SIDDHARTH GROUP OF INSTITUTIONS :: PUTTUR
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QUESTION BANK (DESCRIPTIVE)

Subject with Code: WRSP&M (16CE143)   **Course & Branch**: B.Tech - CE

Year & Sem: IV-B.Tech & II-Sem   **Regulation:** R16

UNIT-I

INTRODUCTION

1. Define system and discuss various types of systems.   [L1,2] [10M]

2. Describe about the role of optimization models.   [L2] [10M]

3. What are the planning and management aspects of water resources system?   [L1] [10M]

4. What are the advantages and disadvantages of system approach?   [L1] [10M]

5. What is a system and what do you mean by systems approach to water resources planning and management?   [L1] [10M]

6. a) Give the classification of optimization problems.   [L3] [2M]

   b) Explain classification based on the nature of the equations involved and physical structure of the problem.   [L2] [8M]

7. a) Explain classification based on the permissible values of the decision variables.[L2] [5M]

   b) Explain classification based on deterministic/ stochastic nature of the variables. [L2] [5M]

8. a) Explain classification based on separability of the functions.   [L2] [5M]

   b) Explain classification based on the number of objective functions.   [L2] [5M]

9. What is hydrologic system and give the relation between function of input & output.[L1,4] [10M]

10. Explain the terms   [L1] [10M]

    a) System analysis

    b) Linear programming

    c) Nonlinear programming

    d) Geometric programming

    e) Quadratic programming

UNIT-II

LINEAR PROGRAMMING-I & LINEAR PROGRAMMING-II

1. How to transform a general form of a LPP to the standard form?   [L1] [10M]

2.   a) Which non-basic variable is to be entered? [L1] [5M]

   b) Which basic variable is to be exited? [L1] [5M]

3.   a) What are the applications of linear programming in water resources? [L1] [5M]

   b) What are the different cases of optimal solution? [L1] [5M]

4. Write a short note on simplex method. [L1] [10M]

5. Consider two crops 1 and 2, one unit of crop1 brings four units of profit and one unit of crop2 brings five units of profit. The demand of production of crop1 is A units and that of crop2 is B units. Let x be the amount of water required for A units of crop1 and y be the same for B units of crop2. The linear relations between the amounts of crop produced (I,e., demands A and B) and the available water (i.e., x & y) for two crops are shown below. $A = 0.5(x-2)+2$, & $B = 0.6(y-3)+3$

   [L4] [10M]

6. Explain revised simplex method with example. [L1] [10M]

7. Describe the duality of LP problems. [L2] [10M]

8. Explain the relation between primal and dual with example. [L3] [10M]

9. What is the post optimality analysis and explain with example. [L1] [10M]

10. Explain the selection of entering variable, exiting variable & departing variable. [L1] [10M]

UNIT-III

DYNAMIC PROGRAMMING & NON-LINEAR OPTIMATIZATION TECHNIQUES

1. a) What are principles of optimality? [L1] [2M]

   b) Explain the backward recursive dynamic programming. [L1] [8M]

2. a) What is a recursive equation? [L1] [2M]

   b) Explain the forward recursive dynamic programming. [L1] [8M]

3. Write a short notes on discrete versus continuous dyna programming. [L1] [10M]

4. Write a short note on multi stage problems. [L1] [10M]

5. Derive the backward recursive equations. [L3] [10M]

6. Derive the forward recursive equations. [L3] [10M]

7. Explain a) Curse of dimensionality [L2] [5M]

           b) Water allocation problem [L2] [5M]

8. a) Write a short note on optimization and simulation. [L1] [5M]

   b) What is the function of single variable? [L1] [5M]

9. a) What are the convex and concave functions? [L1] [5M]

   b) Solve the convex function, $f(x)=2x^2$ and concave function, $f(x)= -2x^2$ [L3] [5M]

10. Check for optimal values of $f(x)= 3x^3-6x^2 + 4x-7$ and $f(x)=12x^5-15x^4-40x^3+81$ [L4] [10M]

UNIT-IV

SIMULATION & WATER RESOURCES ECONOMICS

1. a) What do you understand by simulation? [L1] [2M]

    b) Explain briefly about simulation method. [L2] [8M]

2. a) What are the components of simulation model? [L1] [5M]

    b) Write a short note on monte-carlo simulation. [L1] [5M]

3. a) Explain uniformly distributed random numbers. [L2] [5M]

    b) The inflow, Q follows an exponential distribution with parameter, T=0.6 Let the first uniformly distributed random number be 0.46. Determine the corresponding inflow. [L4] [5M]

4. Describe the Narmada system simulation model. [L1] [10M]

5. What are the steps involved in simulation of reservoir system? [L1] [10M]

6. The nominal rate of interest is 10%, determine the effective rate of interest when money is compounded. a) Yearly, b) Half yearly, c) Quarterly & d) Daily [L4] [10M]

7. a) Write a short note on combination simulation and optimization. [L2] [5M]

    b) What is discount rate and depreciation? [L1] [5M]

8. Describe the benefits and cost estimation. [L1] [10M]

9. Water is supplied from a project for two types of uses rural and urban. The demand curve (DC) for rural is given by p+3y=30 and the demand curve for the urban use is 4p+y=40, where y is the demand and p is price in appropriate units. Determine the combined demand curve? [L4] [10M]

10. Water is supplied from a project for two types of uses rural and urban. The benefits to rural community are given by B_r=30, Y_r= -3/2y^2 and those are to be urban community are given by B_u= 10Y_u- Y_u^2 /8 if the total cost of the project is C= r^2/2+2Y where Y is the aggregate demand. Determine optimum level of total water supply. Also determine the corresponding components of rural and urban water supply levels. [L4] [10M]

UNIT-V

WATER RESOURCES MANAGEMENT

1. a) How to manage the water resources system? [L1] [5M]

    b) What are the steps involved in water resources management? [L1] [5M]

2. How to planning the reservoir system and explain it. [L1] [10M]

3. What are the important activities of planning of reservoir basins? [L1] [10M]

4. How do you optimally operate a single resource system? [L1] [10M]

5. Explain how to allocation of water resources. [L2] [10M]

6. Discuss the various advantages of conjunctive use of surface and sub-surface water resources.

7. Explain linear programming techniques for optimal cropping pattern.   [L2] [10M]

8. Write the components of ground water and surface water balance.   [L2] [10M]

9. Explain the optimal cropping pattern.   [L1] [10M]

10. Discuss the various advantages of conjunctive use of water.   [L1] [10M]

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