <th>Fair</th> <th>Brown</th> <th>Black</th> </tr> <tr> <td>Blue</td> <td>30</td> <td>10</td> <td>40</td> <td>80</td> </tr> <tr> <td>Grey</td> <td>40</td> <td>20</td> <td>40</td> <td>100</td> </tr> <tr> <td>Brown</td> <td>50</td> <td>30</td> <td>40</td> <td>120</td> </tr> <tr> <td>Total</td> <td>120</td> <td>60</td> <td>120</td> <td>300</td> </tr> </table>	Eye Colour	Hair Colour			Total	Fair	Brown	Black	Blue	30	10	40	80	Grey	40	20	40	100	Brown	50	30	40	120	Total	120	60	120	300		
Eye Colour	Hair Colour			Total																											
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b.	Discuss the various Types of Business Analytics.	10	5																												