

Chemical Engineering Economics  
SE/III/CBGS/CHEM/CEE

(31)

QP Code : 5289

(3 Hours)

[ Total Marks : 80

- N. B. : (1) Question No.1 is compulsory.  
 (2) ~~Solve any three out of remaining five.~~  
 (3) Assume suitable data required.

1. Answer the following (any four) :- 20
- Explain demand supply curve.
  - Explain various cost indices used in economics.
  - Explain concept of nominal and effective interest rates.
  - What is present worth of an annuity.
  - Describe the general outline of accounting procedure.
2. Explain the following terms in detail. (Any five) 20
- Diseconomies of scale
  - Types of Growth Strategies
  - Demand schedule and demand curve
  - Concept of price determination under particular market conditions
  - Price discrimination
  - Law of supply-assumptions and exceptions
3. (a) Draw "Tree diagram" showing cash flow for industrial operation. 10  
 (b) The purchase cost of 5 m<sup>3</sup> SS tank in 1980 was Rs. 3,75,000/-. The 10  
 tank is cylindrical with flat top and the bottom diameter is 2 m. If the  
 entire outer surface of the tank is to be covered with 5 cm thick  
 magnesia block, estimate the present total cost for the installed and  
 insulated tank. 1 January 1980 cost for the 5 cm magnesia block was  
 Rs. 1000/m<sup>3</sup> while labor for installing the insulation was Rs. 200/m<sup>3</sup>  
 and if the installed equipment cost index for 1980 was 560 and now  
 it is 979.
4. (a) A heat exchanger has been designed for use in a chemical process. A 10  
 standard type of H.E. with negligible scrap value. Cost of HE is  
 Rs. 4000 & will have useful life 6 yrs. Another proposed HE of  
 equivalent design capacity cost Rs. 6800 but will have a useful life 10  
 years & a scrap value of Rs. 800. Assuming an effective compound  
 interest rate of 8% per annum, determine which H.E. is cheaper.

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21/12/15

- (b) What is Break Even point? Explain with graph, in detail. 10
5. Estimate the manufacturing cost for 100 kg of product under the following conditions. 20
- FCI = Rs. 100 millions.
- Annual production output = 10 million kg of product
- Raw material cost = Rs. 12/kg of product
- Utilities :-
- 100 psi(g) steam = 50 kg/kg of product
- Electric power = 0.4 kwh/kg of product
- Filtered & softend water = 50 lit/kg of product
- Operating labor = 20 men/shift at Rs. 40 employee per hour
- Cost of 100 psig steam = Rs. 260/Tonne of steam
- Cost of power = Rs. 3.5 /kwh.
- Cost of filtered & softend water = Rs. 14/m<sup>3</sup>
- Plant operates 300 days 24 hrs. per year
- Non corrosive fluids are involved, no direct supervision is required. There are no patents royalties, interest or rent charges. The plant overhead cost amount 50% of the cost for operating labor, supervision and maintenance.
6. (a) The total capital investment for a chemical plant is Rs. 10,00,000/- and working capital is Rs. 1,00,000/-. If plant can produce average of 8,500 kg product/day during a 360 days a year, what selling price per kg of product will be necessary to give turnover ratio of 1.0. 10
- (b) What is depreciation? Describe the methods of depreciation in detail. 10