

Roll No.

Total No. of Pages : 03

Total No. of Questions : 07

B.Com. (2013 to 2017 Batch) (Sem.-3)

OPERATION RESEARCH

Subject Code : BCOP-304

M.Code : 22016

Time : 3 Hrs.

Max. Marks : 60

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.**
2. **SECTION-B contains SIX questions carrying TEN marks each and students have to attempt any FOUR questions.**

SECTION-A

1. Answer briefly :

- a. Define operations research
- b. Define unit penalties
- c. Hungarian method
- d. Limitation of dominance method in games theory
- e. Importance of EOQ model
- f. PERT vs. CPM
- g. Define free float
- h. Saddle point
- i. Duality vs. Primal
- j. Define one price break

SECTION-B

2. Solve the following LPP :

$$\text{Max } Z = 2X_1 + 4X_2$$

Sub to $2X_1 + X_2 \leq 18$

$$3X_1 + 2X_2 \geq 30$$

$$X_1 + 2X_2 = 26$$

whereas $X_1, X_2 \geq 0$

3. Solve the following transportation problem to maximize profit and give criteria for optimality :

Profit (Rs. Unit)

Origin	Destination				Supply
	1	2	3	4	
A	40	25	22	33	200
B	44	35	30	30	60
C	38	38	28	30	140
Demand	80	40	120	60	

4. The data for a project are :

Activity	Preceding activity	Time (in weeks)		Cost in (Rs.)	
		Normal	Crash	Normal	Crash
A	--	3	2	18,000	19,000
B	--	8	6	600	1,000
C	B	6	4	10,000	12,000
D	B	5	2	4,000	10,000
E	A	13	10	3,000	9,000
F	A	4	4	15,000	15,000
G	F	2	1	1,200	1,400
H	C,E,G	6	4	3,500	4,500
I	F	2	1	7,000	8,000

- Draw a project network and find the critical path?
 - If a deadline of 17 weeks is imposed for completion of the project, what activities will be crashed, what would be the additional costs and what would be the critical activities of the network after crashing?
5. Solve the following salesman problem given by the following data :
- $C_{12} = 20$, $C_{13} = 4$, $C_{14} = 10$, $C_{23} = 5$, $C_{34} = 6$, $C_{25} = 10$, $C_{35} = 6$, $C_{45} = 20$, where $C_{ij} = C_{ji}$ and there is no route b/w cities i & j , if a value of C_{ij} is not known.

6. Solve the following game :

Player A	Player B		
		I	II
	I	2	5
	II	2	3
	III	3	2
	IV	-2	8

7. Following data regarding processing times of some jobs on three machines I, II and III. The order of processing is I, II, III. Determine the sequence that minimizes the total elapsed time required to complete the jobs. Also evaluate I and the idle time of II and III.

Jobs	A	B	C	D	E	F	G
I	3	8	7	4	9	8	7
II	4	3	2	5	1	4	3
III	6	7	5	11	5	6	12

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.