MTH601 Operations Research

Final Term Examination - February 2005

Time Allowed: 150 Minutes

Instructions

Please read the following instructions carefully before attempting any of the questions:

1. Attempt all questions. Marks are written adjacent to each question.
2. Do not ask any questions about the contents of this examination from anyone.
   - ***a***. If you think that there is something wrong with any of the questions, attempt it to the best of your understanding.
   - ***b***. If you believe that some essential piece of information is missing, make an appropriate assumption and use it to solve the problem.
   - ***c***. Write all steps, missing steps may lead to deduction of marks.
3. In Q3 you can either draw the network diagram or simply write the asked terms for each activity in the exam software, whichever you think is easy for you. But remember that you have to show your work on exam application correspond to each question.

Total Marks: 50 **Total Questions: 8**

Question No. 1 **Marks : 4**

Define the followings.

(a) Impossible Assignment
(b) Unbounded Solution.

Question No. 2 **Marks : 10**

Consider the problem

$$\text{maximize } z = x_1 + 5x_2 + 3x_3$$

Subject to

$$x_1 + 2x_2 + x_3 = 3$$

$$2x_2 - x_1 = 4$$

$$x_1, x_2, x_3 \geq 0$$

The variable x_3 plays the role of a slack. Use *big M-method* to solve the problem.

Question No. 3 **Marks : 4**

How the problem of the degeneracy arises in a transportation problem?

Question No. 4 **Marks : 4**

Define the followings in Queuing Theory.

a. Customer
b. Server
c. Priority

Question No. 5 **Marks : 4**

What are the variants of the simplex method? Write few lines about the followings.

(a) Unbounded solution.
(b) Unrestricted variables.

Question No. 6 **Marks : 10**

Five different machines can process any of the five required jobs with different profits resulting from each assignment.

Find the maximum profit possible through optimum assignments.

Question No. 7 **Marks : 4**

How can the linear programming be applied to management problem?

Question No. 8 **Marks : 10**

Consider the transportation problem having the following parameter table.

Use the northwest corner rule to obtain an initial basic feasible solution.