Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – I • EXAMINATION – SUMMER • 2014

Subject code: 1721202 **Date: 18-06-2014**

Subject Name: Water Resources Planning

Time: 02:30 pm - 05:00 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) Define the following terms: 07

(i) The physical life (ii) Cash flow diagram
(iii) Compound amount factor (iv) Sinking fund factor.
(v) Joint cost (vi) Cost-center and (vii) Benefits.

(b) The two alternatives described below are available for irrigation project for the next 45 years when all economic lives as well as the periods of analysis terminate. 07

Construction cost	Project-A	Project-B
Year-1	Rs. 20×10^6	Rs. 15×10^6
Year-20	0	Rs. 10×10^6
Year-30	0	Rs. 05×10^6
Operation & Maintenance cost	Project-A	Project-B
Year 1-15	Rs. 80000	Rs. 60000
Year 16-30	Rs. 90000	Rs. 85000
Year 31-45	Rs. 98000	Rs. 93000

Using a 5% discount rate, compare the projects by the present-worth method.

Q.2 (a) Explain the following discounting techniques: 07

(i)The rate of return method. (ii) The annual cost method.

(b) Briefly discuss the critique of benefit cost analysis. 07

OR

(b) The following data pertain to a multipurpose project: 07

Allocate the cost using the alternative justifiable cost method.
Assume total cost of project is Rs. 3.00 crores

Sr. No.	Item	Flood control	Irrigation	Hydro-power
		(Cost in thousands of rupees)		
1	Separable cost	2400 x 2	6500 x 2	2600 x 2
2	Benefits	4000 x 2	8200 x 2	3400 x 2
3	Alternative single purpose cost	3000 x 2	7200 x 2	3200 x 2

Q.3 (a) Briefly discuss the steps involved in planning of water reservoir project. 07

(b) What are the stages of project life? Discuss in brief. 07

OR

Q.3	(a)	State and explain the various feasibility tests carried out in the project evaluation.	07
	(b)	Write the various water requirements of a multipurpose project. Discuss their compatibility.	07
Q.4	(a)	Discuss the reservoir operation for optimum benefits.	07
	(b)	Explain the method for the determination of required storage capacity of a reservoir when the demand is uniform.	07
		OR	
Q.4	(a)	Explain the following terms: (i) Valley storage (ii) Design yield (iii) Full reservoir level (iv) Firm yield (v)Useful life of reservoir (vi) Trap efficiency and (vii) Dead storage.	07
	(b)	Discuss in detail analytical method for determination of storage capacity	07
Q.5	(a)	Explain the environmental impacts of multipurpose project.	07
	(b)	Discuss risk and uncertainty considerations in water resources planning	07
		OR	
Q.5	(a)	Write water laws and policies. Discuss interstate water problems with examples	07
	(b)	Discuss in detail financing of water resources development projects.	07

****