Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M.E –IIst SEMESTER–EXAMINATION – JULY- 2012

Subject code: 1721202 **Date: 09/07/2012**

Subject Name: Water Resources Planning

Time: 10:30 am – 13:00 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 (a) Explain the following discounting techniques: **07**
(i) The rate of return method (ii) The annual cost method.

(b) Define the following. **07**
(i) The economic life
(ii) Cash flow diagram
(iii) Single-payment present worth factor
(iv) Compound amount factor
(v) Sinking fund factor
(vi) Capital recovery factor
(vii) Remaining benefit factor

Q.2 (a) Discuss the basic principles of cost allocation. **07**

(b) Briefly discuss the steps involved in planning of Water Resources Project **07**

OR

(b) The average monthly adjusted runoff of a river during a critical year are as follows: **07**

Month	J	F	M	A	M	J	J	A	S	O	N	D
Runoff (ha-m)	500	350	650	600	300	650	7500	6000	3500	2500	600	700

If there is a uniform demand of 6 cumecs, determine the reservoir capacity by the analytical method.

Q.3 (a) Write the various water requirements of a multipurpose project. Discuss their compatibility. **07**

(b) Explain with neat sketch, the stages of project life. **07**

OR

Q.3 (a) How would you estimate the available storage capacity of a reservoir? Draw typical storage-elevation curve. **07**

(b) Discuss in detail the reservoir operation of a multipurpose project and working table. **07**

Q.4 (a) Differentiate between: **07**
(i) Engineering feasibility test and financial feasibility test.
(ii) Direct benefits and indirect benefits.
(iii) Tangible benefits and intangible benefits.
(iv) Political feasibility and social feasibility.

(b) Two alternative water supply projects described in table given below are available for supplying community water supply. Compare projects by present worth method. Which project will you select? **07**

Item	Project- A	Project- B
Construction cost in Rs.	8,00,00,000	5,00,00,000 1st stage of 20 years 6,00,00,000 2nd stage of 20 years
Operation & Maintenance Cost in Rs.	3,20,000 per year	2,00,000 per year for 1st 20years 4,40,000 per year for 2nd 20years
Economic life	40 years	40 years for each stage

Annual benefits	50,00,000	50,00,000
Discount rate	5%	5%

OR

Q.4 (a) What is the trap efficiency? How would you estimate the useful life of reservoir? **07**

Q.4 (b) Using the data given below calculate the allocations to each project purpose by remaining benefit method and by alternative justifiable expenditure method. The estimated cost of the project is 15 million rupees. **07**

Project function	Separable Costs	Estimated Benefits	Alternative Single purpose cost
Irrigation Cost	500	550	525
Flood mitigation Cost	650	1000	850

(All items given in thousands rupees)

Q.5 (a) Discuss risk and uncertainty consideration in water resources planning. **07**

(b) Discuss water laws and policies. **07**

OR

Q.5 (a) Explain the environmental impacts of multipurpose project. **07**

(b) Write briefly: **07**

(i)Reservoir losses (ii) Flood control reservoir

(iii) Useful storage (iv) Surcharge storage

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