C 83760 (Pages 3) Name.....

Reg. No.....

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** *qusetions.*
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 x 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 :

	M1	M_2	Contribution (per 100 units)
P1	4	5	10
P2	5	2	5
Available hours	100	80	

The manufacturer is in a market upswing and can sell as much as he can produce of o 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 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					
		I	II	III	IV	V	
							Capacity
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 x 3 = 18 weightage)

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)