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MBN-010-002201

Seat No. _____

P.G. Diploma in Hospital Management
(Sem. II) (CBCS) Examination
April / May - 2018
Operations Research

Faculty Code : 010
Subject Code : 002201

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

Instructions : (1) Attempt all questions.
(2) Each question carries equal marks.

1 Answer the following questions : (any **seven**) **14**

(1) A variable which does not appear in the basic variable (B) column of simplex table is always equal to _____

(2) _____ is used when the sign in constraints are $\leq$.

(3) In assignment problem we get optimal solution when number of row / column is _____

(4) The objective of network analysis is to _____

(5) PERT means _____

(6) Network modes have advantages in terms of project _____

(7) Define Successor activity.

(8) Define unbounded solution.

(9) Define predecessor activity.

2 Answer the following : **14**

(a) Use graphical method to solve the following LPP,

Maximize $Z = 50x_1 + 60x_2$

Subject to $2x_1 + 3x_2 \leq 1500$

$3x_1 + 2x_2 \leq 1500$

$x_1 \leq 400$

$x_2 \leq 400$

$x_1, x_2 \geq 0$

(b) Define following terms :

(i) Feasible solution

(ii) Basic Solution

(iii) Basic feasible solution

OR

2 Answer the following : **14**

(a) Explain types of failure in replacement problem.

(b) The seminar planning project has been developed with the following details :

Activity	Details	Preceding activity	Duration (months)
A	Plan seminar content	-	2
B	Obtain acceptance of speakers/ participants	A	1
C	Select seminar venue	-	1
D	Prepare and mail invitations	B,C	2
E	Accept reservations	D	1
F	Keep material ready	B	2
G	Notify press	E, F	1/2

Draw network diagram for this seminar planning project.

3 Answer the following : **14**

(a) Explain North- West Corner Rule method for finding initial basic feasible solution in transportation problem.

(b) What are the advantages and limitations of simulation?

OR

3 Answer the following : **14**

(a) Define following terms :

(i) Event

(ii) Merge event

(iii) Burst event

(b) Determine the initial basic feasible solution to the following transportation problem by using least cost method :

Source	Destination				Supply
	D_1	D_2	D_3	D_4	
S_1	21	16	15	3	11
S_2	17	18	14	23	13
S_3	32	27	18	41	19
Demand	6	10	12	15	

4 Answer the following. **14**

(a) Determine the initial basic feasible solution to the following transportation problem by using row minima method :

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

(b) Discuss the characteristics of LP problem.

OR

4 Answer the following : **14**

(a) Explain the mathematical approach in economic order quantity.

(b) A department has five employees with five jobs to be performed. The time (in hours) each man will take to perform each job is given in the cost matrix.

		Employees				
		I	II	III	IV	V
Jobs	A	10	5	13	15	16
	B	3	9	18	13	6
	C	10	7	2	2	2
	D	7	11	9	7	12
	E	7	9	10	4	12

How should the jobs be allocated, one per employee, so as to minimize the total manhours?

5 Answer the following : **14**

(a) Use simplex method to solve the following LPP

Maximize $Z = 45x_1 + 80x_2$

Subject to $5x_1 + 20x_2 \leq 400$

$10x_1 + 15x_2 \leq 450$

$x_1, x_2 \geq 0$

(b) Write the advantages of simulation.

OR

5 Answer the following : **14**

(a) State difference between PERT and CPM.

(b) Explain dual of a linear programming problem.