

B.E. CHEMICAL ENGINEERING 4 TH YEAR 1 ST SEMESTER EXAMINATION, 2018

OPERATIONS RESEARCH

ANSWER ANY FOUR QUESTIONS

ALL QUESTIONS CARRY EQUAL MARKS

ASSUME MISSING DATA, IF ANY

REFERENCE NO.:EX/CHE/T/414H/2018

TOTAL MARKS: 100

TIME: 3 HRS

1. A Company has three factories at Amethi, Baghpat and Gwalior and four distribution centres at Allahabad, Bombay, Kolkata and Delhi. With identical cost of production at the three factories the only variable cost involved is transportation cost. The production at the three factories is 5000 tonnes, 600 tonnes and 2500 tonnes respectively. The transportation costs per tonne from different factories to different centres are given below:

	Distribution Centre			
Factory	Allahabad	Bombay	Kolkata	Delhi
Amethi	3	2	7	6
Baghpat	7	5	2	3
Gwalior	2	5	4	5

Suggest the optimum transportation schedule and find the minimum cost of transportation.

2. A methods engineer wants to assign four new methods to three work centres. The assignment of the new methods will increase production and they are given below. If only one method can be assigned to a work centre, determine the optimum assignment.

	Increase in production (unit)		
	Work centres		
Methods	A	B	C
1	10	7	8
2	8	9	7
3	7	12	6
4	10	10	8

3. An oil company may bid for only one of the two centres for oil drilling in two different areas. It is estimated that a profit of Rs 3,00,000 would be realized from the first field and Rs 4,00,000 from the second field. These profit amounts have been determined ignoring the costs of bidding which amount to Rs 2,500 for the first field and Rs 500 for the field. Which oil field the company should bid for if the probability of getting contract for the first field is 0.6? The probability of bidding for the first field is 0.3 and that of the second field is 0.4.

4. Two breakfast food manufacturers, ABC and XYZ are competing for an increased market share. The pay-off matrix, shown in the following table, show the increase in market share of ABC and decrease in market share of XYZ.

		XYZ		
ABC	Give coupons	Decrease price	Maintain present strategy	Increase advertising
Give coupons	2	-2	4	1
Decrease price	6	1	12	3
Maintain present strategy	-3	2	0	6
Increase advertising	2	-3	7	1

Simplify the problem by the rule of dominance and find optimum strategies for both manufacturers and the value of the game.

5. A small maintenance project consists of the following twelve jobs whose precedence relations are identified with node numbers:

Job(i,j)	(1,2)	(1,3)	(1,4)	(2,3)	(2,5)	(2,6)
Duration(days)	10	4	6	5	12	9
Job(i,j)	(3,7)	(4,5)	(5,6)	(6,7)	(6,8)	(7,8)
Duration(days)	12	15	6	5	4	7

- i) Draw an arrow diagram representing the project
- ii) Calculate earliest start, earliest finish, latest start, latest finish time for all the jobs
- iii) Find the critical path and project duration.