UG–478   BSCS-07

B.Sc. DEGREE EXAMINATION – DECEMBER, 2018.

Second Year

Computer Science

APPLIED OPERATIONS RESEARCH

Time : 3 hours   Maximum marks : 75

PART A — (5 × 5 = 25 marks)

Answer any FIVE questions.

1.   What are the Limitations of an O.R models?

2.   Computer all the basic feasible solution to the LP problem.

Maximize $Z = 2x_1 + 3x_2 + 4x_3 + 7x_4$
Subject to the constraints $2x_1 + 3x_2 - x_3 + 4x_4 = 8$
$$x_1 - 2x_2 + 6x_2 - 7x_4 = -3$$
and $x_1, x_2, x_3, x_4, \geq 0$.

3. Discuss about the Branch and Bound algorithm for solving a mixed integer programming problem.

4. Describe the terms (a) Total float (b) Free float (c) Independent float.

5. State the principal assumptions made while dealing with sequencing problems.

6. We have five jobs, each of which must be processed on the two machines A and B in the order AB. Processing times in hours are given in the table below.

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

Determine a sequence for the five jobs that will minimize the elapsed time T.

7. Distinguish between Individual and Group replacement polices.

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PART B — (5 × 10 = 50 marks)

Answer any FIVE questions.

8. Explain about the different phases of OR.

9. Use simplex method to solve the following LPP.

Maximize $Z = 4x_1 + 10x_2$
Subject to
$2x_1 + x_2 \leq 50$
$2x_1 + 5x_2 \leq 100$
$2x_1 + 3x_2 \leq 90$
$x_1, x_1 \geq 0.$

10. By dynamic programming technique, solve the problem.

Min $Z = x_1^2 + x_2^2 + x_3^2$
Subject to the constraints
$x_1 + x_2 + x_3 \geq 15$
& $x_1, x_2, x_3, \geq 0.$

11. How to do the same effectively and efficiently? Explain its components.

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12. Find the sequence that minimizes the total elapsed time required to complete the following tasks on the machines in the order 1-2-3. Find also the minimum total elapsed time (hours) and the idle times on the machines.

Task	A	B	C	D	E	F	G
Time on
Machine 1	3	8	7	4	9	8	7
Machine 2	4	3	2	5	1	4	3
Machine 3	6	7	5	11	5	6	12

13. The cost of a machine is Rs. 6100 and its scrap value is Rs 100. The maintenance costs found from experience are as follows.

Year	1	2	3	4	5	6	7	8
Maintenance	100	250	400	600	900	1250	1600	2000

When the machine should be replaced?

14. Explain about the Group replacement and individual policy.

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