



NARSIMHA REDDY ENGINEERING COLLEGE

UGC AUTONOMOUS INSTITUTION

Maisammaguda (V), Kompally - 500100, Secunderabad, Telangana State, India

UGC - Autonomous Institute
Accredited by NBA & NAAC with 'A' Grade
Approved by AICTE
Permanently affiliated to JNTUH

UNIT-V

APPLIED STATISTICS

S.No	Questions	BT	CO	PO																																	
Part – A (Short Answer Questions)																																					
1	Define correlation and regression.	L1	CO5	PO1																																	
2	Write a short note on types of correlation.	L1	CO5	PO1																																	
3	Criticize the following: Regression coefficient of Y on X is 0.7 and that of X on Y is 3.2.	L2,L4	CO5	PO2																																	
4	If θ is the angle between two regression lines and standard deviation of Y is twice the standard deviation of X and $r=0.25$, find $\tan\theta$.	L2,L3	CO5	PO1																																	
5	From the following data calculate correlation coefficient and standard deviation of Y, given $b_{xy} = 0.85, b_{yx} = 0.89$ and $\sigma_x = 3$.	L2,L3	CO5	PO1																																	
6	Find the regression line of X on Y and Y on X. given $\bar{X} = 83.67, \bar{Y} = 88.42, b_{xy} = 0.795, b_{yx} = 0.59$	L2,L3	CO5	PO1																																	
7	Write the formula for correlation coefficient for Bivariate data.	L1	CO5	PO1																																	
8	Write the formula for regression of Bivariate data.	L1	CO5	PO1																																	
9	Write the properties of correlation coefficient.	L1	CO5	PO1																																	
10	Give a short note on Karl Pearson's coefficient of correlation.	L1	CO5	PO1																																	
Part – B (Long Answer Questions)																																					
11	a) Psychological tests of Intelligence and of engineering ability were applied to 10 students. Here is a record of ungrouped data showing intelligence ratio (I.R) and Engineering ratio (E.R). Calculate the coefficient of correlation. <table><tr><td></td><td>A</td><td>B</td><td>C</td><td>D</td><td>E</td><td>F</td><td>G</td><td>H</td><td>I</td><td>J</td></tr><tr><td>I.R</td><td>105</td><td>104</td><td>102</td><td>101</td><td>100</td><td>99</td><td>98</td><td>96</td><td>93</td><td>92</td></tr><tr><td>E.R</td><td>101</td><td>103</td><td>100</td><td>98</td><td>95</td><td>96</td><td>104</td><td>92</td><td>97</td><td>94</td></tr></table>		A	B	C	D	E	F	G	H	I	J	I.R	105	104	102	101	100	99	98	96	93	92	E.R	101	103	100	98	95	96	104	92	97	94	L4,L5	CO5	PO3
	A	B	C	D	E	F	G	H	I	J																											
I.R	105	104	102	101	100	99	98	96	93	92																											
E.R	101	103	100	98	95	96	104	92	97	94																											
	b) Following are the rank obtained by 10 students in two subjects' statistics and Mathematics. To what extent the knowledge of the students in two subjects is related. <table><tr><td>statistics</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>Mathematics</td><td>2</td><td>4</td><td>1</td><td>5</td><td>3</td><td>9</td><td>7</td><td>10</td><td>6</td><td>8</td></tr></table>	statistics	1	2	3	4	5	6	7	8	9	10	Mathematics	2	4	1	5	3	9	7	10	6	8	L4,L5	CO5	PO4											
statistics	1	2	3	4	5	6	7	8	9	10																											
Mathematics	2	4	1	5	3	9	7	10	6	8																											
12	a) Obtain the rank correlation coefficient for the following data <table><tr><td>x</td><td>68</td><td>64</td><td>75</td><td>50</td><td>64</td><td>80</td><td>75</td><td>40</td><td>55</td><td>64</td></tr><tr><td>y</td><td>62</td><td>58</td><td>68</td><td>45</td><td>81</td><td>60</td><td>68</td><td>48</td><td>50</td><td>70</td></tr></table>	x	68	64	75	50	64	80	75	40	55	64	y	62	58	68	45	81	60	68	48	50	70	L4,L5	CO5	PO3											
x	68	64	75	50	64	80	75	40	55	64																											
y	62	58	68	45	81	60	68	48	50	70																											

