

Roll No. ....

274-N

**B. Sc. (Part III) EXAMINATION, 2019**

(New Course)

(Vocational Course)

INFORMATION TECHNOLOGY

Paper Second

**(Operations Research and Optimization Techniques)**

Time : Three Hours ] [ Maximum Marks : 50

Note : Attempt questions from all Sections as directed.

Inst. : The candidates are required to answer only in serial order. If there are many parts of a question, answer them in continuation.

**Section—A**

**(Short Answer Type Questions)**

Note : All questions are compulsory. Each question carries 3 marks.

- (A) Write mathematical model for general transportation problem.
- (B) What are the situations where *or* techniques will be applied ?

(A-39) P. T. O.

[ 2 ]

274-N

- (C) Find out optimal solution of the following transportation problem by any method :

	D <sub>1</sub>	D <sub>2</sub>	D <sub>3</sub>	D <sub>4</sub>	a <sub>i</sub>
O <sub>1</sub>	1	2	1	4	30
O <sub>2</sub>	3	3	2	1	50
O <sub>3</sub>	4	2	5	9	20
b <sub>j</sub>	20	40	30	10	

- (D) Write short notes on the following :
  - Game
  - Strategy
  - Pay-off
- (E) What do you understand by arrival pattern in queuing system ?
- (F) Explain the project planning.

**Section—B**

**(Long Answer Type Questions)**

Note : Attempt any *two* questions. Each question carries 8 marks.

- Solve the following by Simplex method :

Maximize :

$$z = 7x_1 + 5x_2$$

Subject to :

$$x_1 + 2x_2 \leq 6$$

$$4x_1 + 3x_2 \leq 12$$

$$x_1, x_2 \geq 0.$$

(A-39)

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3. A truck company on a particular day has 4 trucks for sending material to 6 terminals. The cost of sending materials from some destination by different trucks will be different as given by the cost-matrix below. Find the assignment of 4 trucks to 4 terminals out of six at a minimum cost :

Terminal	Trucks			
	A	B	C	D
1	3	6	2	6
2	7	1	4	4
3	3	8	5	8
4	6	4	3	7
5	5	2	4	4
6	5	7	6	2

4. Explain the scope and application of OR.  
5. Find the initial basic feasible solution by Vogel's method :

	W <sub>1</sub>	W <sub>2</sub>	W <sub>3</sub>	W <sub>4</sub>	Capacity
F <sub>1</sub>	19	30	50	10	7
F <sub>2</sub>	70	30	40	60	9
F <sub>3</sub>	40	8	70	20	18
Demand	5	8	7	14	

**Section—C**

**(Long Answer Type Questions)**

Note : Attempt any two questions. Each question carries 8 marks.

6. Describe the structure of a queuing system with the help of diagram.

(A-39) P. T. O.

7. Write short notes on the following :  
(a) PERT and CPM  
(b) Network techniques in project management
8. A small project consists of seven activities for which the relevant data is given below :

Activity	Preceding 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

- (a) Draw network and find project completion time.  
(b) Calculate the three floats for each activity.
9. Explain the following :  
(i) Saddle point  
(ii) Zero-Sum game  
(iii) Mixed-strategy  
(iv) Optimal strategy