NBO-010-002201 Seat No. _____

P.G.D.H.M. (Sem. II) (CBCS) (External) Examination

April / May – 2017

Paper-07 : Operations Research

Faculty Code : 010

Subject Code : 002201

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

Instructions : (i) Attempt all questions.
(ii) Each question carries equal marks.

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

(1) Slack variable is used when the sign in constraints are _____.

(2) The objective of network analysis is to minimise total project _____.

(3) CPM means _____.

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

(5) PERT means _____.

(6) State the any four types of models used in operations research.

(7) What is operations research ?

(8) Define merge event.

(9) Define burst event.

2 Answer the following : **14**

(a) Define following terms :

(i) Basic solution

(ii) Feasible solution

(iii) Unbounded solution

(b) Use simplex method to solve the following LPP,

$$\text{Minimise} \quad Z = 8x_1 - 2x_2$$

Subject to constraints $-4x_1 + 2x_2 \leq 1$

$$5x_1 - 4x_2 \leq 3$$

$$x_1, x_2 \geq 0$$

OR

2 Answer the following : **14**

(a) Write the algorithm for simplex method.

(b) An assembly is to be made from two parts X and Y. Both parts must be turned on a lathe and Y must be polished whereas X need not polished. The sequence of activities together with their predecessor is given below.

Activity	Description	Predecessor Activity
A	Open work order	-
B	Get material for X	A
C	Get material for Y	A
D	Turn X on lathe	B
E	Turn Y on lathe	B, C
F	Polish Y	E
G	Assemble X and Y	D, F
H	Pack	G

Draw a network diagram for the project.

3 Answer the following : **14**

(a) Discuss types of failure in replacement problem.

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

	D_1	D_2	D_3	Capacity
S_1	2	2	3	10
S_2	4	1	2	15
S_3	1	3	1	40
Demand	20	15	30	

OR

3 Answer the following : **14**

(a) Define following terms :

(i) Events

(ii) Predecessor activity

(iii) Successor activity

(b) Explain least cost method for finding initial basic feasible solution in transportation problem.

4 Answer the following : **14**

(a) Explain row minima method in transportation problem.

(b) Solve the following assignment problem and find the optimal assignment.

	I	*II*	*III*	*IV*	*V*
A	8	4	2	6	1
B	0	9	5	5	4
C	3	8	9	2	6
D	4	3	1	0	3
E	9	5	8	9	5

OR

4 Answer the following : **14**

(a) Define inventory and give its functional Goal.

(b) Write the applications of operations research.

5 Answer the following : **14**

(a) Solve the following LPP by using graphical method.

$$\text{Minimise} \quad Z = 20x_1 + 10x_2$$

Subject to constraints $x_1 + 2x_2 \leq 40$

$$4x_1 + 3x_2 \geq 60$$

$$3x_1 + x_2 \geq 30$$

$$x_1, x_2 \geq 0$$

(b) What are the characteristics of a good model in operations research ?

OR

5 Answer the following : **14**

(a) Give the mathematical formulation of linear programming problem.

(b) Explain briefly the general methods for solving operations research model.