	b)	Given the following information regarding a distribution $N = 5, \bar{X} = 10, \bar{Y} = 20, \sum(X - 4)^2 = 100, \sum(Y - 10)^2 = 160$. Find the Regression coefficients and correlation coefficient.	L3	CO5	PO2																																																								
13	a)	Calculate the regression equations of Y on X from the data given below, taking deviations from actual means of X and Y. <table border="1"><tr><td>Price (Rs.)</td><td>10</td><td>12</td><td>13</td><td>12</td><td>16</td><td>15</td></tr><tr><td>Amount Demanded</td><td>40</td><td>38</td><td>43</td><td>45</td><td>37</td><td>43</td></tr></table> Estimate the likely demand when the price is Rs.20.	Price (Rs.)	10	12	13	12	16	15	Amount Demanded	40	38	43	45	37	43	L3,L4	CO5	PO3																																										
Price (Rs.)	10	12	13	12	16	15																																																							
Amount Demanded	40	38	43	45	37	43																																																							
	b)	Fit a second-degree polynomial to the following data by the method of least squares <table border="1"><tr><td>x</td><td>10</td><td>12</td><td>15</td><td>23</td><td>10</td></tr><tr><td>y</td><td>14</td><td>17</td><td>23</td><td>25</td><td>21</td></tr></table>	x	10	12	15	23	10	y	14	17	23	25	21	L3	CO5	PO3																																												
x	10	12	15	23	10																																																								
y	14	17	23	25	21																																																								
14	a)	Using the method of least square determine the constants a and b such that $y = ae^{bx}$ fits the following data. <table border="1"><tr><td>x</td><td>0</td><td>0.5</td><td>1</td><td>1.5</td><td>2</td><td>2.5</td></tr><tr><td>y</td><td>0.10</td><td>0.45</td><td>2.15</td><td>9.15</td><td>40.35</td><td>180.75</td></tr></table>	x	0	0.5	1	1.5	2	2.5	y	0.10	0.45	2.15	9.15	40.35	180.75	L2,L3	CO5	PO2																																										
x	0	0.5	1	1.5	2	2.5																																																							
y	0.10	0.45	2.15	9.15	40.35	180.75																																																							
	b)	Calculate Karl Pearson's correlation coefficient for the following paired data. <table border="1"><tr><td>X</td><td>28</td><td>41</td><td>40</td><td>38</td><td>35</td><td>33</td><td>40</td><td>32</td><td>36</td><td>33</td></tr><tr><td>Y</td><td>23</td><td>34</td><td>33</td><td>34</td><td>30</td><td>26</td><td>28</td><td>31</td><td>36</td><td>38</td></tr></table> What inference would you draw from the estimate.	X	28	41	40	38	35	33	40	32	36	33	Y	23	34	33	34	30	26	28	31	36	38	L2,L3	CO5	PO2																																		
X	28	41	40	38	35	33	40	32	36	33																																																			
Y	23	34	33	34	30	26	28	31	36	38																																																			
15		Calculate coefficient of correlation between the marks obtained by a batch of 100 students in Accountancy and statistics are given below. <table border="1"><tr><th rowspan="2">Marks in Statistics</th><th colspan="5">Marks in Accountancy</th><th rowspan="2">Total</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><td>17</td></tr><tr><td>25-35</td><td></td><td>10</td><td>25</td><td>2</td><td>-</td><td>37</td></tr><tr><td>35-45</td><td></td><td>1</td><td>12</td><td>2</td><td></td><td>15</td></tr><tr><td>45-55</td><td></td><td></td><td>4</td><td>16</td><td>5</td><td>25</td></tr><tr><td>55-65</td><td></td><td></td><td></td><td>4</td><td>2</td><td>6</td></tr><tr><td>Total</td><td>5</td><td>20</td><td>44</td><td>24</td><td>7</td><td>100</td></tr></table>	Marks in Statistics	Marks in Accountancy					Total	20-30	30-40	40-50	50-60	60-70	15-25	5	9	3	-	-	17	25-35		10	25	2	-	37	35-45		1	12	2		15	45-55			4	16	5	25	55-65				4	2	6	Total	5	20	44	24	7	100	L4,L5	CO5	PO3		
Marks in Statistics	Marks in Accountancy					Total																																																							
	20-30	30-40	40-50	50-60	60-70																																																								
15-25	5	9	3	-	-	17																																																							
25-35		10	25	2	-	37																																																							
35-45		1	12	2		15																																																							
45-55			4	16	5	25																																																							
55-65				4	2	6																																																							
Total	5	20	44	24	7	100																																																							
16		The following are the marks obtained by 132 students in test X and test Y. <table border="1"><tr><th>X\Y</th><th>30-40</th><th>40-50</th><th>50-60</th><th>60-70</th><th>70-80</th><th>Total</th></tr><tr><td>20-30</td><td>2</td><td>5</td><td>3</td><td></td><td></td><td>10</td></tr><tr><td>30-40</td><td>1</td><td>8</td><td>12</td><td>6</td><td></td><td>27</td></tr><tr><td>40-50</td><td></td><td>5</td><td>22</td><td>14</td><td>1</td><td>42</td></tr><tr><td>50-60</td><td></td><td>2</td><td>16</td><td>9</td><td>2</td><td>29</td></tr><tr><td>60-70</td><td></td><td>1</td><td>8</td><td>6</td><td>1</td><td>16</td></tr><tr><td>70-80</td><td></td><td></td><td>2</td><td>4</td><td>2</td><td>8</td></tr><tr><td>Total</td><td>3</td><td>21</td><td>63</td><td>39</td><td>6</td><td>132</td></tr></table> Calculate correlation coefficients and regression equations	X\Y	30-40	40-50	50-60	60-70	70-80	Total	20-30	2	5	3			10	30-40	1	8	12	6		27	40-50		5	22	14	1	42	50-60		2	16	9	2	29	60-70		1	8	6	1	16	70-80			2	4	2	8	Total	3	21	63	39	6	132	L4,L5	CO5	PO3
X\Y	30-40	40-50	50-60	60-70	70-80	Total																																																							
20-30	2	5	3			10																																																							
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40-50		5	22	14	1	42																																																							
50-60		2	16	9	2	29																																																							
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70-80			2	4	2	8																																																							
Total	3	21	63	39	6	132																																																							