***Practical 1***

***Completely Randomized Design***

**Example 1)**

The effective life of insulating fluids at an accelerated load of 35kV is being studied. Test data have been obtained for four types of fluids. The results from the completely randomized experiments were as follow;

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Fluid Type | Life (in hr.) at 35kV Load | | | | | |
| 1 | 17.6 | 18.9 | 16.3 | 17.4 | 20.1 | 21.6 |
| 2 | 16.9 | 15.3 | 18.6 | 17.1 | 19.5 | 20.3 |
| 3 | 21.4 | 23.6 | 19.4 | 18.5 | 20.5 | 22.3 |
| 4 | 19.3 | 21.1 | 17.4 | 17.5 | 18.3 | 19.8 |

1. Is there any indication that the fluids differ? (Use l.o.s. 0.05)
2. Which fluid would you select; given that objective is long life?
3. Analyze the residuals from this experiment.

(Reference: “Design and Analysis of Experiments”, 7th Ed., Douglas C. Montgomery, pg. 116 (3.17))

**Example 2)**

An experiment was run to determine whether four specific firing temperatures affect the density of a certain type of brick. A competently randomized design led to following data;

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Temp | Density | | | | |
| 100 | 21.8 | 21.9 | 21.7 | 21.6 | 21.7 |
| 125 | 21.7 | 21.4 | 21.5 | 21.4 |  |
| 150 | 21.9 | .21.8 | 21.8 | 21.6 | 21.5 |
| 175 | 21.9 | 21.7 | 21.8 | 21.4 |  |