

**R16**

Code No: 138FG

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 2021

WATER RESOURCES SYSTEMS ANALYSIS

(Civil Engineering)

Time: 3 hours

Max. Marks: 75

Answer any Five Questions  
All Questions Carry Equal Marks

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1. Explain how the system approach is helping the improvement of water resources planning. [15]
2. Write Kuhn Tucker conditions and explain the theory of constrained optimization. [15]
3. Solve the following linear programming problem using the graphical method.  
Maximize the function:  $f(x) = 3X_1 - 6X_2$   
Subject to:  $4X_1 + 9X_2 \leq 36$   
 $6X_1 + 10X_2 \geq 30$   
 $X_1, X_2 \geq 0$  [15]
4. What is the non linear programming techniques applied in water resource planning? Explain in detail. [15]
5. Differentiate between linear programming and dynamic programming. Which is more useful to water resources systems? [15]
6. Discuss the following concepts  
a) Principle of optimality,  
b) State and  
c) Stage. [15]
7. Write and explain the conditions of project optimality. [15]
8. Discuss the principles of benefit cost analysis and economics analysis in water resource economics. [15]

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