Reg. No ..... Name **18P256**

M. COM DEGREE END SEMESTER EXAMINATION - APRIL 2018

SEMESTER 2 : COMMERCE

COURSE : **16P2COMT10 ; OPERATIONS RESEARCH**

(Common for Regular - 2017 Admission & Supplementary - 2016 Admission)

Time : Three Hours Max. Marks: 75

Section A
Answer any 10 (2 marks each)

1. Define Management Science.
2. What do you mean by Management Opitmisation Techniques?
3. An animal feed company must produce at least 200 kgs of a mixture consisting of ingredients X1 and X2 daily. X1 costs Rs. 3 per kg and X2 Rs. 8 per kg. No more than 80kg of X1 can be used atleast 60 kgs of X2 must be used. Formulate the mathematical model to the problem.
4. What are travelling salesmen problems?
5. What is zero sum game?
6. What do you mean by minimax and maximin principle?
7. What is average length of queue?
8. What is a mixed strategy?
9. What is network analysis? When is it used?
10. Distinguish between 'slack' and 'float'.
11. What is critical path method?
12. What is float?

(2 x 10 = 20)

Section B
Answer any 5 (5 marks each)

13. Give main characteristics of O.R
14. What is a feasible region? What will be the shape of a feasible region?
15. A manufacturer of a line of patent medicines is preparing a production plan on medicines A and B. There are sufficient ingredients available to make 20,000 bottles of A and 40,000 bottles of B but there are only 45,000 bottles into which either of the medicines can be put. Furthermore, it takes 3 hours to prepare enough materials to fill 1,000 bottles of B and there are 66 hours available for the operation. The profit is Rs. 8 per bottle of A and Rs. 7 per bottle of B. Formulate the problem as a liner programming problem.
16. Find the initial feasible solution to the transportation problem given below, by North West Corner Rule

	Destination			
Origin	D1	D2	D3	**Supply**
O1	2	7	4	**5**
O2	3	3	1	**8**
O3	5	4	7	**7**
tO4	1	6	2	**14**

Demand	**7**	**9**	**18**	

17. Determine the basic feasible solution of the transportation problem using lowest cost entry method.

	destinations				
	A	B	C	D	supply
1	1	5	3	3	34
2	3	3	1	2	15
3	0	2	2	3	12
4	2	7	2	4	19
DEMAND	21	25	17	17	

18. What is maximax decision criterion?
19. What is Harwicz alpha criterion?
20. Highlight the difficulties in network techniques.

(5 x 5 = 25)

Section C
Answer any 3 (10 marks each)

21. Comment on the following statements:

I. O.R. is the art of winning war without actually fighting it.
II. O.R. is the art of finding bad answers where worse exits.

22. Solve graphically the following problems:

Maximize $Z = 3X_1 + 5X_2$

Subject to $X_1 + X_2 \leq 2000$

$X_1 + X_2 \geq 1500$

$X_1 \geq 600$

$X_1 , X_2 \geq 0$

23. A multinational company has three manufacturing plants A,B and C and two markets X and Y. Production cost at A ,B and C is 1500,1600 and 1700 per piece respectively. Selling prices in X and Y are Ra.4400 and Rs.4700 respectively. Demands in X and Y are 3500 and 3600 pieces respectively. Production capacities at A, B and C are 2000, 3000 and 4000 pieces respectively. Transportation cost are shown in the adjacent matrix. Solve this so as to maximise the profit.

	X	y
A	1000	1500
B	2000	3000
C	1500	2500

24. A food products company is planning the introduction of a revolutionary new product with new packing to replace the existing product at much higher price (S_1) or a moderate change in the composition of the existing product with a new packaging at a small increase in price (S_2) or a small change in the composition of the existing except the word, 'New' with a negligible increase in the price (S_3). The three possible states of nature of events are (i) high increase in sales (N_1), (ii) no change in sales (N_2), (iii) decrease in sales (N_3). The marketing department of the company worked out the pay offs in terms of yearly new profits for each of the strategies on these events. This is represented in the following table.

Payoffs			
	States of nature		
Strategies	N1	N2	N3

S1	700	300	150
S2	500	450	0
S3	300	300	300

Which strategy should the executive concerned choose on the basis of (a) Maximin Criterion (b) Maximax Criterion (c) Minimax Regret criterion (d) Laplace Criterion

25. For the following data draw a network. Find the slack time of activities after calculating earliest expected time and the allowable time of all events. Find the critical path.

Activity	Duration	Activity	Duration
1-2	5	5-9	3
1-3	8	6-10	5
2-4	6	7-10	4
2-5	4	8-11	9
2-6	4	9-12	2
3-7	5	10-12	4
3-8	3	11-13	1
4-9	1	12-13	7

(10 x 3 = 30)