MODEL QUESTIONS FOR END SEMESTER

M.Sc. Sem-IV

Paper – ECMATH402(C) (Operations Research)

Short type Questions

1) Describe Branch and Bound Technique to solve an IPP.

2) Prove the necessary and sufficient Condition for the optimality of the objective function of n decision variables and ~~two~~ m equality Constraints.

3) Discuss Wolfe's Method to solve a QPP.

4) Write the Procedure of determination of critical path.

5) Prove Kuhn-Tucker Necessary and Sufficient Conditions for the optimality of the objective function in a GNLPP.

6) Write the difference between CPM and ~~Rev~~ PERT.

7) Define i) Dummy Activity
ii) Total float
iii) Free Float
iv) Independent Float
v) Critical Event

Long-type question:

i) Solve $\max. z = x_1 + 2x_2$

S.t.

$$x_1 + x_2 \leq 7$$
$$2x_1 \leq 11$$
$$2x_2 \leq 7$$

$x_1, x_2 \geq 0$ and are integers.

2) Solve ~~$\max z = 7x_1 + 9x_2$~~

S.t.

~~$2x_1 + 5x_2$~~

2) Solve $\max. z = 3x_1 + 4x_2$

S.t.

$$3x_1 - x_2 \leq 12$$
$$3x_1 + 11x_2 \leq 66$$

$x_1, x_2 \geq 0$ and x_2 is an integer.

3) Use Branch and Bound Technique to solve the following IPP.

$\max. z = 7x_1 + 9x_2$

S.t.

$$-x_1 + 3x_2 \leq 6$$
$$7x_1 + x_2 \leq 35$$
$$x_1 \leq 7$$
$$x_2 \leq 7$$

$x_1, x_2 \geq 0$ and are integers.

4) Solve the following NLPP by Lagrangian Multiplier method

$$\min Z = x_1^2 + x_2^2 + x_3^2$$
s.t.
$$x_1 + x_2 + 3x_3 = 2$$
$$5x_1 + 2x_2 + x_3 = 5$$
$$x_1, x_2, x_3 \geq 0.$$

5) Solve the following NLPP by Kuhn-Tucker conditions.

$$\max. Z = 10x_1 - x_1^2 + 10x_2 - x_2^2$$
s.t.
$$x_1 + x_2 \leq 9$$
$$x_1 - x_2 \geq 6$$
$$x_1, x_2 \geq 0.$$

6) Solve the QPP by Wolfe's method

$$\max. Z = 2x_1 + x_2 - x_1^2$$
s.t.
$$2x_1 + 3x_2 \leq 6$$
$$2x_1 + x_2 \leq 4$$
$$x_1, x_2 \geq 0.$$

7) Derive an Economic Lot-size Model with uniform rate of demand Infinite production Rate and having no shortages.

8) Derive an Economic Lot-size Model with different Rates of demand in different production cycles, Infinite production Rate and having no shortages

(4)

9) Draw a network diagram on the basis of the following data.

Activity	Duration (days)	Activity	Duration (days).
1-2	2	4-8	8
1-4	2	5-6	4
1-7	1	6-9	3
2-3	4	7-8	3
3-6	1	8-9	5
4-5	5	9-10	2

Find the critical path, total duration and slack times.

10) The following table gives the activities in a construction project and time duration

Activity	Preceeding Activity	Normal time (days)
1-2	—	5
1-3	—	4
2-4	1-2	6
3-4	1-3	2
4-5	2-4	1
4-6	2-4, 3-4	7
5-7	4-5	8
6-7	4-6	4
7-8	6-7, 5-7	3

a) Draw the activity network of the project
b) Find total float and free float for each activity.
c) Determine the critical path and project duration.