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B.E. / B.TECH. DEGREE EXAMINATIONS, DEC 2019

Seventh Semester

CH16701 – PROCESS ECONOMICS FOR CHEMICAL ENGINEERS*(Chemical Engineering)***(Regulation 2016)****Time: Three Hours****Maximum : 100 Marks**Answer **ALL** questions**PART A - (10 X 2 = 20 Marks)**

	CO	RBT
1. Give the significance of planning in an organization.	1	U
2. List the importance of effective communication in an organization.	1	R
3. Define method study.	1	U
4. Describe amortization.	2	R
5. A person borrows \$ 1000 and repays \$ 1050 at the end of 4 months. What compound interest rate was paid?	3	AN
6. Elaborate payout time with reference to profitability evaluation?	3	U
7. List the different types of taxes.	4	R
8. Draw a simple cash flow diagram.	4	U
9. What is the basis of an optimum economic design?	5	U
10. Define economics of scale.	5	U

PART B - (5 X16 = 80 Marks)

11. (a) Explain the various types of organization and also the importance of coordination in an organization. **(16)** **1** **U**
- (OR)**
- (b) Describe in detail the various elements of production planning and control. **(16)** **1** **U**
12. (a) The annual direct production costs for a plant operating at 70 percent capacity are \$280,000 while the sum of the annual fixed charges, overhead costs and general expenses is \$ 200,000. What is the break-even point in units of production per year if the total annual sales are \$560,000 and the product sells at \$40 per unit? What were the annual

gross earnings and net profit for this plant at 100 per cent capacity in 1994 when corporate income taxes required a 15 percent tax on the first \$50,000 of annual gross earnings, 25 percent on annual gross earnings of \$ 50,000 to \$ 75,000, 34 percent on annual gross earnings above \$ 75,000 and 5 percent on gross earnings from \$ 100,000 to \$ 335,000?

(OR)

- (b) A fluidized bed reactor is purchased for Rs.2,40,000 and the estimated life of 6 years with negligible scrap value. If the rate of interest on depreciable fund is 5 % calculate the rate of depreciation by straight line method, sum of years' digit method and sinking fund method. Compare the results in a table. **(16) 2 AN**

13. (a) (i) The following table gives the running costs per year and resale values of a certain equipment whose purchase price is Rs.6500. At what year is the replacement due optimally? **(10) 3 AN**

Year	1	2	3	4	5	6	7	8
Running Costs (Rs.)	1400	1500	1700	2000	2400	2800	3300	3900
Resale Value (Rs.)	4000	3000	2200	1700	1300	1000	1000	1000

- (ii) List the different sales forecasting methods. **(6) 3 AN**

(OR)

- (b) A heat exchanger has been designed and insulation is being considered for the unit. The insulation can be obtained in thickness 1, 2, 3 or 4 inches. The following data have been determined for different insulation thicknesses: **(16) 3 AN**

	1 in.	2 in.	3 in.	4 in.
Btu/h saved	300,000	350,000	370,000	380,000
Cost for installed insulation	\$1200	\$1600	\$1800	\$1870
Annual fixed charges	10%	10%	10%	10%

What thickness of insulation should be used? The value of heat is 30cents / 1,000,000 Btu. An annual return of 15 percent on the fixed – capital investment is required for any capital put into this type of investment. The exchanger operates 300 days per year.

14. (a) Illustrate the construction of a balance sheet. Discuss the different forms of balance sheet with examples. (16) 4 AN

(OR)

- (b) Tara Chemicals Ltd. showing the following balance sheet, calculate the following ratios: i) Current ratio ii) Liquid ratio iii) Absolute liquidity ratio iv) Current assets to fixed assets ratio v) Debt to equity ratio vi) Proprietary ratio vii) Capital gearing ratio viii) Fixed asset ratio. (16) 4 AN

Liabilities	Rs.	Assets	Rs.
Equity capital	10,00,000	Goodwill (at cost)	5,00,000
6%pref capital	5,00,000	Plant and machinery	6,00,000
General reserve	1,00,000	Land and building	7,00,000
Profit and loss A/c	4,00,000	Furniture	1,00,000
Provision for taxation	1,76,000	Inventories	6,00,000
Bills payable	1,24,000	Bills receivable	30,000
Bank overdraft	20,000	Debtors	1,50,000
creditors	80,000	Bank	2,00,000
12% debentures	5,00,000	investments	20,000

15. (a) The annual fixed costs for insulating a certain steam pipe installation can be expressed as $C_F = (30S + 40)$ Rs. per year, the annual direct cost of energy lost by providing insulation over the same steam pipe can be expressed as $C_D = (100 / S)$ Rs. per year where C_F is the fixed cost and C_D is the direct cost , S is the insulation thickness . Calculate the optimum insulation thickness by both graphical method and analytical method. (16) 5 U

(OR)

- (b) Explain with an example the economic balance for a heat exchanger. (16) 5 U