C 62635 (Pages : 4) Name

Reg. No....................

SECOND SEMESTER (CUCBCSS—UG) DEGREE EXAMINATION, MAY 2019

B.C.A.

BCA 2C 04—OPERATIONS RESEARCH

(2017 Admissions)

Time : Three Hours Maximum : 80 Marks

Section A

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

1. Define Operations Research.
2. Explain Network Analysis.
3. Write any *two* applications of LPP.
4. Define Transportation Problem.
5. Define Sequencing problem.
6. Describe an event in Network Scheduling.
7. Define Optimistic Time Estimates.
8. Explain Objective Function.
9. Define PERT.
10. Explain Duality.

(10 x 1 = 10 marks)

Section B

Answer **all** *the questions.*
Each question carries 2 marks.

11. Explain Assignment Problem.
12. Cite any *two* limitations of OR.
13. Explain basic assumptions of LPP.
14. Define the terms : (a) Basic feasible solution ; and (b) Linear constraints.

Turn over

15. Explain Vogel's Approximation Method.

16. Define Simplex Method.

17. Define Artificial Variable. Explain the use of artificial variable.

18. Define slack time and total float in the context of network model.

(8 x 2 = 16 marks)

Section C

Answer any six questions.
Each question carries 4 marks.

19. Explain the procedure of problems with *'n'* jobs and two machines.

20. Describe travelling Salesman Problem.

21. Formulate dual of the following LPP :

Maximize $Z = 4x_1 + 2x_2$

subject to — x_1 — x_2 5 — 3
— + x_2 — 2
x_i, X2 0

22. A marketing manager wishes to allocate his annual advertising budget of Rs. 20,000 in two media vehicles A and B. The unit cost of a message in media A is Rs. 1,000 and that of B is Rs. 1,500. Media A is a monthly magazine and not more than one insertion is desired in one issue. At least five messages should appear in the media B. The expected effective audience for unit message in media A is 40,000 and for media B is 55,000. Develop a mathematical model.

23. Explain the procedure of Simplex Method.

24. Explain some of the areas where Transportation Techniques are employed.

25. Draw the network diagram to the following activities :

Activity *(i, j)*	1 - 2	1 - 3	1 - 4	2 - 5	3 - 5	4 - 6	5 - 6
Time duration :	2	4	3	1	6	5	7

26. Explain North West Corner Rule.

27. How will you solve maximization problems using assignment techniques ?

(6 x 4 = 24 marks)

Section D

Answer any three *questions.*
Each question carries 10 *marks.*

28. Solve the following problem using dual Simplex Method.

Minimize Z = $4x_i + 2x_2$

Subject to : $x_1 + 2x_2$ 20

$3x_1 + x_2$?. 30

$4x_1 + 3x_2$?_ 60

0.

29. Use Big M method to solve the LPP :

Minimize Z = $3x_1 + 8x_2$

Subject to $x_1 + x_2 = 200$

x_1 5 80

$x_2 > 60$

xi, x2 o.

30. Solve the Assignment problem :

	1	2	3	4
A	32	26	35	38
B	27	24	26	32
C	28	22	25	34
D	10	10	16	16

31. A small maintenance project consists of the following 10 jobs. Draw network diagram (arrow diagram). Calculate : (a) T_E and T_L values of all events ; (b) EST, LST, EFT, LFT of all activities ; and (c) Floats of all the activities. Also obtain : (i) Critical activities ; and (b) Project duration :

Activity :	1 - 2	2 - 3	2 - 4	3 - 5	3 - 6	4 - 6	4 - 7	5 - 8	6 - 8	7 - 8
Duration :	4	6	10	8	2	12	4	15	14	8

32. We have five jobs each of which must go through the two machines A and B in the order A, B. Processing times in hours are given in the table below :

Job	1	2	3	4	5
Time on Machine A	5	1	9	3	10
Time on Machine B	2	6	7	8	4

Determine a sequence for the five jobs that will minimize the elapsed time. Also find :

(a) Total minimum elapsed time ; and (b) Idle time for machine. (i) A ; and (ii) B.

(3 x 10 = 30 marks)