

GUJARAT TECHNOLOGICAL UNIVERSITY
M. E. - SEMESTER – II • EXAMINATION – WINTER 2012

Subject code: 1721202**Date: 31-12-2012****Subject Name: Water Resources Planning****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 (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) Alternative cost 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 x 10 ⁶	Rs. 20 x 10 ⁶
Year-15	0	Rs. 10 x 10 ⁶
Year-30	0	Rs. 05 x 10 ⁶
Operation & Maintenance cost	Project-A	Project-B
Year 1-15	Rs. 70000	Rs. 60000
Year 16-30	Rs. 80000	Rs. 70000
Year 31-45	Rs. 90000	Rs. 80000

Using a 5% discount rate, compare the projects by:

- (i) The present-worth method (ii) The benefit-cost ratio 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 total cost of a multipurpose project is Rs. 200 crores. Allocate the costs to different project purposes using the following information by alternate justifiable method. **07**

Project Purpose	Flood Mitigation	Hydro-Power	Irrigation	Navigation
Separable cost (Rs. in crores)	43.00	68.00	17.00	5.50
Estimated Benefits (Rs. in crores)	57.00	170.00	40.00	11.00
Alternative single purpose cost (Rs. in crores)	45.00	113.00	68.00	9.00

Q.3 (a) Briefly discuss the steps involved in planning of water reservoir project. **07****(b)** Write the various water requirements of a multipurpose project. **07**
Discuss their compatibility.**OR****Q.3 (a)** State and explain the various feasibility tests carried out in the project evaluation. **07****(b)** What are the stages of project life? Discuss in brief. **07****Q.4 (a)** Discuss the reservoir operation for optimum benefits. **07**

- (b) The average annual discharge of a river for 11 years is as follows: **07**

Year	1980	1981	1982	1983	1984	1985
Discharge (cumecs)	1750	2050	3010	2240	2630	3200
Year	1986	1887	1988	1989	1990	-
Discharge (cumecs)	1080	950	1200	4150	3500	-

Determine the storage capacity required to meet a demand of 2000 cumecs throughout the year.

OR

- Q.4** (a) How would you estimate the available storage capacity of reservoir? Draw typical storage elevation curve. **07**
- Q.4** (b) What is trap efficiency? How would you estimate the useful life of reservoir? **07**

- Q.5** (a) Write water laws and policies. **07**
Discuss interstate water problems with examples
- (b) Discuss risk and uncertainty considerations in water resources planning **07**

OR

- Q.5** (a) Discuss social, economical and environmental impacts of water resources projects. **07**
- (b) Discuss in detail financing of water resources development projects. **07**
