NRT/KS/19/2234

Bachelor of Computer Application (B.C.A) Semester–IV Examination
OPERATIONS RESEARCH–II
Paper–IV

Time : 3 Hours]   [Maximum Marks : 50

N.B. :— (1) All questions are compulsory and carry equal marks.

(2) Draw neat and labelled diagrams wherever necessary.

EITHER

1. (A) State the rules for determining a saddle point.

Write down the conditions for :

(i) A game is said to be fair

(ii) A game is strictly determinable.   5

(B) Solve the following game using dominance properties.

Player B

		I	II	III	IV
	I	3	2	4	0
Player A	II	3	4	2	4
	III	4	2	4	0
	IV	0	4	0	8

5

OR

(C) Solve the following game graphically :

Player B

Player A $\begin{bmatrix} 3 & -3 & 4 \\ -1 & 1 & -3 \end{bmatrix}$ 5

(D) Explain decision tree with suitable example.   5

EITHER

2. (A) Define :

(i) Event

(ii) Activity

(iii) Looping

(iv) Dangling   5

(B) Draw the network and find the project completion time for following data :

Activity	Preceding Activities	Activity Duration (in days)
A	—	4
B	—	7
C	—	6
D	A, B	5
E	A, B	7
F	C, D, E	6
G	C, D, E	5

5

OR

(C) Explain different time estimates made for each activity for PERT Network. Also write formula for standard deviation and variance.   5

(D) State the differences between CPM and PERT.   5

EITHER

3. (A) Define order cycle. Explain types of inventory review system.   5

(B) Find the optimum order quantity for a product for which the price break are as follows :

Quantity	**Unit cost (Rs.)**
$0 \leq Q1 < 500$	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

OR

(C) A contractor has to supply 12000 bearings per day to an automobile manufacturer. He finds that, when he starts a production run, he can produce 25000 bearings per day. The cost of holding a bearing in stock for one year is Rs. 2 and the set-up cost of production run is Rs. 1800. How frequently should production run can be made ?   5

(D) Derive an EOQ formula for deterministic inventory problems with no shortages.   5

EITHER

4. (A) Explain operating characteristics of queuing system.   5

(B) Customer arrive at a sales counter managed by a single person according to a Poisson process with a mean rate of 20 per hours. The time required to serve a customer has an exponential distribution with a mean of 100 seconds. Find the average waiting time of a customer.   5

OR

(C) A barber shop has two barbers and three chairs for waiting customers. Assume that customer arrive in a Poisson fashion at a rate of 5 per hour and that each barber services customers according to an exponential distribution with mean of 15 minutes. Further, if a customer arrives and there are no empty chain in the shops he will leave. Find the steady-state probabilities. What is the probability that the shop is empty ? What is the expected number of customers in the shop ?   5

(D) Explain Kendall's notation for representing queuing models with transient state and steady states of the system.   5

5. (A) Define :

(i) Two person zero sum game

(ii) Value of the game   2½

(B) Write down the rules for network construction.   2½

(C) Write a note on Economic Order Quantity.   2½

(D) Explain Queuing system with a suitable diagram.   2½