

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. - SEMESTER – II • EXAMINATION – WINTER • 2013****Subject code: 1721202****Date: 27-12-2013****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) 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 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. 80000	Rs. 70000
Year 16-30	Rs. 85000	Rs. 75000
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 resources 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. **07**
 Discuss their compatibility.
- 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 |
| Discharg | 1750 | 2050 | 3010 | 2240 | 2630 | 3200 |
- e
(cumecs)
- | | | | | | | |
|----------|------|------|------|------|------|---|
| Year | 1986 | 1887 | 1988 | 1989 | 1990 | - |
| Discharg | 1080 | 950 | 1200 | 4150 | 3500 | - |
- e
(cumecs)
- Determine the storage capacity required to meet a demand of 2000 cumecs throughout the year.
- OR**
- Q.4 (a)** Explain the following terms: **07**
 (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.
- (b)** How would you estimate the available storage capacity of reservoir? Draw typical storage elevation curve. **07**
- 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**
OR
- 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**
