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Name.....

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Reg. No.....

SECOND SEMESTER M.Com. DEGREE EXAMINATION, JUNE 2014

(CUCSS)

MC 2C 09—OPERATIONS RESEARCH

(2010 Admissions)

Time : Three Hours

Maximum : 36 Weightage

Part A

Answer all questions.

Each question carries 1 weightage.

1. State the conditions for an unbounded solution of a LPP.
2. What is the use of MODI method?
3. How do you convert an unbalanced transportation problem into a balanced one?
4. Distinguish between sequencing and scheduling.
5. State the rule of dominance in game theory.
6. Explain the significance of simulation in model building. (6 × 1 = 6 weightage)

Part B

Answer any six questions.

Each question carries 3 weightage.

7. An animal feed company must produce at least 200 Kgs. of mixture consisting of ingredients X1 and X2 daily. X1 costs Rs.3/- per Kg and X2 costs Rs.8/- per Kg. No more than 80 Kg of X1 can be used and at least 60 Kg of X2 must be used. Formulate a mathematical model to the problem
8. A manufacturer has two products P1 and P2 both of which are produced in two steps by machines M1 and M2. The process times per hundred for the products on the machines are

	M1	M2	Contribution (per 100 units)
P1	4	5	10
P2	5	2	5
Available hours	100	80	

Turn over

The manufacturer is in a market upswing and can sell as much as he can produce of both products. Formulate the mathematical model and determine the optimal product mix.

9. ABC limited has three production shops supplying a product to five warehouses. The cost of product varies from shop to shop and cost of transportation from one shop to a warehouse also varies. Each shop has a specific production capacity and each warehouse has certain amount of requirement. The cost of production is as given below.

		Ware house					Capacity
		1	11	111	1V	V	
Shop	A	6	4	4	7	5	100
	B	5	6	7	4	8	125
	C	3	4	6	3	4	175
		60	80	85	105	70	

The costs of manufacture of the product at different shops are

Shop	Variable cost	Fixed cost
A	14	7,000
B	16	4,000
C	15	5,000

Find the optimum quantity to be supplied from each shop to different warehouses at minimum total cost.

10. With suitable example illustrate PERT and CPM.

11. With a suitable methodology how will you help the following sales person?

		To city				
		1	2	3	4	5
From city	1	----	10	25	25	10
	2	1	---	10	15	2
	3	8	9	----	20	10
	4	14	10	24	----	15
	5	10	8	25	27	----

12. What are the steps involved in simulation? Explain its advantages and disadvantages.

13. Explain the various steps in solving the travelling salesman's man problem.

14. Egg contains 6 units of vitamin A per gram and 7 units of vitamin B per gram and cost 12 paise per gram. Milk contains 8 units of vitamin A per gram and 12 units of vitamin B per gram, and costs 20 paise per gram. The daily minimum requirement of vitamin A and vitamin B are 100 units and 120 units respectively. Find the optimal product mix. (6 × 3 = 18 weightage)

Turn over

Part C

Answer any two questions.

Each question carries 6 weightage.

15. Solve the problem under simplex method

$$Z = 5x_1 + 3x_2$$

Subject to $x_1 + x_2 \leq 2$

$$5x_1 + 2x_2 \leq 10$$

$$3x_1 + 8x_2 \leq 12$$

16. How can you explain the theoretical frame for simplex method?

17. Solve the following transportation problem whose cost matrix availability at each plant and requirement at each warehouse are given as follows.

	Ware house				Availability
	190	300	500	100	70
Plant	700	300	400	600	90
	400	100	600	200	180
Requirement	50	80	70	140	

Analyze the solution by VAM

(2 x 6 = 12 weightage)