



End Semester Examination – Nov/Dec – 2016

Code : 14MA3011
Sub. Name : Bio Statistics and Quality Control

Semester : 2016-17 ODD
Duration : 3hrs
Max. marks : 100

ANSWER ALL QUESTIONS (5 x 20 = 100 Marks)

Q. No.	Sub Div.	Questions	Course Outcome	Marks																																																
1.	a.	Compute Median and Mode for the data given below:	CO1	12																																																
		<table><tr><td>Class Interval</td><td>10-15</td><td>15-20</td><td>20-25</td><td>25-30</td><td>30-35</td><td>35-40</td><td>40-45</td><td>45-50</td></tr><tr><td>Frequency</td><td>2</td><td>28</td><td>125</td><td>270</td><td>303</td><td>197</td><td>65</td><td>10</td></tr></table>			Class Interval	10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50	Frequency	2	28	125	270	303	197	65	10																														
		Class Interval			10-15	15-20	20-25	25-30	30-35	35-40	40-45	45-50																																								
Frequency	2	28	125	270	303	197	65	10																																												
Also write the characteristics of measures of central tendency.																																																				
	b.	Derive the mean and variance of binomial distribution.	CO1	8																																																
(OR)																																																				
2.	a.	In test of 2000 bulbs electric bulbs, it was found that the life of a particular make, was normally distributed with an average life of 2040 hours and standard deviation of 60 hrs. Estimate the number of bulbs likely to burn for (i) More than 2150 hrs (ii) Less than 1950 hrs (iii) more than 1920 but less than 2160 hrs.	CO1	10																																																
		b.	Compute quartile deviation and the coefficient of quartile deviation from the following data:	CO1	10																																															
						<table><tr><td>Wages per week</td><td>20 – 30</td><td>30 – 40</td><td>40 – 50</td><td>50 – 60</td><td>60 – 70</td><td>70 -80</td></tr><tr><td>No of person</td><td>5</td><td>20</td><td>14</td><td>10</td><td>8</td><td>5</td></tr></table>	Wages per week	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 -80	No of person	5	20	14	10	8	5																																
Wages per week	20 – 30	30 – 40	40 – 50	50 – 60	60 – 70	70 -80																																														
No of person	5	20	14	10	8	5																																														
3.	a.	Random samples of 400 men and 600 women were asked whether they would like to have a flyover near their residence. 200 men and 325 women were in favour of the proposal. Test the hypothesis that proportions of men and women in favour of the proposal are same.	CO2	10																																																
	b.	The weight of 10 people of a locality are found to be 70,67,62,68,61,68,70,64,64,66 kilograms. Is it reasonable to believe that the average weights of the people locality is grater than 64 kg. Test 5% Level of significance.	CO2	10																																																
(OR)																																																				
4.	a.	Calculate the χ^2 test of goodness of fit for the following data:	CO2	8																																																
		<table><tr><td>O</td><td>14</td><td>56</td><td>110</td><td>88</td><td>40</td><td>12</td></tr><tr><td>E</td><td>10</td><td>50</td><td>100</td><td>100</td><td>50</td><td>10</td></tr></table>			O	14	56	110	88	40	12	E	10	50	100	100	50	10																																		
		O			14	56	110	88	40	12																																										
E	10	50	100	100	50	10																																														
	b.	Below are given the gain in weight of pigs fed on two diet A and B <table><tr><td>Diet A</td><td>25</td><td>32</td><td>30</td><td>34</td><td>24</td><td>14</td><td>32</td><td>24</td><td>30</td><td>31</td><td>35</td><td>25</td><td>-</td><td>-</td><td>-</td></tr><tr><td>Diet B</td><td>44</td><td>34</td><td>22</td><td>10</td><td>47</td><td>31</td><td>40</td><td>30</td><td>32</td><td>35</td><td>18</td><td>21</td><td>35</td><td>29</td><td>22</td></tr></table> Test, if the two diets differ significantly as regards their effect on increase in weight.	Diet A	25	32	30	34	24	14	32	24	30	31	35	25	-	-	-	Diet B	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22	CO2	12																
Diet A	25	32	30	34	24	14	32	24	30	31	35	25	-	-	-																																					
Diet B	44	34	22	10	47	31	40	30	32	35	18	21	35	29	22																																					
5.	a.	A number of leaves were taken from each of half a dozen trees and their lengths measured. The following measurements are given below:	CO2	12																																																
		<table><tr><td>Trees</td><td colspan="6">Length</td></tr><tr><td>1</td><td>82</td><td>87</td><td>86</td><td>90</td><td>81</td><td>84</td></tr><tr><td>2</td><td>85</td><td>84</td><td>91</td><td>92</td><td>88</td><td></td></tr><tr><td>3</td><td>92</td><td>90</td><td>84</td><td>86</td><td>88</td><td>93</td><td>89</td><td>90</td></tr><tr><td>4</td><td>80</td><td>82</td><td>87</td><td>81</td><td>82</td><td>82</td><td></td><td></td></tr><tr><td>5</td><td>87</td><td>86</td><td>88</td><td>90</td><td>85</td><td>86</td><td>82</td><td></td></tr></table>			Trees	Length						1	82	87	86	90	81	84	2	85	84	91	92	88		3	92	90	84	86	88	93	89	90	4	80	82	87	81	82	82			5	87	86	88	90	85	86	82	
		Trees			Length																																															
1	82	87	86	90	81	84																																														
2	85	84	91	92	88																																															
3	92	90	84	86	88	93	89	90																																												
4	80	82	87	81	82	82																																														
5	87	86	88	90	85	86	82																																													
	b.	Compare RBD and LSD.	CO2	8																																																
(OR)																																																				

