

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 $\sigma_x = 0.85$, $\sigma_y = 0.89$, $r = 3$.	L2,L3	CO5	PO1
6	Find the regression line of X on Y and Y on X. given $\bar{X} = 83.67$, $\bar{y} = 88.42$, $r_{xy} = 0.795$, $r_{yx} = 0.59$	L2,L3	CO5	PO1
7	Define regression.	L1	CO5	PO1
8	Write the Normal equations for second degree polynomial.	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

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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		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																												
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><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)	Calculate Karl Pearson's correlation coefficient for the following paired data. <table><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	L3	CO5	PO3											
X	28	41	40	38	35	33	40	32	36	33																												
Y	23	34	33	34	30	26	28	31	36	38																												
14	a)	Using the method of least square determine the constants a and b such that $y = a + bx$ fits the following data. <table><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)	From a sample of 200 pairs of observation the following quantities were calculated. $\sum x = 11.34, \sum y = 20.78,$	L2,L3	CO5	PO2																																	

		$\sum X^2 = 12.16, \sum Y^2 = 84.96, \sum XY = 22.13$ From the above data, show how to compute the coefficients of the equation $Y=a+bX$																																																										
15		Calculate coefficient of correlation between the marks obtained by a batch of 100 students in Accountancy and statistics are given below. <table><tr><th rowspan="2">Marks in Statistics</th><th colspan="6">Marks in Accountancy</th></tr><tr><th>20-30</th><th>30-40</th><th>40-50</th><th>50-60</th><th>60-70</th><th>Total</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						20-30	30-40	40-50	50-60	60-70	Total	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																																																											
	20-30	30-40	40-50	50-60	60-70	Total																																																						
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55-65				4	2	6																																																						
Total	5	20	44	24	7	100																																																						
16		Fit a second-degree polynomial to the following data by the method of least squares <table><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	L4,L5	CO5	PO3																																											
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y	14	17	23	25	21																																																							

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