

Seat No.: _____

Enrolment No. _____

GUJARAT TECHNOLOGICAL UNIVERSITY
BE SEM-VII Examination-Nov/Dec.-2011

Subject code: 170503

Date: 24/11/2011

Subject Name: Plant design & Project Engineering

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) State and discuss the factors to be considered in selection of the location of a chemical process plant. **07**
- (b) State various methods for estimating capital investment and discuss any one method. **07**

- Q.2** (a) Define layout of a plant. Discuss the principles of the storage layout and equipment lay-out in a process plant. Write a brief note on 'Scale Model'. **07**
- (b) State the advantages of standard equipment over special equipment. What are the different types of flow diagrams? **07**

OR

- (b) Discuss the selection criteria of valves. Name commonly used pipe fittings and valves with their main functions. **07**
- Q.3** (a) Define 'Pilot plant'. Explain the importance of laboratory development of 'Pilot plant'. **07**
- (b) Total capital investment for a chemical plant is Rs. 50 million and the working capital is Rs. 50 lakhs. If the plant can produce an average of 8000 kg of final product per day during a 365-day year, what selling price in rupees per kilogram of product would be necessary to give a turn-over ratio of 1.0? **07**

OR

- Q.3** (a) Discuss the method for evaluation of total product cost showing the individual components. **07**
- (b) State and explain the factors affecting investment and production cost. **07**
- Q.4** (a) Define cost index with example. Explain the estimation of equipment cost by scaling. **07**
- (b) Define depreciation. State and briefly explain various methods of determining depreciation. **07**

OR

- Q.4 (a)** The original value of a piece of equipment is Rs. 11 lakhs, completely installed and ready for use. Its salvage value is estimated to be Rs 1 lakh at the end of a service life estimated to be 10 years. Determine the asset (or book) value of the equipment at the end of 5 years using **07**
- (i) Straight line method
 - (ii) Text book declining balance method

- (b)** State various methods of profitability evaluation and explain the principle of each method in brief. **07**

- Q.5 (a)** Discuss the practical factors in alternative investment and replacement studies. **07**

- (b)** Explain break-even point with a diagram. Discuss the importance of break even analysis. **07**

OR

- Q.5 (a)** A company is using a piece of equipment which originally cost \$ 30,000. The equipment has been in use for 5 years, and now has a net realizable value of \$6000. At the time of installation, the service life was estimated to be 10 years and zero salvage value at the end. Operating costs amount to \$ 22,000/year. At the present time, the remaining service life of the equipment is estimated to be 3 years. **07**

A proposal has been made to replace the present piece of property by one more advanced design. The proposed equipment would cost \$ 40,000, and the operating costs would be \$ 15,000 per year. The service life is estimated to be 10 years with a zero salvage value. Each piece of equipment will perform the same service and all costs other than those for operation and depreciation will remain constant. The company requires an annual return of at least 10 percent. Should the present equipment be replaced? (Straight line depreciation is applicable).

- (b)** Define/explain the following: **07**
- (i) PERT (ii) CPM (iii) Inventory scheduling (iv) Battery limit (v) Salvage value (vi) Book value (vii) Contingency
