

15U445

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Name: .....

Reg.No.....

**FOURTH SEMESTER B.B.A. DEGREE EXAMINATION, MAY 2017**

(CUCBCSS-UG)

**CC15U BB4 C04 – MANAGEMENT SCIENCE**

(Complementary Course)

(2015 Admission)

Time: Three Hours

Maximum: 80 Marks

**Part A**

*(Answer all questions. Each carries 1mark)*

1. .... is called as certain limitations on the resources, that limit the degree to which an objective can be achieved
2. .... is a scientific approach to problem solving for executive management
3. Sum of the gains and losses equals zero, then the game is said to be .....
4. In ..... three estimates are used to form a weighted average of the expected completion time of each activity based on probability distribution of completion times.
5. .... is the length of time to which a non critical activity and/or an event can be delayed or extended without delaying the total project completion time.

**Choose the correct answer**

6. Decision variables are .....  
a) Controllable b) Uncontrollable c) Parameters d) None of the above
7. The quantitative approach to decision analysis is a .....  
a) Logical approach b) Rational approach c) Scientific approach d) All of the above
8. Which of the following criterion is not used for decision making under uncertainty?  
a) Maxmin b) Maximax c) Minimax d) Minimize expected loss
9. The slack for an activity is equal to .....  
a) LF-LS b) EF-ES c) LS-ES d) None of the above
10. When the total supply is equal to total demand in a transportation problem, the problem is said to be .....  
a) Balanced b) Unbalanced c) Degenerate d) None of the above

**(1x1=10 marks)**

**Part B**

*(Answer any 8 questions. Each carries 2 marks)*

11. What is the role of Operation Research in decision making?
12. What is meant by the term 'feasible region'?
13. Explain the assumptions of LPP in management?

**(1)**

**Turn Over**

14. A company sells two different products A and B, making a profit of Rs 40 and Rs 30 per unit on them respectively. They are produced in a common production process and are sold in two different markets. The production process has a total capacity of 30,000 man hours. It takes 3 hours to produce a unit of A and one hour to produce a unit of B. The market has been surveyed and company officials feel that the maximum number of units of A can be sold is 8000 units and that of B is 12000. Subject to these limitations products can be sold in any combination. Formulate this problem as an LP model to maximize profit.

15. Solve graphically for the following problem

$$\text{Min } Z = 4X_1 - 2X_2$$

$$\text{Subject to } X_1 + X_2 < 14$$

$$3X_1 + 2X_2 > 36$$

$$X_1, X_2 > 0$$

16. An assembly is to be made from two parts X and Y. Both parts must be turned on a lathe and Y must be polished whereas X need not be polished. The sequence of activities together with their predecessor is given below.

Activity	Description	Predecessor Activity
A	Open the work order	—
B	Get material for X	A
C	Get material for Y	A
D	Turn X on lathe	B
E	Turn Y on lathe	B, C
F	Polish Y	E
G	Assemble X and Y	D, F
H	Pack	G

Draw the network diagram

17. Compare and contrast PERT and CPM

18. Find the initial basic feasible solution to the transportation problem given below, by Vogel's approximation method.

Plants	Distribution centre				Supply
	D1	D2	D3	D4	
P1	2	3	11	7	6
P2	1	0	6	1	1
P3	5	8	15	9	10
Demand	7	5	3	2	

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19. A firm manufacturer three types of products. The fixed and variable costs are given below:

	Fixed cost( Rs)	Variable Cost per Unit(Rs)
Product A	25,000	12
Product B	35,000	9
Product C	53,000	7

The likely demand (units) of the products is given as, poor demand is 3,000, moderate demand is 7,000, and high demand is 11,000. If the sale price of each type of product is Rs. 25, then prepare the payoff matrix.

20. Explain briefly the three methods of initial feasible solution for transportation problems

(8x2=16 marks)

**Part C**

(Answer any 6 questions. Each carries 4 marks.)

21. Discuss the advantage and limitations of operations research

22. Describe briefly the applications of Operations Research in managerial decision making.

Give suitable examples

23. Use the graphical method to solve the following linear programming problem.

$$\text{Max. } Z=2X_1+3X_2$$

Subject to the constraints

$$X_1 + X_2 \leq 30$$

$$X_2 > 3$$

$$0 \leq X_2 \leq 12$$

$$0 \leq X_1 \leq 20$$

$$X_1 - X_2 \geq 0 \text{ and } X_1, X_2 \geq 0$$

24. Explain the difference between expected opportunity loss and expected value of perfect information.

25. "PERT takes care of uncertain durations" "how far is this statement correct? explain with reasons.

26. Vitamin A and B are found in foods F1 and F2. One unit of food F1 contains three units of vitamin A and four units of vitamin B. One unit of food F2 contains six units of vitamin A and three units of vitamin B. One unit of food F1 and F2 costs Rs 4 and 5 respectively. The minimum daily requirement for a person of vitamins A and B is 80 and 100 units respectively. Assuming that anything in excess of the daily minimum requirement of A and B is not harmful, formulate this problem as an LP model to find out the optimum mixture of food F1 and F2 at the minimum cost which meets the daily minimum requirement of vitamins A and B.

(3)

Turn Over

27. Solve the following LPP graphically

$$\begin{aligned} \text{Min. } Z &= 20X_1 + 10X_2 \\ \text{Subject to } X_1 + 2X_2 &\leq 40 \\ 3X_1 + X_2 &\geq 30 \\ 4X_1 + 3X_2 &\geq 60 \text{ and} \\ X_1, X_2 &\geq 0 \end{aligned}$$

28. What is a game in game theory? What are the properties of a game?

(6x4=24 marks)

**Part D**

(Answer any Two questions carries 10 marks.)

29. What is meant by the term “feasible” region? Why this must be a well defined boundary for maximization problem.

30. A small scale manufacturer has production facilities for producing two different products. Each of these products requires three different operations: grinding, assembly, and testing. Product I requires 15, 20, 10 minutes to grind assemble and test, respectively, where as product II requires 7.5, 40, 45 minutes for grinding , assembling and testing. The production run calls for at least 7.5 hours of grinding time, at least 20 hours of assembly and at least 15 hours of testing time. If product I costs Rs. 60 and Product II costs Rs 90 to manufacture, determine the number of units of each product the firm should produce in order to minimize the cost of operation.

31. A project has the following time schedule

Activity:	1-2	1-3	1-4	2-5	2-6	2-7	4-9	6-9	7-8	8-10	9-10
Duration (in days)	6	2	13	4	9	2	6	3	4	10	5

Construct network and compute (1) EST, LST ,EFT and LFT of the activities (2) Total float for each activity (3) Critical path and its duration.

(2x15=30 marks)

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