## Department of CSIT, GGV, Bilaspur Operational Research

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Max. Marks: 70 Time: 2 Hours Course: BSc. Semester: V

Notes: Attempt any 14. All questions having equal marks. Try to use less number of pages.

- 1. Discuss judgement phase of Operation Research.
- 2. Explain scope of Operation Research in industry and planning.
- 3. Elaborate some of the Industrial applications of Linear Programming.
- 4. A firm can produce three types of cloth, say, A, B and C. Three kinds of wool are required for it, say, red wool, green wool, and blue wool. One unit length of type A cloth needs 2 yards of red wool and 3 yards of blue wool: one unit length of type B cloth needs 3 yards of red wool, 2 yards of green wool and 2 yards of the blue wool: and one unit length of type C cloth needs 5 yards of green wool and 4 yards of blue wool. The firm has a stock of only 8 yards of red wool, 10 yards of green wool and 15 yards of blue wool. It is assumed that the income obtained from one unit length of type A cloth is Rs. 3, of type B cloth is Rs. 5 and that of type C cloth is Rs. 4. Formulate the problem as a linear programming problem.
- 5. Explain the limitations of Linear Programming Method.
- 6. What is the canonical form of Linear Programming Problem? Explain it properly.
- 7. Discuss in brief about management applications of linear programming model.
- 8. Use graphical method to solve the following problem:

$$\begin{array}{ll} \text{Maximize} & Z = 8x_1 + x_2, \\ \text{Subject to} & 8x_1 + x_2 \leq 8, \\ & 2x_1 + x_2 \leq 6, \\ & 3x_1 + x_2 \leq 6, \\ & x_1 + 6x_2 \leq 8, \\ & x_1, x_2 \geq 0. \end{array}$$

- 9. Write steps to solve linear programming problem using Big-M Method.
- 10. Discuss any five possible special cases in the simplex method.
- 11. Write some applications of the dual simplex method.
- 12. Solve the following problem by the simplex method (one iteration only):

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Maximize Z = 2x_1 + x_2,

Subject to x_1 + 2x_2 \le 10,

x_1 + x_2 \le 6,

x_1 - x_2 \le 2,

x_1 - 2x_2 \le 1,

x_1, x_2 \ge 0.
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- 13. Explain flow chart of simplex method.
- 14. Write a note on sensitivity analysis.
- 15. Explain Dual problem when primal is in canonical form.
- 16. Write the Algorithm for dual simplex method.
- 17. Solve the following linear programming problem, using the two phases of the simplex method:

Minimize 
$$Z = x_1 + x_2$$
,  
Subject to  $2x_1 + x_2 \ge 4$ ,  
 $x_1 + 7x_2 \ge 7$ ,  
 $x_1, x_2 \ge 0$ .

18. Solve the following problem by dual simplex method (one iteration only):

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\begin{array}{ll} \text{Minimize} & Z = 20x_1 + 2x2, \\ \text{Subject to} & x_1 + x_2 \! \geq \! 12, \\ & 2x_1 + x_2 \! \geq \! 17, \\ & x_1 \! \geq \! 2.5, \\ & x_2 \! \geq \! 6, \\ & x_1, x_2 \! \geq \! 0. \end{array}
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