

# School of Basic and Applied Sciences

Mathematics  
ETE - Jun 2023

Time : 3 Hours

Marks : 50

## Sem II - MBS30T1002 - Operations Research

*Your answer should be specific to the question asked*

*Draw neat labeled diagrams wherever necessary*

1. Define artificial variables in LPP. K1 CO1 (2)
2. Construct network diagram for following activities:  
A< B, C; B<D; B, C<E; E<F; D, F<G; G<H K2 CO4 (2)
3. Define server utilization factor for M/M/C system. K2 CO3 (2)
4. When an ordering cost is increased to 4 times, the EOQ will be increased to how many times? K1 CO2 (2)
5. Discuss the difference between: Transportation Problems and Assignment Problems. K2 CO1 (2)
6. The production department of a company requires 3,600 kg of raw material for manufacturing a particular item per year. It has been estimated that the cost of placing an order is Rs 36 and the cost of carrying inventory is 25 per cent of the investment in the inventories. The price is Rs 10 per kg. Help the purchase manager to determine an ordering policy( economic order quantity and total optimal cost) for raw material . K3 CO2 (5)
7. Evaluate the mean number of customer in M/M/1 system. K3 CO3 (5)
8. Use Simplex method to maximize  $2x+y$   
s/t  $4x+3y \leq 12$ ;  $4x+y \leq 8$ ;  $4x-y \leq 8$ ;  $x, y \geq 0$  K4 CO3 (6)
9. Obtain optimal solution of the following transportation problem: K4 CO2 (8)

	D1	D2	D3	D4	Supply
S1	19	30	50	10	7
S2	70	30	40	60	9
S3	40	8	70	20	18
Demand	5	8	7	14	

10. Explain and derive the equations of continuous time birth and death process. K3 CO1 (8)
11. Find the critical path and calculate the slack time for the following network: K4 CO4 (8)

