PAPER ID-310054

Roll No: | | | | | | | | | | | | | | |

MBA-INT
(SEM V) THEORY EXAMINATION 2023-24
OPERATIONS RESEARCH

TIME: 3 HRS

M.MARKS: 100

Note: 1. Attempt all Sections. If require any missing data; then choose suitably.

SECTION A

1. Attempt *all* questions in brief.

Q no	Question	Marks
a.	What is the role of operations Research in management	2
b.	What are the factors affecting the decision making process ?	2
c.	What is optimal solution area ?	2
d.	Briefly explain the relevance of feasible solution.	2
e.	What is zero sum game ?	2
f.	What is saddle point ?	2
g.	Where is Johnsons algorithm used ?	2
h.	What is Jockeying behavior ?	2
i.	What is the salvage value ?	2
j.	What is PERT ?	2

SECTION B

2. Attempt any *three* of the following:

Q no	Question	Marks
a.	What is the importance of decision making in operations research ? Explain the various environments affecting the decision making process ?	10
b.	Explain the Big - M method for solving LPP. Define slack and surplus variables in a LPP.	
c.	Explain the algorithm used for the solution of the assignment problem and give a suitable example to explain the relevance of assignment models in the field of management.	10
d.	Describe the Johnson's algorithm for sequencing n jobs on three machines. Discuss its advantages and limitations.	10
e.	How can the Critical Path Method (CPM) technique be applied in project planning and control? Explain with a suitable example.	10

SECTION C

3. Attempt any *one* part of the following:

Q no	Question	Marks
a.	What is decision tree ?Explain by giving suitable examples the risk factors affecting the decision process.	10
b.	What do you understand by Linear Programming in managerial decision making?Explain by giving a suitable example.	10

4. Attempt any *one* part of the following:

Q no	Question	Marks
a	Describe the graphical method of solving linear programming problems. How is it useful in gaining insights into the feasible solution space?	10
b.	A firm uses three types of machine M1, M2 and M3 to produce two types of products X &Y . Following table represents the machine time requires for producing each product, the machine time available for each machine. Find the quantity of product X and Y be produced per week for maximum profit ,ifprofit on product X is Rs 40 and profit on product Y is RS 100.	10

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Products → Machine ↓	Product X	Product Y	Machine maximum time availability per week ↓
Machine M1	12 minutes	6 minutes	3000 minutes / week
Machine M2	4 minutes	10 minutes	2000 minutes / week
Machine M3	2 minutes	3 minutes	900 minutes / week
Profit per unit →	Rs40	Rs100	

5. Attempt any one part of the following:

Q no	Question	Marks
a.	Define the concept of a game in the context of game theory. What are the characterizes a two-person zero-sum game? Provide a simple example to illustrate this concept of game theory.	10
b.	A machine tool company decides to make four sub-assemblies through four contractors. Each contractor is to receive only one order for sub assembly. The cost of each sub assembly is determined by the bids submitted by each contractor as shown in the table below in terms of lakhs of rupees. Use the Hungarian method to solve the given assignment problem and calculate the total cost for getting the four sub assembly completed.	10

Contractors → Sub Assemblies ↓	Contractor A	Contractor B	Contractor C	Contractor D
Assembly A1	15	13	14	17
Assembly A2	11	12	15	13
Assembly A3	13	12	10	11
Assembly A4	15	17	14	16

6. Attempt any one part of the following:

a.	Explain Johnson's algorithm for sequencing n jobs on two machines. How does it optimize the scheduling process?	10
b.	A machine operator has to perform two operations on two different machines A and B. Determine sequence of jobs for the following 6 jobs.	10

Job	1	2	3	4	5	6	7
Machine A	3	12	15	6	10	11	9
Machine B	8	10	10	6	12	1	3

7. Attempt any one part of the following:

a.	Draw a PERT network for the following project: A is the starting event and K is the end event J is a successor event to F C & D are successor events to B D is predecessor event to G E & F occur after event C E precedes F C restrains the occurrence of G and G precedes H H precedes J F restrains the occurrence of H K succeeds event J	10
b.	What is the approach used for replacement of a depreciating assets? Explain by giving a suitable example.	