Reg. No. | | | | | | | | | |

MBAH 503

Third Semester M.B.A. Degree Examination, March 2023
BUSINESS ADMINISTRATION
Operations Research

Time : 3 Hours | Max. Marks : 70

SECTION – A

Answer **any two** of the following. **Each** question carries **10** marks. Answer to **each** question should **not** exceed **5** pages. **(2×10=20)**

1. Explain the significance and scope of operations research in modern management.

2. What is the basic object of CPM and PERT technique ? Differentiate between CPM Network and PERT Network.

3. Explain the role of OR in decision-making.

SECTION – B

Answer **any three** of the following. **Each** question carries **12** marks. Answer to **each** question should **not** exceed **6** pages. **(3×12=36)**

4. A manufacturer produces 2 products A and B. Both the products are processed on two different machines. The available capacity of first machine is 12 hours and that of the second machine is 9 hours per day. Each unit of product A requires 3 hours on both machines and each unit of product B requires 2 hours on first machine and 1 hour on second machine. Each unit of product A is sold at Rs. 7 profit and that of B at a profit of Rs. 4. Find the production level per day for maximum profit graphically.

5. A manager has 5 jobs and 5 operators. The operators differs in efficiency. The efficiency is the measure of time taken by them to do the various jobs. The manager wants to assign the duty to his operator, so that the total time taken by the operator should be minimum. The matrix given below shows the time taken by each operator to do a particular job. Solve the problem of minimising total time for doing all the jobs using Hungarian method.

Operator/Jobs	Job A	Job B	Job C	Job D	Job E
Operator 1	9	11	14	11	7
Operator 2	6	15	13	13	10
Operator 3	12	13	6	8	8
Operator 4	11	9	10	12	9
Operator 5	7	12	14	10	14

6. Solve the following game and state the optimum strategy for both players using Dominance property.

Player A/Player B	1	2	3	4	5
1	4	6	5	10	6
2	7	8	5	9	10
3	8	9	11	10	9
4	6	4	10	6	4

7. The following table shows 3 sources and 4 destinations and respective supply and demand. Find the initial basic feasible solution by North West Corner method and then optimise the solution using UV - MODI method.

Source/Destination	A	B	C	D	Supply
1	3	1	7	4	**250**
2	2	6	5	9	**350**
3	8	3	3	2	**400**
Demand	**200**	**300**	**350**	**150**	

8. Explain the advantages and limitations of Simulation.

SECTION – C
(Compulsory)

9. The following table shows the jobs of a network along with their time estimates. **(1×14=14)**

Activity **Time estimates**

Activities	O	M	P
1-2	1	7	13
1-6	2	5	14
2-3	2	14	26
2-4	2	5	8
3-5	7	10	19
4-5	5	5	17
6-7	5	8	29
5-8	3	3	9
7-8	8	17	32

a) Draw the project network.

b) Calculate the expected duration and variance of each activity.

c) Calculate EST and LCT.

d) Calculate the expected project length.

e) Calculate the variance and standard deviation.

f) Find the probability of the completion of project in 40 days.
