C 21208 (Pages : 5) Name.....

Reg. No.....

FOURTH SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION
APRIL 2022

B.B.A.

BBA IVC 04—MANAGEMENT SCIENCE

(2014—2018 Admissions)

Time : Three Hours Maximum : 80 Marks

Part I

Answer **all** *questions.*
Each question carries 1 *mark.*

1. What have been constructed from OR problems an methods for solving the models that are available in many cases ?

   a) Scientific Models. b) Algorithms.

   c) Mathematical Models. d) None of the above.

2. Which of the following is not the phase of OR methodology ?

   a) Formulating a problem. b) Constructing a model.

   c) Establishing controls. d) Controlling the environment.

3. Feasible solution satisfies :

   a) Only constraints.

   b) Only non-negative restriction.

   c) [a] and [b] both.

   d) [a], [b] and Optimum solution.

4. Pick up the incorrect statement from the following :

   a) The activity which consumes maximum time, is called a node.

   b) The activity is the time consuming part of a project.

   c) The beginning and end of a job, are called events.

   d) Logically and sequentially connected activities and events for man at work.

Turn over

5. In a Transportation Problem, if the number of non-negative independental location is ———— —than $m + n - 1$.

   a) Equivalent. b) Greater.

   c) Less. d) None of the above.

6. The artificial activity which indicates that an activity following it, cannot be started unless the preceding activity is complete, is known as :

   a) Free float. b) Event.

   c) Dummy. d) Constant.

7. Which of the following is a method for improving an initial solution in a ———— transportation problem ?

   a) Northwest-corner rule. b) Intuitive lowest-cost.

   c) Southeast-corner rule. d) Stepping-stone

8. In graphical representation the bounded region is known as ————.

   a) Solution. b) Basic solution.

   c) Feasible solution. d) Optimal.

9. In game theory, a situation in which one firm can gain only what another firm loses is called a :

   a) Nonzero-sum game. b) Prisoners' dilemma.

   c) Zero-sum game. d) Cartel temptation.

10. The dummy source or destination in a transportation problem is added to :

    a) Satisfy rim conditions.

    b) Prevent solution from becoming degenerate.

    c) Ensure that total cost does not exceed a limit.

    d) None of the above.

(10 × 1 = 10 marks)

Part II (Short Essay Questions)

Answer any **eight** *questions.*
Each question carries 2 *marks.*

11. What are Iconic models ?

12. Explain application of transportation technique.

13. Explain hurwicz alpha criterion.

14. What is Decision Tree ?

15. Explain EOL.

16. What is linear programming problems ?

17. What is feasible solution ?

18. What do you mean by pure strategy ?

19. Explain the term CPM.

20. What is critical activity ?

(8 × 2 = 16 marks)

Part III

Answer any **six** *questions.*
Each question carries 4 *marks.*

21. Discuss the important Operation Research techniques.

22. State the uses of network techniques for the management.

23. Discuss some methods which are useful for decision making under uncertainty.

24. Explain (a) Pay-off ; (b) Value of the Game ; and (c) Saddle point.

25. Write a note on : (a) Total float ; (b) Free float ; and (c) Independent float.

26. For a project following time estimates are given. Prepare network and find project duration. Also find variance of the project :

Activity	Preceeding	t_o	t_p	t_m
A	—	2	10	3
B	—	2	4	3
C	A	1	3	2
D	A	4	14	6
E	B	4	12	5
F	C	3	5	4
G	D, E	1	7	1

Turn over

27. Use the graphical method to solve the following LP problem :

Minimize $Z = 3x_1 + 2x_2$
subject to the constraints
$5x_1 + x_2 \geq 10$,
$x_1 + x_2 \geq 6$,
$x_1 + 4x_2 \geq 12$
and $x_1, x_2 \geq 0$.

28. Determine an initial basic feasible solution to the following transportation problem by using the North-West corner rule, where O_i and D_j represent i^{th} origin and j^{th} destination, respectively :

		Destination				
		D_1	D_2	D_3	D_4	Supply
Origin	O_1	6	4	1	5	14
	O_2	8	9	2	7	16
	O_3	4	3	6	2	5
	Demand	6	10	15	4	

(6 × 4 = 24 marks)

Part IV (Long Essays)

Answer any **two** *questions.*
Each question carries 15 *marks.*

29. A firm makes two products X and Y, and has a total production capacity of 9 tonnes per day. Both X and Y require the same production capacity. The firm has a permanent contract to supply at least 2 tonnes of X and at least 3 tonnes of Y per day to another company. Each tonne of X requires 20 machine hours of production time and each tonne of Y requires 50 machine hours of production time. The daily maximum possible number of machine hours is 360. All of the firm's output can be sold. The profit made is Rs. 80 per tonne of X and Rs. 120 per tonne of Y. Formulate this problem as an LP mode and solve it by using graphical method to determine the production schedule that yields the maximum profit.

30. A project has the following times schedule :

Activity	Times in weeks	Activity	Times in weeks
(1–2)	4	(5–7)	8
(1–3)	1	(6–8)	1
(2–4)	1	(7–8)	2
(3–4)	1	(8–9)	1
(3–5)	6	(8–10)	8
(4–9)	5	(9–10)	7
(5–6)	4		

Construct the network and compute :

1 T_E and T_L for each event.

2 Float for each activity.

3 Critical path and its duration.

31. The following is a pay-off table :

Event (State of nature)

Action	E_1	E_2	E_3	E_4
A_1	50	300	– 150	50
A_2	400	0	100	0
A_3	– 50	200	0	100
A_4	0	300	300	0

Suppose that the probabilities of the events in this table are P (E_1) = 0.15 ; P (E_2) = 0.45 ; P (E_3) = 0.25 ; P (E_4) = 0.15.

Calculate the expected pay-off. Prepare the opportunity loss table and calculate the expected loss of each action.

(2 × 15 = 30 marks)