

B.Sc. Part-III (Semester-VI) Examination
STATISTICS

[Maximum Marks : 80]

Time : Three Hours]

1. (A) Fill in the blanks :

- (i) Optimum solution of LPP occurs at _____ of feasible region.
- (ii) Assignment problem is solved by _____ algorithm.
- (iii) In ANOVA _____ test is used.
- (iv) In $m \times m$ LSD the total number of experimental units needed are _____.

(B) Choose the correct alternatives :

- (i) In LPP the objective function and constraints are always _____.
 - (a) Non-linear
 - (b) Exponential
 - (c) Linear
 - (d) None of the above
- (ii) A necessary and sufficient condition for existence of a feasible solution to the transportation problem is _____.

- (a) $\sum_i a_i > \sum_j b_j$
- (b) $\sum_i a_i = \sum_j b_j$
- (c) $\sum_i a_i < \sum_j b_j$
- (d) $\sum_i a_i \neq \sum_j b_j$

(iii) The principle of _____ is not used in CRD.

- (a) Randomization
- (b) Replication
- (c) Local control
- (d) None of the above

(iv) In 2^3 factorial experiment the total treatment combinations will be _____ in number.

- (a) 8
- (b) 6
- (c) 4
- (d) 12

(C) Answer in **ONE** sentence :

- (i) What is saddle point ?
- (ii) Define contrast.
- (iii) What do you mean by feasible solution ?
- (iv) What is mean sum of squares ?

2. (A) State the standard form of LPP.

(B) Give the Simplex algorithm to solve LPP.

(C) Solve the given LPP by graphical

$$\text{Max. } Z = 3x_1 + 2x_2$$

subject to :

$$x_1 - x_2 \leq 1$$

$$x_1 + x_2 \geq 3$$

$$x_1, x_2 \geq 0$$

4

OR

3. (P) Explain LPP in general.

(Q) Define :

4

(i) Feasible solution

4

(ii) Net evaluations.

(R) Solve the given LPP graphically :

$$\text{Max. } Z = x_1 + 2x_2$$

4

subject to :

$$x_1 + x_2 \leq 5$$

$$x_2 \leq 4$$

$$x_1, x_2 \geq 0$$

4. (A) What do you mean by transportation problem ? Give its mathematical formation.

4

(B) Explain matrix minima method and obtain an initial basic feasible solution to the given transportation problem using matrix minima method :

8

	D ₁	D ₂	D ₃	D ₄	Availability
O ₁	1	2	3	4	6
O ₂	4	3	2	0	8
O ₃	0	2	2	1	10
Demand	4	6	8	6	

OR

5. (P) Define :

4

(i) Basic feasible solution to T.P.

(ii) Optimal solution to T.P.

(Contd.)

- (Q) Explain North-West Corner rule of finding solution to T.P. and solve the given T.P. by this method : 8

	W_1	W_2	W_3	Availability
F_1	2	7	4	5
F_2	3	3	1	8
F_3	5	4	7	7
F_4	1	6	2	4
Requirement	7	9	8	

6. (A) Explain Assignment problem. 4
 (B) Define two person zero sum game. 4
 (C) Solve the given sequencing problem : 4

Job	:	1	2	3	4	5	6	7
Time on M_1	:	3	12	15	6	10	11	9
Time on M_2	:	8	10	10	6	12	1	3

Obtain optimum sequence of jobs.

OR

7. (P) Explain Maximin and Minimax principle of the theory of games. 4
 (Q) State the assumptions made in sequencing problem. 4
 (R) Solve the following assignment problem : 4

		Jobs			
		J_1	J_2	J_3	J_4
Persons	A	8	26	17	11
	B	13	28	4	26
	C	38	19	18	15
	D	19	26	24	10

8. (A) What is ANOVA ? State the assumption in ANOVA. 4
 (B) Give the mathematical analysis of one-way classification. 4
 (C) State the null hypothesis and ANOVA table for two-way classification with one observation per cell. 4

OR

9. (P) Give the null hypothesis and ANOVA table of one-way classification. 4
 (Q) Write the ANOVA table alongwith null hypothesis for two-way classification with m observations per cell. 4
 (R) Carry out the mathematical analysis of two-way classification with one observation per cell. 4

10. (A) Define : 4
- (i) Treatment
 - (ii) Uniformity trials.
- (B) State the principles of design of experiments and explain any one of them. 4
- (C) What is randomized block design ? Give the particular layout of RBD with four treatments A, B, C and D replicated in three blocks. 4

OR

11. (P) Define CRD and give its mathematical model. 4
- (Q) Give the null hypothesis and ANOVA table for RBD with t treatments and r replicates. 4
- (R) State advantages and disadvantages of CRD. 4
12. (A) Define Latin square design. 4
- (B) Give particular layout of 4×4 LSD with treatments A, B, C and D. 4
- (C) Explain Yate's method of obtaining factorial effect totals in 2^3 factorial experiment. 4

OR

13. (P) Define factorial experiments and state its advantages. 4
- (Q) Write the ANOVA table of $m \times m$ LSD. 4
- (R) Give the ANOVA table for 2^2 factorial experiment. 4