AW–1773

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

STATISTICS

Time : Three Hours] [Maximum Marks : 80

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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 × m LSD the total number of experimental units needed are _____.

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(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) $\sum_i a_i = \sum b_j$

(c) $\sum_i a_i < \sum b_j$ (d) $\sum a_i \neq \sum b_j$

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

(a) Randominzation (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

4

(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. 4

(B) *Give the Simplex algorithm to solve LPP.* 4

(C) Solve the given LPP by graphica

Max. $Z = 3x_1 + 2x_2$ 4

subject to :

$x_1 - x_2 \leq 1$

$x_1 + x_2 \geq 3$

$x_1, x_2 \geq 0$

OR

3. (P) Explain LPP in general.

(Q) Define : 4

(i) Feasible solution 4

(ii) Net evaluations.

(R) Solve the given LPP graphically :

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	6	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