

Signature of Centre Superintendent

**B. Sc. (Honours) Agriculture Semester-VI Examination, 2023**  
**Subject: Design in Agricultural Experiment (STAT 321)**

Roll No. (in figure)..... (in words).....

Student Index No.....Reg. No. ....of.....

Time: 2 hours

Full marks: 50

Questions are of value as indicated in the margin

**Part-I**

**(Objective and Short Answer Type)**

**Time: 30 minutes**

**Marks: 20**

- Note: 1. Answer in question paper itself  
2. Striking, rewriting or over writing are not allowed in the objective type questions.

**1. Tick the appropriate answer**

(1×5 = 5)

- a) The degrees of freedom for error is 12 in a one-way ANOVA table with total number of observations (n) = 20, then the number of treatments to be compared are  
(i) 9 (ii) 8 (iii) 11 (iv) 19
- b) Randomization in an experiment helps to eliminate  
(i) systematic influences (ii) human biases (iii) dependence among observations (iv) all of the above
- c) The total number of main effects in a  $2^5$  factorial experiment is  
(i) 2 (ii) 10 (iii) 5 (iv) 25
- d) The degrees of freedom for error in the ANOVA table of a latin square design with five treatments is  
(i) 5 (ii) 4 (iii) 10 (iv) 12
- e) The number of errors in the ANOVA table of split plot designs are  
(i) 1 (ii) 2 (iii) 3 (iv) 4

**2. Fill in the blanks**

(1×5 = 5)

- a) The formula for Standard error of difference of mean in case of RCBD design is \_\_\_\_\_
- b) The total number of treatment combination in a  $2^4$  factorial experiment is \_\_\_\_\_
- c) In case of RBD, with five treatments and four blocks, the degrees of freedom of F-Statistic for testing the significance of treatments is \_\_\_\_\_
- d) ANCOVA stands for \_\_\_\_\_
- e) In asymmetrical factorial experiments, the number of levels for all the factors are \_\_\_\_\_

**3. Write short notes on any five questions**

(2×5 = 10)

- a) What do you understand by confounding in factorial experiments?
- b) Write short note on uniformity trials.
- c) Prepare a suitable randomized layout of split plot design having 4 main plots (A), 3 sub plots (B) and 3 replications
- d) Give an experimental situation in the context of agriculture where we can use strip plot designs.
- e) "Missing values doesn't affect the analytical procedure in case of completely randomized designs"-justify the statements
- f) Explain with an example that factorial experiments save experimental resources.
- g) Explain an experimental situation where we can use latin square designs.
- h) What are the basic principles of Design of experiments?

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**Part-II**  
**(Descriptive Type)**

**Time: 90 minutes**

**Marks: 30**

Questions are of value as indicated in the margin  
Answer any three of the following questions

4. Explain the randomization procedure for a Randomized Complete Block Design (RCBD). [10]
  5. What do you understand by ANOVA? What are its basic assumptions? Explain the analytical steps for one way ANOVA model. [2+3+5]
  6. An experiment is to be conducted for comparing 4 varieties of wheat crop and there are 20 units available which can be grouped into 5 homogeneous groups. Suggest a suitable design for this situation along with its layout. Give the steps for its analysis along with appropriate standard error(s) for testing the difference between two treatment means. [4+6]
  7. Define factorial experiment? What are the advantages and disadvantages of factorial experiments? Obtain the algebraic expression of main effects and interaction effect in the context of  $2^2$  factorial experiments. [2+3+5]
  8. What is difference between split plot and strip plot designs? What are the advantages and disadvantages of split plot designs? Explain the model and ANOVA table in case of strip plot designs. [2+4+4]
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