

# School of Business

MBA  
ETE - May 2023

Time : 3 Hours

Marks : 50

## Sem IV - MBOP6011 - Operations Research Applications

*Your answer should be specific to the question asked*

*Draw neat labeled diagrams wherever necessary*

1. Explain any MODM technique. K2 CO1 (2)
2. Job Sequencing is an essential part of any operations in any Industry. Explain why? K2 CO2 (2)
3. Analyze why random numbers are useful in simulation models? K4 CO3 (2)
4. Examine the different situations that make the replacement of items necessary? K4 CO4 (2)
5. A manufacturing company processes 6 different jobs on two machines A and B. Processing times on A and B are given in the following table. K4 CO5 (2)

Job	1	2	3	4	5	6
Time on Machine A (in hrs)	5	16	6	3	9	6
Time on Machine B (in hrs)	8	7	11	5	7.5	14

Select a sequence of these jobs that will minimize the total elapsed time.

6. The cost of a machine is Rs. 6,100 and its scrap value is Rs. 100. The maintenance costs found from experience are as follows: K4 CO1 (5)

Year	1	2	3	4	5	6	7	8
Maintenance Cost (Rs.)	100	250	400	600	900	1200	1600	2000

Analyze when should the machine be replaced?

7. A readymade garments manufacturer has to process 7 items through two stages of production, viz., cutting and sewing. The time taken for each of these items at the different stages are given below in appropriate units: K4 CO2 (5)

Item	1	2	3	4	5	6	7
Process Time Cutting	5	7	3	4	6	7	12
Process Time Sewing	2	6	7	5	9	5	8

Identify an order in which these items are to be processed through these stages so as to minimize the total processing time. Also obtain the total elapsed time and the idle time for two processes.

8. Interpret the importance of Operations Research by taking any 3 real life applications. K5 CO5 (6)
9. 'Monte Carlo technique has been used to tackle a variety of problems involving stochastic situations and mathematical problems which cannot be solved with mathematical techniques and where physical experimentation with the actual system is impracticable'. Discuss. K5 CO3 (8)

PTO

10. A plant has a large number of similar machines. The machine breakdown or failure is random and independent. The shift incharge of the plant collected the data about the various machines breakdown times, the repair time required on hourly basis, and the record for the past 100 observations. This is shown below. K5 CO4 (8)

Time between recorded machine breakdowns (hours)	Probability	Repair time required (hours)	Probability
0.5	0.05	1	0.28
1	0.06	2	0.52
1.5	0.16	3	0.20
2	0.33		
2.5	0.21		
3	0.19		

For each hour that one machine is down due to being, or waiting to be repaired, the plant loses Rs 70 by way of lost production. A repairman is paid @Rs. 20 per hour.

Answer the following questions.

1. Simulate this maintenance system for 15 breakdowns.
2. How many repairmen should the plant hire for repair work?

11. Assess the factors affecting the performance of cold supply chain with respect to sustainability. K6 CO5 (8)