Uva Wellassa University of Sri Lanka
Faculty of Science and Technology
Department of Science and Technology
200 level 2nd Semester Examination – Dec./Jan. 2016/17
SCT 202-2 Statistical Methods

Uva Wellassa University

3.

a. A factory has three machines, A, B and C, which produce bolts. The percentages of defective bolts produced by these machines are 2%, 5% and 10% respectively. Of all bolts produced by the factory, 60% are produced by A, 25% by B and 15% by C. A bolt is randomly chosen and checked for defects.

i. Draw a probability tree for this experiment. (04 mark)

ii. Find the probability that the bolt is defective. (04 mark)

iii. Find the probability that it is not produced by A and is defective (04 mark)

4.

a. A production manager has compared the scores of a test to check the working speed of employees in an assembly-line with their productivity. The data are shown in the following table (Table 01).

Table 01: Data of Employees

Employee	x = Score on test	y = Units produced in one hour
A	12	55
B	14	63
C	17	67
D	16	70
E	11	51

i. To get a relationship between "score on test" and "units produced in one hour". What is the suitable analysis he has to perform? (02 mark)

ii. Write down the hypothesis for the particular analysis. (04 mark)

iii. Construct the complete ANOVA table for the test.
(Suppose that in usual notation, SSE = 22.8 , and SSTol = 256.8) (05 mark)

iv. Check the model adequacy at 5% significance level (using F ratio). (04 mark)

v. Find the coefficient of determination (R^2) and interpret it. (03 mark)

vi. What are the model assumptions? (04 mark)

b. 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 A: 19 24 24 21 20 22 25
Brand B: 25 26 34 25 24 24 23
Brand C: 25 31 28 29 28 30 28

i. Identify the most suitable experimental design for this experiment giving justifications. (4 mark)

ii. What is the model that you will use? (4 mark)

iii. What is/are the hypothesis (hypotheses) that you intend to test? (4 mark)

iv. What is/are the test statistic(s) that you will use to test above hypothesis (hypotheses)? (4 mark)