

Life (years)	No. of Cars	
	TATA	HYUNDAI
0 – 5	8	6
5 – 10	12	10
10 – 15	17	20
15 – 20	10	12
20 – 25	3	2

Part B - Compulsory (01*10=10 marks)

- 4 Ten competitors in a beauty contest were ranked by 3 judges X, Y and Z in the following order:

Judge X	1	6	5	10	3	2	4	9	7	8
Judge Y	3	5	8	4	7	10	2	1	6	9
Judge Z	6	4	9	8	1	2	3	10	5	7

Calculate Rank Correlation Coefficient to find out which pair of judges has the nearest approach to beauty.

CO5 L3

Course Outcomes (COs)		PO1	PO2	PO3	PO4	PO5
CO1:	Facilitate objective solutions in business decision making under subjective conditions.	1a, 3a				
CO2:	Demonstrate different statistical techniques in business/real-life situations.				1b, 1c	
CO3:	Understand the importance of probability in decision making.	2a			2b	
CO4:	Understand the need and application of analytics.				3b	
CO5:	Understand and apply various data analysis functions for business problems.				2c, 4	

Cognitive level	KEYWORDS
L1 - Remember	list, define, tell, describe, recite, recall, identify, show, label, tabulate, quote, name, who, when, where, etc.
L2 - Understand	describe, explain, paraphrase, restate, associate, contrast, summarize, differentiate interpret, discuss
L3 - Apply	calculate, predict, apply, solve, illustrate, use, demonstrate, determine, model, experiment, show, examine, modify
L4 - Analyze	classify, outline, break down, categorize, analyze, diagram, illustrate, infer, select
L5 - Evaluate	asses, decide, choose, rank, grade, test, measure, defend, recommend, convince, select, judge, support, conclude, argue, justify, compare, summarize, evaluate
L6 - Create	design, formulate, build, invent, create, compose, generate, derive, modify, develop, integrate

PO1–Theoretical Knowledge; PO2–Effective Communication Skills; PO3–Leadership Qualities; PO4 –Sustained Research Orientation; PO5 –Self-Sustaining Entrepreneurship

CI

CCI

HOD

Sub: Business Statistics

Date: 22/04/22 Duration: 90mins Max Marks: 50 **Sem:** I

Code: 20MBA14

Branch: MBA

Note: Part A - Answer Any Two Full Questions (20*02=40 Marks)

Part B - Compulsory (01*10= 10marks)

Part	Question #	Description	Marks Distribution	Max Marks
A	1	<p>a) One of the most widely used statistics is the coefficient of correlation 'r' which measures the degree of association between the two values of related variables given in the data set.</p> <p>Properties of correlation co-efficient (r)</p> <ul style="list-style-type: none"> + Correlation co-efficient is independent of the units of measurement of the variables. + Correlation co-efficient is independent of change of scale and origin. + The value of 'r' lies between -1 and +1 	<p>1 mark</p> <p>2 marks</p>	3
		<p>b) Mean of X = 48, Mean of Y = 55 $B_{xy} = 0.64$ $B_{yx} = 1$ RE of X on Y is $x = 0.64y + 12.8$ RE of Y on X is $y = x + 7$</p> <p>The marks in Statistics (Y) given marks in Accountancy (X) =50 is $Y = 57$</p> <p>The marks in Accountancy (X) given marks in Statistics (Y) = 65 is $X = 54.4$</p>	<p>2 marks</p> <p>3 marks</p> <p>2 marks</p>	7
		<p>c) Karl Pearson's Coefficient of Correlation</p> <p>$r = + 0.9753$</p> <p>Probable Error (PE) = 0.0147</p> <p>$6PE = 0.0882$</p> <p>$R > 6PE$, hence r is significant</p>	<p>3 marks</p> <p>4 marks</p> <p>2 marks</p> <p>1 mark</p>	10
	2	<p>a) Mutually Exclusive Events – Two or more events are said to be mutually exclusive if the happening of any one of them excludes the happening of all others in the same experiment.</p> <p>Addition theorem of probability (Theorem of total probability) : If A and B are any two events of a random experiment, then the probability of</p>	<p>1 mark</p> <p>1 mark</p>	3

