DBX-003-1172002 Seat No. _____

M. Sc. (Sem. II) Examination

July - 2022

MS-202 : Planning & Analysis of Industrial Experiments

Faculty Code : 003
Subject Code : 1172002

Time : $2\frac{1}{2}$ Hours] [Total Marks : **70**

1 Answer the following questions : (any seven) **14**

   (1) Write parameters and parametric relation of BIBD.

   (2) Discuss briefly a Binary Design with an example.

   (3) What is meant by Confounding ?

   (4) Define α-resolvable BIBD.

   (5) What is the main purpose of running the experiment ?

   (6) Explain the elementary contrast.

   (7) Explain the Orthogonality.

   (8) What is Block design ?

   (9) Define a Complete block design.

   (10) Explain Incomplete Block Design.

2 Answer the following questions : (any two) **14**

   (1) Prove that for any symmetrical BIBD $(r-\lambda)$ must be a perfect square for even v.

   (2) Explain Bose Inequality for BIBD.

   (3) Construct the BIBD with a series $v = 4\lambda + 3$, $b = 4\lambda + 3$, $r = 2\lambda + 1 = k$ and λ, where $4\lambda + 3$ is a prime number.

3 Answer the following questions : **14**

   (1) Show that a BIBD is connected, if $R(C) = v-1$.

   (2) Construct the BIBD using Block section method. Write appropriate example.

OR

3 Answer the following questions : **14**

(1) Explain the following terms :
  (i) Latin Square Design
  (ii) OLSD
  (iii) MOLSD

(2) Construct the CDC plan with parameters v = b = 7, r = k = 3, λ = 1 (BIBD) using GF (7).

4 Answer the following questions : (any two) **14**

(1) Explain total confounding using an example.

(2) Explain analysis of Youden square design.

(3) What are the merits and demerits of balanced confounding ? Give a suitable example of balanced confounding with ANOVA.

5 Answer the following questions : (any two) **14**

(1) Explain 3^3 factorial experiments. Write ANOVA table of 3^2 factorial experiments.

(2) Discuss in detail of partially balanced incomplete block design.

(3) An agriculture experiment was conducted at Junagadh agriculture university to find the increase of groundnut of the application of 2 fertilizers of Nitrogen and Potash. Nitrogen was applied as 40 gm/hector and 80 gm/h, while Potash was applied at 50 gm/h and 100 gm/h. The groundnut seeds were planted in such way that the distance between 2 plants in a row is same. This experiment is conducted in 3 replications. The collected observations of groundnut are shown below.

Rep – 1	Rep – 2	Rep – 3
$a_0b_0(60)$	$a_1b_1(79)$	$a_0b_1(72)$
$a_0b_1(70)$	$a_0b_0(66)$	$a_0b_0(55)$
$a_1b_0(75)$	$a_0b_1(88)$	$a_1b_0(69)$
$a_1b_1(80)$	$a_1b_0(100)$	$a_1b_1(120)$

Analyze the data and give your comments.

(4) Show that a design with parameters v = 4, b = 6, r = 3, k = 2, λ = 1 is balanced or connected or orthogonal.