THE OPEN UNIVERSITY OF SRI LANKA

B.Sc. /B.Ed. Degree Programme, Continuing Education Programme

APPLIED MATHEMATICS - LEVEL 05

PCU3142/PSU2182/ PCU2142/PCE5142/PCE4142- DESIGN AND ANALYSIS OF EXPERIMENTS

OPEN BOOK TEST 2015/2016

Duration: One Hour

Date: 15.10.2016	**Time: 01.00 p.m- 02.00 p.m**

Answer all questions

Statistical Tables are provided. Non-programmable calculators are permitted.

(1) A construction company is interested in testing the effectiveness of four types of paints; say A, B, C, and D. They have decided to test the paints before choosing one type of paint, by comparing the times that these paints take time in minutes to dry enough for a second coat. Suppose that the construction company seeks your help to design an experiment to determine whether the average times taken to dry for a second coat are the same for each paint or not.

Following resources are available to conduct an experiment to meet this objective.

- Four types of paints (A, B, C, D).
- Twenty homogeneous paint test strips
- Direct sunlight
- Stopwatch

(a) In relation to this experiment, identify

(i) Response variable

(ii) Treatments

(iii)Experimental unit

(b) What kind of design structure is suitable to conduct this experiment? Justify your answer.

(c) How do you apply the concept of randomization in conducting this experiment?

(d) Briefly explain how you conduct the experiment.

(2) An animal scientist conducted an experiment to compare the weight gains of chicks under four different types of diets ,say D_1, D_2, D_3 and D_4,. The scientist used 20 chicks that were in the same age group for this experiment. A completely randomized design was used with 5 chicks for each type of diet. The results are shown in the following table.

Diet type	**Weight gain (in grams)**					**Total**
D_1	5	3	6	7	5	**26**
D_2	8	7	9	10	5	**39**
D_3	9	10	7	8	9	**43**
D_4	10	15	19	20	22	**86**

Total Sum of Squares = 526.2

(a) State the hypotheses that need to be tested to achieve the objectives of the researcher.
(b) Construct the analysis of variance (ANOVA) table which suitable to test the stated hypotheses.
(c) Test your hypotheses in part (a), at 5% level of significance and clearly state the findings.

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