GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. 2ND Semester Examination – June/July- 2011

Subject code: 1721205

Subject Name: Hydro system Engineering and Management

Date:29/06/2011   **Time: 10:30 am – 01:00 pm**
                                                           Total Marks: 70

Instructions:
1. **Attempt all questions.**
2. **Make suitable assumptions wherever necessary.**
3. **Figures to the right indicate full marks.**

Q.1   Maximize Z = 10 X1 + X2 +2X3 Subject to Constraints   **14**
                X1 + X2 – 2X3 ≤ 10
                4X1 + X2 + X3 ≤ 20
                X1, X2 , X3 ≥ 0

Q.2 **(a)** Write short note on Linear programming   **07**
      (b) Define:- 1) Slack Variable 2) Surplus Variable 3) Objective function   **07**
                              OR
      (b) Write short note on Duality   **07**

Q.3   Town A,B,C are supplied water from desalination plant costing Rs.8   **14**
             lakh each and borehole costing Rs 5 lakh each. The minimum daily
             requirements for the three towns are 15,18 and 27 units of water
             respectively.Each desalination plant can supply 9 units of water in the
             ratio 6:2:1 to towns A,B ,C while bore-hole can supply 8 units of water
             in the ratio of 1:2:5 to towns A,B,C Determine the optimum number of
             desalination plants and bore-holes required to satisfy the water demand
             of each town.Use Graphical Method.
                              OR
Q.3 **(a)** Write dual form of a given primal problem   **07**
             Maximize Z = 10 X1 + X2 +2X3 Subject to Constraints
                X1 + X2 – 2X3 ≤ 10
                4X1 + X2 + X3 ≤ 20
                X1, X2 , X3 ≥ 0
      (b) Discuss the applications of System Engineering in the field of Water   **07**
             Resources.

Q.4 **(a)** Write short note on Modified Method for optimum solution of   **07**
             Transportation Problem.
      (b) Explain Big-M method forL.P.P in detail   **07**
                              OR
Q.4 **(a)** Explain Kuhn-Tucker conditions for optimizing nonlinear problem.   **07**
      (b) What is Langrangian Multiplier? Discuss it.   **07**

Q.5 **(a)** Explain How Non-Linear function can be made Linear.   **07**
      (b) Explain Bellman's principle of optimality   **07**
                              OR
Q.5 **(a)** Write short-note on Dynamic Programming   **07**
      (b) Define: Local Maximum,Local Minimum,Global Maximum and Global   **07**
             Minimum

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