

**Uva Wellassa University of Sri Lanka**  
**Faculty of Science and Technology**  
**Department of Computer Science and Technology**  
**300 level 1<sup>st</sup> Semester Examination – June/July 2017**  
**IIT 312-3 Quantitative Techniques**

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**Part C: Essay Questions (35 mark)**

3. In a bolt factory machines A, B, C manufacture 25%, 35% and 40% respectively of the total of their output and 5%, 4%, 2% are defective bolts. If a bolt is drawn at random from the product and is found to be defective, what are the probabilities that it was manufactured by machine B? (10 mark)
4. A certain pen has been designed so that true average writing lifetime under controlled conditions (involving the use of a writing machine) is at least 12 hours. Production will need to be stopped to readjust the machine that makes the pens, if there is evidence that the average writing lifetime under controlled conditions is less than 12 hours. For a random sample of 37 pens, the sample mean is 11.9 hours with sample standard deviation 0.2 hour.
- a. Find a 95% confidence interval for the average writing lifetime. (5 mark)
- b. Test the appropriate hypotheses and advise the company what to do. Use  $\alpha = 0.05$  (7 mark)
5. An experiment was conducted to compare 3 brands of gasoline. Each brand was used with 7 different cars of the same weight and engine size, under similar operating conditions. The data collected were the miles per gallon obtain for each of the cars.

Brand	Miles per gallon						
A	19	24	24	21	20	22	25
B	25	26	34	25	24	24	23
C	25	31	28	29	28	30	28

- a. Identify the most suitable experimental design for this experiment giving justifications. (3 mark)
- b. What is the model that you will use? (define all terms in the model) (4 mark)
6. Construct the complete ANOVA table and interpret the results in ANOVA table with suitable hypothesis. (Suppose that in usual notation,  $SSE = 135.43$ , and  $SSTol = 275.24$ .) (6 mark)