8. Explain the principles of replication, randomization and local control in experimental design pointing out the role of each one plays in the valid and accurate interpretation of data.

9. Write down (a) layout of two way ANOVA with it's assumption (b) effect model (c) ANOVA table

10. An agricultural research organization wants to study the effect of four types of fertilizers at random in 6 plots of land. Port of calculation are shown below:

Source of Variation	Sum of squares	Degrees of freedom	M.SS	F test
Between fertilizer	2940	-	-	-
Within samples	-	-	-	-
Total	6212			

a) Fill in the blanks in the ANOV A table
b) Test at 5% level of significance, whether fertilizers differ significantly.

11. In a single model, $y_{ij} = \mu + \tau_i + e_{ij}$, show that

$$\sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij} - \bar{y}_{..})^2 = n\sum_{i=1}^{a}(\bar{y}_i - \bar{y}_{..})^2 + \sum_{i=1}^{a}\sum_{j=1}^{n}(y_{ij} - \bar{y}_i)^2$$

12. The results of 2^2 experiments with 3 replications are presented below. Estimate the main effects, interaction effects, SSA, SSB, SSAB. Which effects appear to be large?

Treatment	Replication		
Combination	I	II	III
(1)	22	30	25
a	32	42	29
b	35	33	50
ab	55	45	46

13. Write short notes on **any two**:
    a. Sampling and non-sampling errors.
    b. Probability proportion to size sampling.
    c. Factorial experiments.