

(i) Printed Pages: 4

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(ii) Questions : 10

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Master of Commerce 2nd Semester
(2054)

OPERATIONS RESEARCH

(Same for USOL Candidates)

Paper : M.C.-205

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :—Attempt any **FIVE** questions in all, selecting at least **ONE** question from each unit.

UNIT—1

1. What are the essential characteristics of operations research ?
Mention different phases in an operation research study.
Explain the role of computers in this field.
2. “Linear programming is one of the most frequently and successfully applied mathematical approaches to managerial decision making”. Comment.
3. Following data are available for a firm which manufactures three items A, B and C :

Product	Time required (in hours)		Profit
	Assembly	Finishing	
A	10	2	800
B	4	5	600
C	5	4	300
Firm's capacity	2000	1009	

Express the above data in the form of linear programming problem to maximize the profit from the production and solve it by simplex method.

16 marks each

UNIT—2

4. A leading firm has three auditors. Each auditor can work up to 160 hours during the next month, during which time three projects must be completed. Project 1 will take 130 hours, project 2 will take 140 hours and project 3 will take 160 hours. The amount per hour that can be billed for assigning each auditor to each project is given in the following table :

Auditor	Project		
	1 (Rs.)	2 (Rs.)	3 (Rs.)
1	1200	1500	1900
2	1400	1300	1200
3	1600	1400	1500

Solve the transportation problem and find out the maximum total billings during the next month.

5. A company has four vehicles to be run on four routes. The distance (kms) for each route and the kms run per litre of diesel for each vehicle in each of the routes are given below. Drivers are associated with the trucks :

		Kms per litre in the route of			
		I	II	III	IV
Vehicles	A	4.0	5.0	5.0	3.0
	B	4.5	6.0	5.0	3.5
	C	5.0	5.5	6.0	4.0
	D	4.8	5.8	5.5	3.0
	Distance covered per day (Kms)	200	300	250	150

Which vehicle should be assigned to which route in order to minimize the total consumption of diesel by all the four vehicles ?

6. What do you understand by transportation problem ? Explain in brief three methods of obtaining initial basic feasible solution for transportation problem. 16 marks each

UNIT—3

7. A computer has 1000 electronic tubes maximum life of which is 500 hours. The probability of failure at different periods of time is as follows :

Period (100 hours)	Age at failure (hours)	Probability of failure
1	0–100	0.10
2	101–200	0.26
3	201–300	0.35
4	301–400	0.22
5	401–500	0.07

Replacement of an individual tubelight failing during service costs Rs. 60 per tube, while in case of group replacement at fixed interval it is Rs. 15 per tube :

- (i) How the replacement should be done (a) individually or (b) in group.
- (ii) When the tubes should be replaced ?
8. Compare and contrast CPM and PERT. Under what circumstances would you use PERT as opposed to CPM in project management ? Discuss with examples.

16 marks each

UNIT—4

9. Obtain the optimal strategies through graphical method for both players and the value of the game for zero sum two person game where pay off matrix for player A is given below :

		Player A					
		I	II	III	IV	V	VI
	Player B						
	I	1	3	-1	4	2	6
	II	-3	5	6	2	3	0

10. Explain the meaning of simulation. What are the reasons for using simulation ? Explain the applications of simulation.

16 marks each