6.	a.	Calculate the control limits in respect of \bar{X} chart and R-chart comment on the state of control for the following data: (Given $A_2 = 0.58$, $D_3 = 0$, $D_4 = 2.15$) <table><tr><td>Sample No:</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>Mean (\bar{X}):</td><td>43</td><td>49</td><td>37</td><td>44</td><td>45</td><td>37</td><td>51</td><td>46</td><td>43</td><td>47</td></tr><tr><td>Range (R):</td><td>5</td><td>6</td><td>5</td><td>7</td><td>7</td><td>4</td><td>8</td><td>6</td><td>4</td><td>6</td></tr></table>	Sample No:	1	2	3	4	5	6	7	8	9	10	Mean (\bar{X}):	43	49	37	44	45	37	51	46	43	47	Range (R):	5	6	5	7	7	4	8	6	4	6	CO3	10
Sample No:	1	2	3	4	5	6	7	8	9	10																											
Mean (\bar{X}):	43	49	37	44	45	37	51	46	43	47																											
Range (R):	5	6	5	7	7	4	8	6	4	6																											
	b.	Write short notes on (i) Producers risk (ii) Consumer risk (iii) Average sample number (iv) O.C curve (v) Single Sampling Plan	CO3	10																																	
7.	a.	15 tape – recorders were examined for quality control test. The number of defects in each tape – recorder is recorded as below. Draw the suitable control chart and comment on the state of control. <table><tr><td>No. of defects</td><td>2</td><td>4</td><td>3</td><td>1</td><td>1</td><td>2</td><td>5</td><td>3</td><td>6</td><td>7</td><td>3</td><td>1</td><td>4</td><td>2</td><td>1</td></tr></table>	No. of defects	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1	CO3	10																	
No. of defects	2	4	3	1	1	2	5	3	6	7	3	1	4	2	1																						
	b.	For a sampling plan $N = 1200$, $n = 64$ and $c = 1$, determine the probability of acceptance of the following lots: (i) 0.5% defective (ii) 1% defective (iii) 10% defective. Also draw an OC curve.	CO3	10																																	
(OR)																																					
8.	a.	The following is a double sampling plan: $N = 2500$, $n_1 = 70$, $c_1 = 3$, $n_2 = 80$, $c_2 = 5$. Interpret the above plan and point out its superiority over a single sampling plan.	CO3	10																																	
	b.	Explain what is single sampling plan and double sampling plan and also discuss its relative merits and demerit.	CO3	10																																	
Compulsory:																																					
9.	a.	Analyze the variance in the following Latin square of yields (in kgs) of paddy where A, B, C, D denote the different methods of cultivation. <table><tr><td>D122</td><td>A121</td><td>C123</td><td>B122</td></tr><tr><td>B124</td><td>C123</td><td>A122</td><td>D125</td></tr><tr><td>A120</td><td>B119</td><td>D120</td><td>C121</td></tr><tr><td>C122</td><td>D123</td><td>B121</td><td>A122</td></tr></table> Examine whether the different methods of cultivation have given significantly different yields.	D122	A121	C123	B122	B124	C123	A122	D125	A120	B119	D120	C121	C122	D123	B121	A122	CO2	20																	
D122	A121	C123	B122																																		
B124	C123	A122	D125																																		
A120	B119	D120	C121																																		
C122	D123	B121	A122																																		

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