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JAJ-P-3050

Seat No. _____

M. C. A. (Sem. III) (CBCS) Examination

November - 2019

P-3050 : Operation Research

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

1 (a) Attempt the following : **4**

(1) What is LPP ?

(2) What is dual simplex ?

(3) What is duality ?

(4) What is feasible solution ?

(b) Attempt any **one** of the following : **2**

(1) What is basic feasible solution ?

(2) Define optimum basic feasible and unbounded solution.

(c) Attempt any **one** of the following : **3**

(1) Explain the general mathematical model of LPP.

(2) Explain alternative and infeasible solution with suitable example.

(d) Attempt any **one** of the following : **5**

(1) Solve the following LPP using graphics method :

maximize $z = 40x_1 + 80x_2$ stc

$2x_1 + 3x_2 <= 48, x_1 <= 15, x_2 <= 10$ and $x_1, x_2 >= 0$.

(2) Solve the following LPP using graphics method :

minimize $z = 600x_1 + 400x_2$ stc

$3x_1 + 3x_2 >= 40, 3x_1 + x_2 >= 40, 2x_1 + 5x_2 >= 44$ and

$x_1, x_2 >= 0$.

2 (a) Attempt the following : **4**

(1) Give the formula to find out the new replaced row.

(2) What is the meaning while performing sensitivity analysis, the upper bound infinity on the value of the right hand side of constrain ?

(3) The right hand side range is often referred to as the range of _____.

(4) Define decision variable.

(b) Attempt any **one** of the following : **2**

(1) What is sensitivity analysis? Explain in brief.

(2) Give the conditions of Big-M method for maximization case.

(c) Attempt any **one** of the following : **3**

(1) Explain how can a change in resource availability affect a solution.

(2) List the different cases in change in the input-output coefficient. And any one in brief.

(d) Attempt any **one** of the following : **5**

(1) Explain change in the coefficient of a non-basic variable with respect to sensitivity analysis.

(2) Explain change in the coefficient of a basic variable with respect to sensitivity analysis.

3 (a) Attempt the following : **4**

(1) Explain RIM condition.

(2) What is degenerate solution ?

(3) What is non degenerate solution ?

(4) What is balanced problem ?

(b) Attempt any **one** of the following : **2**

(1) List the characteristics of TP ?

(2) Explain loop in TP.

(c) Attempt any **one** of the following : **3**

(1) Solve the following using NWCM.

	D_1	D_2	D_3	D_4	Supply
S_1	2	3	11	7	6
S_2	1	0	6	1	1
S_3	5	8	15	9	10
Demand	7	5	3	2	

(2) Solve the following using LCM.

	D_1	D_2	D_3	D_4	Supply
S_1	2	3	11	7	6
S_2	1	0	6	1	1
S_3	5	8	15	9	10
Demand	7	5	3	2	

(d) Attempt any **one** of the following : **5**

(1) Explain general mathematical model for transportation problem.

(2) Write a C/C++ program to find the initial solution using NWCM.

4 (a) Attempt the following : **4**

(1) Define enumeration method.

(2) What is unbalanced assignment problem ?

(3) How Maximization assignment problem is transformed into a minimization case ?

(4) In how many ways a sales man can visit n cities ?

(b) Attempt any **one** of the following : **2**

(1) List the different methods to solve the assignment problem.

(2) Explain maximization case in assignment problem.

(c) Attempt any **one** of the following : **3**

(1) Explain optimality criterion in assignment problem.

(2) Solve the following assignment problem using Hungarian method :

	1	2	3
A	30	31	27
B	28	29	26
C	29	30	28
D	28	31	27
E	31	29	26

(d) Attempt any **one** of the following : **5**

(1) Explain the mathematical model for assignment problem.

(2) Write a C/C++ program to solve the assignment problem.

5 (a) Attempt the following : **4**

(1) What is pert ?

(2) What is network ?

(3) Explain CP.

(4) What is event ?

(b) Attempt any **one** of the following : **2**

(1) Explain burst event.

(2) List different types of activities.

(c) Attempt any **one** of the following : **3**

(1) List and explain different errors in network.

(2) What is dummy in network ? Explain its utility.

(d) Attempt any **one** of the following : **5**

(1) Explain forward pass method to find the critical path.

(2) Draw network diagram for the following :

Activity	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*	*J*
Predecessor Activity	-	A	B	B	B	C	C	F,G	D,E,H	I