

IV B.Tech I Semester Supplementary Examinations, November 2005
CHEMICAL ENGINEERING PLANT DESIGN & ECONOMICS
(Chemical Engineering)

Time: 3 hours

Max Marks: 80

Answer any FIVE Questions
All Questions carry equal marks

1. Ethylene is produced commercially in a variety of different process. Feed stocks for these various processes range from refinery gas, Ethane, Propane, butane, natural gasoline, light and heavy naphthas to gas and oil and heavier fractions. Make a preliminary material balance for the production of 50 million kg/year of ethylene. Assume an operating factor of 90. [16]
2. Give an account of materials handling, storage, structural design and utilities in the design of a chemical process plant. [16]
3. (a) Write about estimating equipment costs by scaling. [6]
(b) The purchased cost of a 200 liters glass-lined, jacketed reactor was Rs. 8,350 in 1981. Estimate the purchased cost of a similar 1200 liters glass-lined, jacketed reactor in 1986. The equipment cost index for 1981 is 721, and for 1986 is 798. The equipment versus capacity exponent may be taken as 0.54. [10]
4. A new storage tank can be purchased and installed for Rs. 10,000. This tank would last for 10 years. A worn out storage tank of capacity equivalent to the new tank is available, and it has been proposed to repair the old tank instead of buying the new tank. If the tank were repaired, it would have a useful life of 3 years before the same type of repairs would be needed again. Neither tank has any scrap value. Money is worth 9 percent compounded annually. On the basis of equal capitalized costs for the two tanks, how much can be spent for repairing the existing tank? [16]
5. (a) Classify major insurance requirements for a manufacturing concern. Give details of each type stating the causes of loss. [8]
(b) What is self-insurance? Mention in detail various methods of applying self-insurance. [8]
6. (a) What do you understand by 'depreciation'? Explain it clearly. [6]
(b) Define the term 'Salvage Value'. How is it related to depreciation period. [6]
(c) State clearly the meaning of 'appraised depreciation'. How does it differ from depreciation? [4]
7. Explain the following
 - (a) Present worth. [5]
 - (b) Capitalised costs. [5]
 - (c) Payout period. [6]

8. Explain the concept of economic balance with suitable examples. What are the factors considered in determining the optimum insulation thickness? [16]

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