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18BT731

Seventh Semester B.E. Degree Examination, Dec.2023/Jan.2024 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 General design consideration in plant location and plant layout. (10 Marks)
- b. Briefly explain the specifications and scale up in design. (10 Marks)

OR

- 2 a. Explain with example optimum economic design and optimum operation design. (10 Marks)
- b. Explain different methods of solid waste disposal using in process industries. (10 Marks)

Module-2

- 3 a. Explain the various fixed capital investments. Give the breakdown of fixed capital investment items for a process plant. (10 Marks)
- b. What are the different types of overheads? Explain with examples. (10 Marks)

OR

- 4 a. What do you understand by working capital? Explain the components of working capital. (10 Marks)
- b. Mention and explain the important factors affecting the investments and production costs. (10 Marks)

Module-3

- 5 a. Define fixed and working capital investment. (04 Marks)
- b. Explain the various components which contribute to fixed capital and working capital. (16 Marks)

OR

- 6 a. Calculate the working capital for a fluid processing plant if the delivered equipment cost is 4,56,000 using lang factor method.
(Given : Lang factor : 5.0 for fixed capital investment)
6.0 for Total capital investment) (06 Marks)
- b. How do you calculate the total capital investment by percentage of delivered equipment cost? (14 Marks)

Module-4

- 7 a. Define Depreciation. Explain different types of depreciation. (10 Marks)
- b. The fermenter was purchased for Rs.8,00,000/- and assumed life is 10 years and scrap value is Rs.2,00,000/-, if the depreciation is charged by declining balance method. Calculate the % by which value of the fermenter is reducing every year. Calculate depreciation fund after two years. (10 Marks)

OR

- 8 a. Define the terms :
- (i) Depreciation.
 - (ii) Book value.
 - (iii) Market value.
 - (iv) Salvage value.
 - (v) Replacement value. (10 Marks)
- b. An Argon gas processor has the first cost of 20,000/- with 5,000/- as the salvage value after 5 years. Find (i) D_3 (ii) BV_3 (iii) Plot book value V/s time by straight line depreciation method. (10 Marks)

Module-5

- 9 a. Explain profitability and discuss various methods of profitability evaluation. (10 Marks)
- b. The fixed cost for the year 2018-19 was Rs.5,00,000/-, variable cost per unit is Rs.25/-. The estimated sales for the period are valued at Rs.15,00,000/-. Each unit sells at Rs.150/-. Determine :
- (i) Break even point
 - (ii) Calculate the estimated contribution if Rs.12,00,000/- will be the sales turn over in the next budget.
 - (iii) If profit target is Rs.6,50,000/- has been budgeted. Compute the turnover required. (10 Marks)

OR

- 10 a. Explain in detail break-even chart and break-even analysis. Mention the assumptions made in drawing the break-even chart. (10 Marks)
- b. A project is expected to have cash flow for the five years as follows. After all expenses and taxes. The initial fixed capital investment is Rs.10,00,000 and the working capital investment is 15% of the fixed capital investment.

Time (years)	0 – 1	1 – 2	2 – 3	3 – 4	4 – 5
Cash flow (Rs.)	2,00,000	2,70,000	3,30,000	4,00,000	4,75,000

Using straight line depreciation method.

Find : (i) Rate of return (ii) Payout period. (10 Marks)

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