

Seventh Semester B.E. Degree Examination, Dec.2024/Jan.2025

**Process Equipment and Plant Design**

Time: 3 hrs.

Max. Marks: 100

**Note:** Answer any FIVE full questions, choosing ONE full question from each module.**Module-1**

- 1 a. Explain the various steps to be considered for process development. (10 Marks)
- b. Explain the factors considered in making a feasibility survey along with the design objectives and constraints. (10 Marks)

**OR**

- 2 a. Explain about the different types of Engineering design available for designing a process. (06 Marks)
- b. Explain the general design considerations considered for setting up of a plant. (14 Marks)

**Module-2**

- 3 a. Illustrate the different types of costs considered for the determination of capital investment in an enzyme manufacturing unit. (10 Marks)
- b. Demonstrate how different types of capital cost estimates can be used to predict the total investment by any manufacturing unit. (10 Marks)

**OR**

- 4 a. Interpret the cost estimation of an equipment based on cost index and scaling factor. (10 Marks)
- b. Predict the factors affecting the investment and production cost for an organization A and B set up at two different geographical locations. (10 Marks)

**Module-3**

- 5 a. Explain the different methods used for the estimation of capital investment. (10 Marks)
- b. Distinguish the types of working capital and relate it to turn over ratio. (10 Marks)

**OR**

- 6 a. Explain the different types of cost involved in total product cost. (10 Marks)
- b. A small scale industry is producing activated carbon of about 18000kg/year, Raw material cost (3 tons/month) is Rs 1000/ton, Cost of personnel is Rs 35760/year, Cost of utilities is Rs 3600/year, Depreciation is Rs 500/month, Transport charges Rs 25/day, Packaging charges is Rs 50/100 kg, Cost of charge of 100kg is Rs 0.25.
  - i) Find the production cost.
  - ii) Selling price with 20% profit on factory cost. Unit works for 26 days/month. (10 Marks)

**Module-4**

- 7 a. A machine is purchased for Rs 1,00,000 and its estimated life is 5 year with negligible salvage value. Rate of interest on depreciation is 6%. Calculate the rate of depreciation by straight line method, sum of year, digit method and sinking fund method. (14 Marks)
- b. Explain the types of depreciation. (06 Marks)

**OR**

- 8 a. A piece of equipment cost 2,00,000 and has a salvage value of Rs 20,000. If the depreciation charge of Rs 48,000 is charged during its second year service by sum of year digit method, Predict its estimated service life. (08 Marks)
- b. Explain the different methods of depreciation. (12 Marks)

**Module-5**

- 9 Elaborate the mathematical methods for profitability evaluation. (20 Marks)

**OR**

- 10 a. Two machines have the following cost comparison. If money is worth 8% per annum. Which machine is more economical? (10 Marks)

Item	M/c - A	M/c - B
Initial cost	Rs 2,20,000	Rs 1,50,000
Uniform end of year maintenance cost	Rs 30,000	Rs 40,000
Salvage value	Rs 15,000	Rs 40,000
Service life	3 year	2 year

- b. Explain the method of profitability evaluation for replacements. (10 Marks)

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