

**Bachelor of Computer Application (B.C.A.) Semester—IV Examination**

**OPERATIONS RESEARCH—II**

**Paper—IV**

Time : Three Hours]

[Maximum Marks : 50

- Note :—**(1) All questions are compulsory and carry equal marks.  
 (2) Draw neat and labelled diagrams wherever necessary.

**EITHER**

1. (A) For the game with pay off matrix determine optimum strategy and value of the game :

	<b>Player B</b>		
	1	2	
<b>Player A</b>	5	4	
	-7	9	5
	-4	-3	
	2	1	

- (B) Explain dominance rules with example. 5

**OR**

- (C) Explain Savage Criterion. 5

- (D) A Manager has a choice between :

- (i) A risky contract promising Rs. 7 lakhs with probability 0.6 and Rs. 4 lakhs with probability 0.4 and  
 (ii) A diversified portfolio consisting of two contracts with independent outcomes each promising Rs. 3.5 lakhs with probability 0.6 and Rs. 2 lakhs with probability 0.4

Construct decision tree for using EMV criteria. What is the decision using EMV criteria ? 5

**EITHER**

2. (A) Write rules for Network Construction. 5

- (B) Draw a network diagram for :

Project Activity	Preceding Activity	
A	—	
B	—	
C	—	
D	—	
E	A, B	
F	E	
G	F	
H	D	
I	G, H	
J	C, I	5

**OR**

- (C) Explain the basic difference between PERT and CPM. 5

(D) Draw the PERT network and find out expected project completion time :

Activity	Immediate Predecessor	Estimated duration		
		Optimistic	Most Likely	Pessimistic
A	–	1	1	7
B	–	1	4	7
C	–	2	2	8
D	A	1	1	1
E	B	2	5	14
F	C	2	5	8
G	D, E	3	6	15
H	F, G	1	2	3

5

**EITHER**

3. (A) What are the various costs associated with inventory ? Explain. 5  
 (B) Explain EOQ Model with constant rate of demand. 5

**OR**

- (C) A contractor has to supply 20,000 units per day. He can produce 30,000 units per day. The cost of holding a stock per unit is Rs. 3 per year and set up cost per run is Rs. 50. How frequently and of what size, the production runs be made ? 5  
 (D) Find the optimal order quantity for a product for which price breaks are as follows :

Quantity	Unit Cost (Rs.)
$0 \leq Q_1 < 500$	10.00
$500 \leq Q_2 < 750$	9.25
$750 \leq Q_3$	8.75

The monthly demand for the product is 200 units, the cost of storage is 2% of the unit cost and the cost of ordering is Rs. 350. 5

**EITHER**

4. (A) What are the elements of Queuing System ? 5  
 (B) In a railway marshalling yard, goods trains arrive at a rate of 30 trains per day. Assuming the inter-arrival time follows an exponential distribution and the service time distribution is also exponential with an average 36 minutes. Calculate the following :  
 (i) The mean queue size  
 (ii) The probability that the queue size exceeds 10  
 (iii) Expected waiting time in the system. 5

**OR**

- (C) What do you mean by queuing control ? 5  
 (D) A supermarket has two girls servicing at the counters. The customers arrive in a Poisson fashion at the rate of 12 per hour. The service time for each customer is exponential with mean 6 minutes. Find :  
 (i) The probability that an arriving customer has to wait for service.  
 (ii) The average number of customers in the system and  
 (iii) The average time spent by a customer in the super-market. 5

5. Attempt **ALL** :

- (A) Write rules for determining saddle point.  $2\frac{1}{2}$   
 (B) Give the iterative procedure of determining the critical path.  $2\frac{1}{2}$   
 (C) What is buffer stock ? How will you calculate buffer stock ?  $2\frac{1}{2}$   
 (D) Explain Kendal's notation for representing queuing models.  $2\frac{1}{2}$