code : 21327

B. Com. (Honours) Sem. II

Sub. Code. 21327

: નોંધ :

૧. દરેક પ્રશ્નનો [a] અથવા [a(i)] અને [a(ii)] જ લખવાના રહેશે.
૨. પ્રશ્ન : ૧[a] અથવા ૧[a(i)] અને ૧[a(ii)] તથા ૨[a] અથવા ૨[a(i)] અને ૨[a(ii)] ના 14 માર્કસ ના બદલે ૧૮ માર્કસ રહેશે.
૩. પ્રશ્ન : ૩[a] અથવા ૩[a(i)] અને ૩[a(ii)] તથા ૪[a] અથવા ૪[a(i)] અને ૪[a(ii)] ના 14 માર્કસ ના બદલે ૧૭ માર્કસ રહેશે.
૪. દરેક પ્રશ્નનો પ્રશ્ન નં ૧(b), પ્રશ્ન નં ૨(b), પ્રશ્ન નં ૩(b) તથા પ્રશ્ન નં ૪(b) (ટુંકા પ્રશ્નો) વિદ્યાર્થીએ લખવાના નથી.

1. **(a)** Explain the simplex method for solving the Linear Programming Problem (LPP). Solve the following LPP graphically. **14**

$$Min\ Z = 4x_1 + x_2 \text{ subject to,}$$
$$3x_1 + x_2 \geq 30$$
$$4x_1 + x_2 \leq 60$$
$$x_1 + 2x_2 \geq 30$$
$$x_1, x_2 \geq 0$$

OR

1. **(a)** **(i)** Solve the following LPP by simplex method. **7**

$$Max\ Z = 4x_1 + 10x_2 \text{ subject to,}$$
$$2x_1 + x_2 \leq 50$$
$$2x_1 + 5x_2 \leq 100$$
$$2\,x_1 + 3x_2 \leq 90$$
$$x_1, x_2 \geq 0$$

(a) **(ii)** State the mathematical form of Linear Programming Problem (LPP). Explain the graphical method for solving the LPP. **7**

1. **(b)** **Answer in short. (attempt any four)** **4**

(1) Explain: Linear constraint
(2) Explain: Objective function
(3) Explain: Feasible solution
(4) What is optimal solution?
(5) What is LPP?
(6) What is a basic solution?

2. **(a)** Explain optimality test for solving transportation problem. Find optimal feasible solution for the following transportation problem. **14**

Factory	**warehouse**				**Supply**
	W_1	W_2	W_3	W_4	
F_1	19	30	50	10	7
F_2	70	30	40	60	9
F_3	40	8	70	20	18
Demand	5	8	7	14	34

OR

2. **(a)** **(i)** Give assignment in the following problem so as to minimize the distance travelled. **7**

Cities	**Depots**				
	a	**b**	**c**	**d**	**e**
A	160	130	175	190	200
B	135	120	130	160	175
C	140	110	155	170	185
D	50	50	80	80	110
E	55	35	70	80	105

(a) **(ii)** Determine an initial basic feasible solution to the following transportation problem using (a) LCM method (b) Vogel's method **7**

Origins	**Destination**					**Supply**
	A	**B**	**C**	**D**	**E**	
P	5	7	6	8	9	20
Q	9	8	10	4	11	35
R	10	12	9	7	8	40
S	6	6	7	8	8	15
Demand	15	10	20	30	35	110

(b) **Answer in short. (attempt any four)** **4**

(1) What is transportation problem?
(2) What is assignment problem?
(3) What is the main objective of transportation problem?
(4) At what stage in the Hungarian method for solving an assignment problem, we can expect the optimum solution?
(5) Explain balanced transportation problem.
(6) Solve the following assignment problem.

Jobs	**Machines**		
	M_1	M_2	M_3
J_1	20	27	30
J_2	10	18	16
J_3	14	16	18

3. (a) State the procedure for determining the optimum sequence for n jobs on 2 machines. **14**

Six jobs go first over machine A and then over machine B. Processing times in hours are given as:

Job	J_1	J_2	J_3	J_4	J_5	J_6
Machine A	1	3	8	5	6	3
Machine B	5	6	3	2	2	10

Find the optimum sequence in which jobs should be processed.

OR

3. (a) **(i)** Explain: The modified dominance property. Solve the following game: **7**

$$\text{Player A} \begin{bmatrix} 3 & 2 & 4 & 0 \\ 3 & 4 & 2 & 4 \\ 4 & 2 & 4 & 0 \\ 0 & 4 & 0 & 8 \end{bmatrix} \quad \text{Player B}$$

(a) **(ii)** How will you determine a saddle point? Solve the following game: **7**

$$\begin{bmatrix} 9 & 3 & 1 & 8 & 0 \\ 6 & 5 & 4 & 6 & 7 \\ 2 & 4 & 3 & 3 & 8 \\ 5 & 6 & 2 & 2 & 1 \end{bmatrix}$$

3. (b) **Answer in short. (attempt any three)** **3**

(1) What is sequencing?

(2) What is total elapsed time?

(3) What is idle time on a machine?

(4) What is pure strategy?

(5) What is optimum strategy?

4. (a) State the uses of Z-transformation. **14**

The correlation coefficient of a random sample of size 27 drawn from a bivariate normal population is 0.42. Test the hypotheses (i) H_0: $\rho = 0$ and (ii) H_0: $\rho = 0.6$

OR

4. (a) **(i)** State the properties and uses of t-statistic. **7**

(a) **(ii)** For filling each bottle with 170 tablets of a particular medicine, an automatic machine was installed. From the production, a sample of 9 bottles was taken. The numbers of tablets found in these 9 bottles are as follows: 168, 164, 166, 167, 168, 169, 170, 170, and 171. Test whether the machine has been installed properly or not ? **7**

(b) **Answer in short. (attempt any three)** **3**

(1) Define student's t-statistic.

(2) Define Z-transformation.

(3) What is degrees of freedom?

(4) What is point estimation?

(5) What is interval estimation?