

**GAP-036043**

Seat No. _____

B. Sc. (Sem. VI) (Mathematics) Examination**March / April – 2019****BSCSE - 606 : Operation Research - II**

Time : 3 Hours]

[Total Marks : 70

Instructions:

1. All the questions are compulsory.
2. Figure to the right side indicate marks.
3. Each sub questions carries equal weightage.
4. All notations are standard.

1. (a) Explain Economic order Quantity (EOQ) Model with finite replenishment rate. 7

OR

- (a) Explain Economic order Quantity (EOQ) Model with constant rate of demand.
- (b) A company uses rivets at a rate of 5000 kg per year, rivets costing Rs.2 per kg. It costs Rs.20 to place an order and the carrying cost of inventory is 10% per annum. How frequently should order for rivets be placed and how much? 7

OR

A product is to be manufactured on a machine. Ordering cost per order=Rs.30, purchase cost per unit=Rs.0.10, Inventory holding cost per unit per annum=Rs.0.05, production rate=1,00,000 units/year. Determine the economic manufacturing quantity.

2. (a) Explain the basic difference between PERT and CPM. 7

OR

- (a) Explain the terms in brief: (1) Events (2) Activities.
- (b) Consider the following information on the activities for a project. Draw the Network Diagram and find the critical path. 7

Activity	A	B	C	D	E	F	G	H	I	J	K	L
Immediate Predecessor	-	-	-	A	A	E	B	B	D,F	C	H,J	G,I,K
Duration	2	2	2	3	4	0	7	6	4	10	3	4

OR

Consider the following data regarding the project. Construct the project Network. Find Total float for each non-critical Activities.

Activity	A	B	C	D	E	F	G	H	I
Immediate Predecessor	-	A	B	B	C	D	C	E,F	G,H
Duration	5	7	2	3	1	2	1	3	10

3. (a) Explain the Dominance Principle. And rules of Dominance. 7

OR

- (a) Define Strategy and Explain the types of Strategy.

- (b) Solve the following 3×3 game by the method of oddments.

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		Player - B		
		B_1	B_2	B_3
Player - A	A_1	3	1	1
	A_2	1	1	5
	A_3	1	4	1

OR

Solve the following game.

		Player - B			
		B_1	B_2	B_3	B_4
Player - A	A_1	-1	2	3	0
	A_2	-4	-1	-1	0
	A_3	-1	1	1	-4
	A_4	4	-1	2	-7

4. (a) Explain Monte Carlo Simulation. Describe its Algorithm.

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OR

- (a) A company manufactures around 200 mopeds. Depending upon the availability of raw materials and other conditions, the daily production has been varying from 196 mopeds to 204 mopeds, whose probability distribution is given below.

Production/day	196	197	198	199	200	201	202	203	204
Probability	0.05	0.09	0.12	0.14	0.20	0.15	0.11	0.08	0.06

The finished mopeds are transported in a specially designed three storied lorry that can accommodate only 200 mopeds. Use 15 random numbers: 82, 89, 78, 24, 53, 61, 18, 45, 04, 23, 50, 77, 27, 54, 10 to simulate the process and find out:

- (i) What will be the average number of mopeds waiting in the factory?
(ii) What will be the average number of empty spaces on the lorry?
- (b) The occurrence of a rain in a city on a day is dependent upon whether or not it rained on the previous day. If it rained on the previous day, the rain distribution is:

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Event	No rain	1 cm rain	2 cm rain	3 cm rain	4 cm rain	5 cm rain
Probability	0.50	0.25	0.15	0.05	0.03	0.02

If it did not rain the previous day, the rain distribution is:

Event	No rain	1 cm rain	2 cm rain	3 cm rain
Probability	0.75	0.15	0.06	0.04

Simulate the city's weather for 10 days and determine by simulation the total days without rain as well as the total rainfall during the period. Use the random numbers 67, 63, 39, 55, 29, 78, 70, 06, 78 and 76 for simulation. Assume that for the first day of simulation, it had not rained the day before.

OR

A project consists of seven activities. The time for performance of each of the activities is a random variable with the respective probabilities given as:

Activity	Immediate processor	Time (in days)		and its probabilities		
A	-	3	4	5		
		0.20	0.60	0.20		
B	-	4	5	6	7	8
		0.10	0.30	0.30	0.20	0.10
C	A	1	3	5		
		0.15	0.75	0.10		
D	B,C	4	5			
		0.80	0.20			
E	D	3	4	5	6	
		0.10	0.30	0.30	0.30	
F	D	5	7			
		0.20	0.80			
G	E,F	2	3			
		0.50	0.50			

- Draw the network diagram and identify the critical path using the expected activity times.
- Simulate the project using random numbers: (68,99,57,57), (13,93,33,12), (09,18,49,31), (20,24,65,96), (73,22,92,86), (07,07,98,92) and (92,29,00,91) respectively for the activities A,B,C,D,E,F, and G. Find the critical path and project duration.
- Repeat the simulation for four times. Is the same path critical in all the simulation runs?

5. Answer the following in short: (any seven)

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- Define holding cost, shortage cost.
- Define ordering cost.
- Define lead time, Demand.
- What is the carrying cost in EOQ model with finite replacement rate if production rate = demand rate?
- Define total float, free float.
- Define Network.
- Define two person zero sum game.
- Given the following information, develop a network.

Activity	Immediate predecessor
A	-
B	-
C	A
D	B

- Solve the following game:

Player - B

	B_1	B_2	B_3	B_4
A_1	8	-2	9	-3
A_2	6	5	-6	8
A_3	-2	4	-9	5

Player - A