Faculty of Science and Technology
2nd year 1st Semester /2016
Quantitative Techniques

Part C: Essay Questions

Marks allocation : 30 marks

1. An aircraft emergency locator transmitter (ELT) is a device designed to transmit a signal in the case of a crash. The Manufacturing Company named by "A" makes 80% of the ELTs, the Company "B" makes 15% of them, and the Company "C" makes the other 5%. The ELTs made by company A have a 4% rate of defects, the company B have a 6% rate of defects, and the company C have a 9% rate of defects.

   a) If an ELT is randomly selected from the general population of all ELTs, find the probability that it was made by the manufacturing company A. (2 mark)

   b) If a randomly selected ELT is then tested and is found to be defective, find the probability that it was made by the manufacturing company A. (4 mark)

2. The finish time of computer process is normally distributed with a mean of 195 minutes and a standard deviation of 25 minutes.

   a) What is the probability that a processing time will less than 3 hours? (3 mark)

   b) What proportion of the processing time will complete between 3 hours and 4 hours? (3 mark)

   c) Calculate to the nearest minute, the time by which the first 8% have completed the computer process? (4 mark)

3. A farmer would like to test four fertilizers for his beans field. He selects plot of same size, having similar soil, exposure to the sun. He tries fertilizers A, B, C and D respectively on 6,8,9,7 test plots with the following yields.

Fertilizer	Yields								
A	47	42	43	46	44	42			
B	51	58	62	49	53	51	50	59	
C	37	39	41	38	39	37	42	36	40
D	42	43	42	45	47	50	48		

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a) Suggest the suitable model to analyze this data. (2 mark)

b) Write down the appropriate hypothesis to test the significance difference in the average bean yield for the four types of fertilizer. (4 mark)

c) Obtain the degree of freedom for the Fertilizer, Error and Total and calculate the F-ratio value (4 mark)

d) Compare the calculated F-ratio value with F table value at 95% significance level and State whether the each fertilizer varieties are equally effect or not. ($F_{3,26}(0.05) = 2.98$) (4 mark)

Source	Degree of freedom	Sum of squared values	Mean sum of squared	F-Ratio
Fertilizer	.....	1015.5	338.5	.....
Error	.....	277.9	10.7	
Total	.....	1293.4		