GUJARAT TECHNOLOGICAL UNIVERSITY M. E. - SEMESTER – I • EXAMINATION – WINTER • 2014

Subject code: 1721202

Subject Name: Water Resources Planning

Time: 02:30 pm - 05:00 pm

Instructions:

Total Marks: 70

Date: 03-12-2014

- 1. Attempt all questions.
- 2. Make suitable assumptions wherever necessary.
- 3. Figures to the right indicate full marks.
- Q.1 (a) Draw reservoir outflow graphs and explain compatible and incompatible uses of 07 a multipurpose reservoir.
 - (b) Requirements of water for a multipurpose reservoir are 75 cumecs for 12 07 months for power generation,50 cumecs for 12 months for water supply,84 cumecs for 4 months for irrigation and 103 cumecs for 6 months for navigation. Flood control requires a space of 200 million meter cube. Dead storage is 22% by volume of useful storage. Determine the total storage upto maximum water level taking each month of 30 days.
- Q.2 (a) Give the general reservoir operation schedule for a north Indian river giving the 07 importance of rule level.
 - (b) Explain equal apportionment method, use of facility method and remaining 07 benefit method of cost sharing for the total cost of a multipurpose reservoir.

OR

- (b) Discuss how the likelihood of inorganic and organic pollution in the region due 07 to commissioning of a new water resources project should be analyzed.
- Q.3 (a) Illustrate current data and historical data. Explain the importance of 07 hydrological, legal and economic data.
 - (b) Draw proportionate sketches to show the following curves and give their utility 07 for a river valley project:
 Cost v/s benefit
 Cost v/s benefit cost ratio.
 Cost v/s benefit cost.

OR

- Q.3 (a) (i)Explain physically independent units and economically independent units 07 (ii)Explain inter benefit surfaces of for a multipurpose project
 - (b) Explain the objective to be achieved and works and measures to be taken up for the purpose of drainage, sediment control and salinity control for a river valley project.
- Q.4 (a) State the various benefits of a multipurpose project and explain the incidental 07 benefits of a single purpose project
 - (b) The cost of lining of a certain main canal is rupees one crore. If the total of annual benefits resulting from resulting from prevention of seepage due to lining is rupees one million. Find out if the lining is economically feasible. Rate of interest iøis 7% and life of lining is estimated to be 22 years.

OR

Q.4 (a) (i)Explain cost index and its significance in doing benefit cost analysis 07 (ii)Explain present worth and amortization of a multipurpose project

- (b) Find out the amount to be charged at the end of every year from the beneficiaries 07 of a river valley project to replace it with a new project at the end of 22 years. The new project will cost Rs 150 million and the interest rate may be taken as 7.5%
- Q.5 (a) Describe the common pitfalls in planning of a water resources project 07
 - (b) Define the term discount factor, capital recovery factor and sinking fund factor 07 for a hydro electric project.

OR

Q.5 (a) Explain cash flow diagrams in the context of a water resources project.

07

(b) Given are the monthly energy demands of a city for twelve months. Give an outline how you will work out the yearly reservoir storage requirement for power supply to the city. The working head of the turbine is given, power demand rate is taken constant and the monthly river inflows for 12 months are given.