		<p>occurrence of either A or B is given by</p> $P(A \cup B) = P(A) + P(B) - P(A \cap B)$ <p>Union of two events – If A and B are any two events of a random experiment, then the union of these events is the event of occurrence of either A or B. It is denoted by (AUB).</p>	1 mark														
	b)	<p>To fit a Poisson Distribution</p> <table border="1"> <tr> <td>No. of errors</td> <td>0</td> <td>1</td> <td>2</td> <td>3</td> <td>4</td> </tr> <tr> <td>Frequency</td> <td>123</td> <td>59</td> <td>14</td> <td>3</td> <td>1</td> </tr> </table> <p>The theoretical frequencies are as follows:</p> <p>T0 = 121.3 ~ 121</p> <p>T1 = 60.65 ~ 61</p> <p>T2 = 15.16 ~ 15</p> <p>T3 = 2.53 ~ 3</p> <p>T4 = 0.32 ~ 0</p>	No. of errors	0	1	2	3	4	Frequency	123	59	14	3	1	3 marks	7	
No. of errors	0	1	2	3	4												
Frequency	123	59	14	3	1												
	c)	<p>Mean of X = 63.714, Mean of Y = 59.571</p> <p>Bxy = 2.1983</p> <p>Byx = 0.3911</p> <p>RE of X on Y is $x = 2.1983y - 67.2409$</p> <p>RE of Y on X is $y = 0.3911x + 34.6525$</p> <p>The value of imports when exports is 70 crore rupees = 62.0295 crores</p>	1 mark 2 marks 2 marks 2 marks 2 marks	10													
3	a)	<p>(i) Standard deviation is defined as the square root of the mean of the squares of deviations from the mean.</p> <p>(ii) Binomial distribution</p> <p>A probability distribution which has the following probability mass function (p.m.f) is called binomial distribution.</p> $p(x) = {}^n C_x p^x q^{n-x} \quad x = 0, 1, 2, \dots, n \quad 0 < p < 1; q = 1 - p$ <p>Here, the variable X is discrete and it is called Binomial variate</p> <p>(iii) Spurious Correlation is a mathematical relationship in which two or more events or variables are associated but <i>not</i> causally related, due to either coincidence or the presence of a certain third, unseen factor.</p>	1 mark 2 marks 1 mark	4	20 M												
	b)	<table border="1"> <thead> <tr> <th>Company</th> <th>Mean</th> <th>S.D.</th> <th>C.V.</th> </tr> </thead> <tbody> <tr> <td>TATA</td> <td>11.3</td> <td>5.6178</td> <td>49.715%</td> </tr> <tr> <td>HYUNDAI</td> <td>11.9</td> <td>5.1614</td> <td>43.373%</td> </tr> </tbody> </table> <p>(i) Mean of Hyundai > Mean of TATA, hence Hyundai has higher average life.</p> <p>(ii) C.V. of Hyundai < C.V. of TATA. Hence</p>	Company	Mean		S.D.	C.V.	TATA	11.3	5.6178	49.715%	HYUNDAI	11.9	5.1614	43.373%	2 marks 4 marks 4 marks 2 marks	16
Company	Mean	S.D.	C.V.														
TATA	11.3	5.6178	49.715%														
HYUNDAI	11.9	5.1614	43.373%														

			Hyundai shows greater consistency in performance.	4 marks		
B	4	a)	Spearman's Rank correlation co-efficient between: Judge X & Y = - 0.2121 Judge Y & Z = - 0.2969 Judge X & Z = 0.6363 Judge X and Judge Z have got nearest approach to beauty.	3 marks 2 marks 2 marks 2 marks 1 mark	10	10 M