Name..Reg. No...

M. COM. DEGREE END SEMESTER EXAMINATION APRIL 2017
SEMESTER – 2: COMMERCE
COURSE: 16P2COMT10 –: OPERATIONS RESEARCH
(For Regular - 2016 admission)

Time: Three Hours
Max. Marks: 75

SECTION A
Answer **any Ten** questions. Each carries *Two* marks.

1. Examine the significance of dummy activity in network analysis.
2. What is operations research?
3. What do you mean by constrains in linear programming?
4. What is a decision variable?
5. What do you mean by a non-degenerate solution?
6. What is an unbalanced assignment problem?
7. What is CPM in network analysis?
8. What is the formula for calculating expected time of each activity?
9. What is traffic intensity in queuing theory?
10. What is saddle point?
11. What is a decision tree?
12. What is roll back technique?
(2 × 10 = 20)

SECTION B
Answer **any five** questions. Each question carries *five* marks.

13.   Enumerate the steps involved in the formulation of a linear programming problem.
14.   What are the conditions that must exist in a simplex table to establish the existence of an   alternative solution? No feasible solution?
15.   Compare and contrast CPM and PERT?
16.   X Ltd. has two products Rice and Wheat. To produce one unit of Rice, two units of material X and four units of material Y are required. To produce one unit of Wheat, three units of material X and two units of material Y are required. At least 16 units of each material must be used in order to meet committed sales of Rice and Wheat. Due to moderate marketing facilities not more than eight units of product Wheat can be sold. Cost per unit of material X and material Y are Rs.2.50 and Re.0.25 respectively. The selling price per unit of Rice and Wheat are Rs.12 and Rs.16 respectively.
    a)   Formulate mathematical model
    b)   Solve it for maximum contribution by graphical method

17. A project is composed of 7 activities, whose time estimates are listed in the table below.

Activity	Estimated Duration (weeks)		
(i---j)	Optimistic	More likely	Pessimistic
1---2	1	1	7
1--3	1	4	7
1—4	2	2	8
2—5	1	1	1
3—5	2	5	14
4--6	2	5	8
5--6	3	6	15

a) Draw the network diagram of the activities in the project.
b) Find the expected duration and variance for each activity. What is the expected project   length?

18. A company has four machines that are to be used for three jobs. Each job can be assigned to
one and only one machine. The cost of each job on each machine is given in the following table.

	Machine W	Machine X	Machine Y	Machine Z
Job A	18	24	28	32
Job B	8	13	17	18
Job C	10	15	19	22

What are the job assignment pairs that shall minimize the cost?

19. A super market has only one cashier. During rush hours, customers arrive at a rate of 20
customers per hour. The average number of customers that can be handled by a cashier is 24
per hour. Assuming the conditions for use of single channel queuing model, Find out:

A) Probability that cashier is idle.
B) Average number of customers in the queue.   (5 x 5 = 25)

SECTION   C
Answer **any three** questions. Each carries *Ten* marks

20. Examine the characteristics of operations research. Explain how and why operation research
methods have been valuable in aiding executive decisions.

21. An advertising agency wishes to reach two types of audiences: Customers with annual income greater than Rs. 15,000 (target audience A) and customers with annual income less than Rs.15000 (target audience B). The total advertising budget is Rs.2, 00,000. One programme of TV advertising costs Rs.50,000; one programme on radio advertising costs Rs.20,000. For contract

reasons, at least three programmes ought be on TV, and the number of radio programmes must be limited to five. Surveys indicate that a single TV programme reaches 4,50,000 customers in target audience A and 50,000 in target audience B. One radio programme reaches 20,000 in   target audience A and 80,000 in target audience B. Using simplex method determine the media
 mix to maximize the total reach .

22. From the following information, find the basic feasible solution

	Ware house 1	Ware house 2	Warehouse 3	Warehouse 4	Supplies
Factory 1	48	60	56	58	140
Factory 2	45	55	53	60	260
Factory 3	50	65	60	62	360
Demand	200	320	250	210	

Cell entries indicate unit transportation costs

23. From the following pay off matrix for players A &B, obtain the optimum strategies for A &B and   determine the value of the game.

		PLAYER B			
		I	II	III	IV
PLAYER A	V				
	1	2	4	3	3	4
	2	5	6	3	7	8
	3	6	7	9	8	7
	4	4	2	8	4	3

24. An investor is given the following investment alternatives and percentage rates of return.

	States of nature (Market conditions)		
	Low	Medium	High
Regular shares	7%	10%	15%
Risky shares	-10%	12%	25%
Property	-12%	18%	30%

Over the past 300 days, 150 days have been medium market conditions and 60 days have had high market increases. On the basis of these data, state the optimum investment strategy for the investment.

(10 x 3 = 30)

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