PG/IVS/MCA-405/16

MCA 4th Semester Examination, 2016

MCA

(*Operation Research*)

PAPER—MCA - 405

Full Marks : 70

Time : 3 hours

Answer any **five** questions

The figures in the right-hand margin indicate marks

Candidates are required to give their answers in their own words as far as practicable

Illustrate the answers wherever necessary

1. (*a*) Write the dual of the following LPP :

$$\text{Max } Z = 2x_1 + 5x_2 + 6x_3$$

$$\text{Subject to, } \begin{aligned} 5x_1 + 6x_2 - x_3 &\le 3 \\ -2x_1 + 4x_3 &\le 4 \\ x_1, x_2 &\ge 0 \end{aligned}$$

(*b*) Solve the following LPP using dual simplex method :

$$\text{Max } Z = -3x_1 - x_2$$

$$\text{Subject to, } x_1 + x_2 \geq 1$$
$$2x_1 + 3x_2 \geq 2$$
$$x_1, x_2 \geq 0$$

4 + 10

2. (*a*) Solve the following LPP using revised simplex method :

$$\text{Max } Z = 4x_1 + 3x_2$$

$$\text{Subject to, } 3x_1 + 4x_2 \leq 12$$
$$3x_1 + 3x_2 \leq 10$$
$$x_1, x_2 \geq 0$$

(*b*) Find the initial basic feasible solution of the transportion problem (minimization type) by VAM method and check wheather it is optimal or not ?

	D_1	D_2	D_3	D_4	
S_1	7	10	14	8	30
S_2	7	11	12	6	40
S_3	5	8	15	9	30
	20	20	25	35	

7 + 7

7. The following network diagram represents the activities associated with a project :

Activities :	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*	*I*
Optimistic time :	5	18	26	16	15	6	7	7	3
Pessimistic time :	10	22	40	20	25	12	12	9	5
Most likely time :	8	20	33	18	20	9	10	8	4

(*a*) Draw the project network.

(*b*) Determine the critical path. 8 + 6

8. (*a*) Determine the minimum cost a deterministic EOQ model with constant demand and without shortage.

(*b*) Find the sequence that minimizes the total required time in performing the following jobs of three machines in order ABC. Processing times (in hrs) are given below :

Job	1	2	3	4	5
Machine-A	8	10	6	7	11
Machine-B	5	6	2	3	4
Machine-C	4	9	8	6	5

8 + 6