SECOND SEMESTER M.Com. DEGREE EXAMINATION, JUNE 2015

(CUCSS)

Operations Research

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 X_1 and X_2 daily. X_1 costs Rs.3/- per Kg and X_2 costs Rs.8/- per Kg. No more than 80 Kg of X_1 can be used and at least 60 Kg of X_2 must be used. Formulate a mathematical model to the problem.

8. A manufacturer has two products P_1 and P_2 both of which are produced in two steps by machines M_1 and M_2. The process times per hundred for the products on the machines are :

	M_1	M_2	Contribution (per 100 units)
P_1	4	5	10
P_2	5	2	5
Available hours	100	80	

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.

Turn over

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

Ware house

Shop	I	II	III	IV	V	Capacity
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 min 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

From city	1	2	3	4	5
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 pa gram. Milk contains 8 units of vitamin A per gram and 12 units of vitamin B per gram, an 20 paise per gram. The daily minimum requirement of vitamin A and vitamin B are 100 uni 120 units respectively. Find the optimal product mix.

(6 × 3 = 18 weig

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 $x_1 + x_2 \le 2$

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

$$3x_1 + 8x_2 \le 12.$$

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.

$(2 \times 6 = 12$ weightage)