ii. Unbalanced problem.
iii. Impossible assignment.

6. A company is currently working with a process, which after paying for materials, labour, etc., brings a profit of Rs. 12,000. The company has the following alternatives:
   i. The company can conduct research R_1 which is expected to cost Rs. 10,000 and having 90% probability of success. If successful, the gross income will be Rs. 26,000.
   ii. The company can conduct research R_2 which is expected to cost Rs. 6,000 and having 60% probability of success. If successful, the gross income will be Rs. 24,000.
   iii. The company can pay Rs. 5,000 as royalty of a new process which will bring a gross income of Rs. 20,000.

   Because of limited resources, only one of the two types of research can be carried out at a time. Draw the decision tree and find the optimal strategy for the company.

7. Describe some of the application of Game theory. What are its limitations?
8. Compare and contrast CPM and PERT. Under what circumstances would you PERT as opposed to CPM in project management? Give some examples of projects where each would be more applicable than the other.

===END OF PAPER===

2207M011

BACHELOR OF VOCATION

BPM and Analytics
Subject: Introduction to Operations Research
Subject Code: MGM-602
Semester: Sixth
July 2022
Theory (External): 70 Marks
Time: 03 Hours

Instructions to the Students

1. This Question paper consists of two Sections. All sections are compulsory.
2. Section A comprises 10 questions of objective type in nature. All questions are compulsory. Each question carries 2 marks.
3. Section B comprises 8 essay type questions out of which students need to do any 5. Each question carries 10 marks.
4. Read the questions carefully and write the answers in the answer sheets provided.
5. Do not write anything on the question paper.
6. Wherever necessary, the diagram drawn should be neat and properly labelled

Roll Number											

SECTION –A (SHORT/OBJECTIVE TYPE QUESTIONS)
(10x2=20 Marks)

A. Explain any two essential features of O.R. approach.

B. What do you understand by a transport problem?

C. What is an assignment problem?

D. Which of the following criteria does not apply to decision making under uncertainty?
   a. Maximum return
   b. Maximax return
   c. Minimax regret
   d. Maximize expected return

E. Discuss the importance of Game theory in business?

F. Briefly mention the area of application of network techniques.

G. Define critical path.

H. Explain the purpose of simplex method.

I. Explain the term basic feasible solution.

J. What are the advantages of linear programming models?

SECTION –B (ESSAY TYPE QUESTIONS)
(5x10=50 Marks)

1. "Operations Research is the applications of scientific methods, techniques and tools to problems involving the operations of systems so as to provide those in control of the operations with optimal solution of the problem." Critically analyze the definition, identify the characteristics of the Operations Research and describe its methodology.
2. Discuss the similarities and differences between minimization and maximizations problems using the graphical solution approaches of linear programming.
3. How do the graphic and simplex methods of solving linear programming problems differ? In what ways are they same? Under what circumstances would you peer to use the graphic approach?
4. Consider the transportation problem where two factories are supplying three retail stores with a certain commodity. The numbers of units available at factories 1 and 2 are 200 and 300; those demanded at stores 1, 2 and 3 are 100, 200 and 50. Rather than ship directly from sources to destinations, it is decided to investigate the possibility of trans-shipment. Find the optimal shipping schedule. The transportation costs per unit are given below:

		Factory		Store		
		1	2			1
Factory	1	0	6	7	8	9
	2	6	0	5	4	3
Store	1	7	2	0	5	1
	2	1	5	1	0	4

5. How will you solve the following solutions in an assignment problem? Write 2-3 lines on each
   i. Maximization.