B.Sc. (Part–III) Semester–VI Examination

STATISTICS

Time : Three Hours] [Maximum Marks : 80

1. (A) Fill in the blanks :

(i) A __ __ solution to LPP is the set of variables which satisfy constraints and non-negative restrictions of the problem.

(ii) A transportation problem is balanced if _____.

(iii) The reciprocal of the __ __ of the mean is known as precision.

(iv) The term analysis of variance was introduced by __ __. 2

(B) Choose the correct alternative from the following :

(i) A constrained optimization problem may have :

(a) Feasible solution

(b) No feasible solution

(c) A unique optimum feasible solution

(d) All of the above

(ii) Which one of the following is a part of every game theory model ?

(a) Players (b) Payoff

(c) Probabilities (d) Strategies

(iii) The degrees of freedom for the F test in one way ANOVA with N observation and K treatment are _____.

(a) (K–N) and (N–1) (b) (K–1) and (N–K)

(c) (N–1) and (K–N) (d) (N–K) and (K–1)

(iv) In an experiment the primary purpose of blocking is to reduce __ __.

(a) Bias (b) Confounding

(c) Variation (d) Randomness 2

(C) Answer is **one** sentence each:

(i) What is surplus variable in LPP ?

(ii) What is saddle point in game ?

(iii) What is an expression for error sum of square in one way classification ?

(iv) Which test is used in ANOVA ? 4

2. (A) Define :

(i) Basic feasible solution

(ii) Constraint. 4

(B) Explain graphical method of solving linear programming problem. 4

(C) Explain linear programming technique. 4

OR

3. (P) Define the following terms :

(i) Optimum solution to LPP

(ii) Dual problem of LPP. 4

(Q) Explain matrix notation of linear programming problem. 4

(R) Explain the procedure of testing basic feasible solution for optimality of LPP. 4

4. (A) What do you mean by transportation problem ? Give its mathematical formulation and list out the methods of finding initial basic feasible solution of the transportation problem. 6

(B) Explain Vogel's approximation method to find initial basic feasible solution to the transportation problem and solve the following transportation problem by this method :

	W_1	W_2	W_3	
F_1	2	7	4	5
F_2	3	3	1	8
F_3	5	4	7	7
F_4	1	6	2	14
	7	9	18	

6

OR

5. (P) Define a basic feasible solution, optimal solution and non-degenerate basic feasible solution to T.P. 6

(Q) Explain North West corner rule of finding solution to the transportation problem and solve the following by this method :

	W_1	W_2	W_3	
F_1	2	7	4	5
F_2	3	3	1	8
F_3	5	4	7	7
F_4	1	6	2	14
	7	9	18	

6

6. (A) Explain an assignment problem. 4

(B) There are 9 jobs, each of which must go through two machines P and Q in the order PQ, find the optimal sequence that minimizes total elapsed time :

Job / Machines	1	2	3	4	5	6	7	8	9
P	2	5	4	9	6	8	7	5	4
Q	6	8	7	4	3	9	3	8	11

4

(C) State and explain the maximin minimax theorem of game. 4

OR

7. (P) Solve the following assignment problem :

Jobs

Person	I	II	III	IV
A	8	26	17	11
B	13	28	4	26
C	38	19	18	15
D	19	26	24	10

4

(Q) Explain two person zero sum game 4

(R) Define the following terms :

(i) Optimal sequence

(ii) Idle time. 4

8. (A) Explain analysis of variance technique and reason of using F test for it. 4

(B) Derive various sum of squares for two way classification with one observation per cell. 4

(C) Describe the analysis of variance table for two way classification with K observation per cell. 4

OR

9. (P) State and explain the assumptions used in analysis of variance. 4

(Q) Explain the splitting of total sum of squares for one way classification. 4

(R) Explain hypothesis and ANOVA table in one way classification. 4

10. (A) Define the following terms :

(i) Experimental error

(ii) Treatment. 4

(B) Explain the principle and importance of randomization in design of experiment. 4

(C) Explain RBD experiment. 4

OR

11. (P) Define the following terms :

(i) Test statistic F

(ii) Interaction effects. 4

(Q) Explain completely randomised design. 4

(R) Obtain the efficiency of RBD relative to CRD. 4

12. (A) Explain Latin square design experiment. 6

(B) Explain 2^3 factorial experiment. 6

OR

13. (P) Explain Latin square design by considering layout of 4 treatments. 6

(Q) Explain factorial experiment and Yates method for computing factorial effect. 6