

B.E/B.TECH. DEGREE EXAMINATION, DECEMBER 2020  
Seventh Semester  
**CH 16701 - PROCESS ECONOMICS FOR CHEMICAL ENGINEERS**  
(Regulation 2016)

Time: Three hours

Maximum : 80 Marks

Answer **ALL** questions

**PART A - (8 X 2 = 16 marks)**

1. How are principles of management are formed?
  - (A) By rule of Thumb
  - (B) By observation and experimentation
  - (C) By experience of customers
  - (D) By experiments in science laboratory
2. Break-even point is the point of intersection.
  - (A) Fixed cost and total cost
  - (B) Total cost and sales revenue
  - (C) Fixed cost and sales revenue
  - (D) Minimum sales revenue
3. Which of the following is a component of working capital investment?
  - (A) Utilities plants
  - (B) Maintenance and repair inventory
  - (C) Process equipment
  - (D) Depreciation
4. Which of the following relationship is not correct is case of a chemical process plant?
  - (A) Manufacturing cost = direct product cost + fixed charges + plant overhead costs
  - (B) General expenses = administrative expenses + distribution & marketing expenses
  - (C) Total product cost = manufacturing cost + general expenses
  - (D) Total product cost = direct production cost + plant overhead cost
5. Identify the important managerial functions in any chemical industry.
6. Mr. Raj has invested money Rs. 1,873 in open ended mutual funds during 2013 and it gains interest at a rate of 12% per annum. Calculate the present value of money if the interest is compounded annually.
7. Give the necessity of accounting system for an organization.
8. List your inferences of economic balance approach.

**PART B - (4 X16 = 64 marks)**

9. (a) (i) Praveen Enterprises manufactures files and folders from old clothes to discourage the use of plastic files and folders. For this, they employ people from nearby villages where very less job opportunities are available. An employee, Kumar, designed a plan for cost reduction but it was not welcomed by the production manager. Another employee gave some suggestions for improvements in design, but it was also not appreciated by the production manager. (8)

Explain the violated principle of management in the Praveen Enterprise?

- (ii) Surya works as a plant superintendent in a carpet making factory. In order to complete the export orders on time, the production manager asks him to make the workers work over time whereas the finance manager is strictly against this practice because it will increase the cost of production. Moreover, Surya feels that since the company is manufacturing handmade carpets as well as machine made carpets there is a lot of overlapping of activities. Therefore, there should be two separate divisions for both of them wherein each division should have its own in charge, plans and execution resources. (8)

Explain the principle of management which is being violated and give your suggestion on which principle should be implemented in the factory.

**(OR)**

- (b) Explain with example on how the “Simultaneous – Motion Cycle ” Chart used to fix “Fair Days Work” in any organization? (16)

10. (a) A laboratory instrument was purchased for Rs. 120000 and was to be used for 5 years with a salvage value of Rs. 10000. Draw graph between annual depreciation charges and year – end book values obtained by using, Straight line depreciation method and Sum – of – digits method and illustrate the findings. (16)

**(OR)**

- (b) (i) The yearly direct production costs for a plant operating at 60 % capacity are Rs.2,70,000, while the sum of the annual fixed charges, overhead costs and general expenses is Rs.2,10,000. (12)

Evaluate the break – even point in units of production per year, if total

annual sales are Rs.5,50,000 and product is sold at Rs.40 / unit.

Also, Calculate annual gross earnings and net profit for this plant at 100 % capacity, when cooperate, income taxes required a 15% tax on the first Rs.50,000 of annual gross earnings, 25% on annual gross earnings of Rs.50000 to Rs.75,000 and 34% on annual gross earnings above Rs.75,000, also 5% on gross earnings from Rs.1,00,000 to Rs.3,35,000?

- (ii) The purchased cost of a shell and tube heat exchanger (floating head and carbon steel tubes) with 9.29 m<sup>2</sup> of heating surface was Rs.2,31,000 in 2019. Evaluate the purchase cost of similar heat exchanger with 18.581 m<sup>2</sup> of heating surface in same year. (Note: use six-tenths-factor rule). **( 4 )**

11. (a) Consider two proposals, each costing Rs.7,50,000. Determine the Rank of proposals under each of the following methods: **(16 )**

- a) Payback  
b) Average rate of return method  
d) Net present value method  
e) Profitability index method.

The tax rate is 50%; depreciation is calculated on straight line method; scrap value is Rs.1000; life time of each of the asset is 3 years and the company is particular about a yield of 12 % per annum. The given below is the cash flows after taxes plus depreciation

	Proposal I	Proposal II
Year 1	40,000	1,80,000
Year 2	1,80,000	1,20,000
Year 3	2,40,000	1,90,000
Year 4	65,000	30,000

**(OR)**

- (b) (i) Explain in detail about project alternative investments followed in process industries. **( 8 )**  
(ii) Analyze and explain the impact of inflation on Men, Material and Machine. **( 8 )**

12. (a) Analyze the contents in the Balance sheet given below and explain the inferences, **(16 )**

<b>Coca-Cola Company</b>		
Consolidated Balance Sheet - January 31, 2001		
Current Assets	Dec. 31, 2001	Dec. 31, 1999
Cash & Equivalents	\$1,819,000,000	\$1,611,000,000
Short Term Investments	\$73,000,000	\$201,000,000
Receivables	\$1,757,000,000	\$1,798,000,000
Inventories	\$1,066,000,000	\$1,076,000,000
Pre-Paid Expenses	\$1,905,000,000	\$1,794,000,000
<b>Total Current Assets</b>	<b>\$6,620,000,000</b>	<b>\$6,480,000,000</b>
Long Term Assets	\$8,129,000,000	\$8,916,000,000
Property, Plant, & Equipment	\$4,168,000,000	\$4,267,000,000
Goodwill	\$1,917,000,000	\$1,960,000,000
<b>Total Assets</b>	<b>\$20,834,000,000</b>	<b>21,623,000,000</b>
Current Liabilities		
Accounts Payable	\$9,300,000,000	\$4,483,000,000
Short Term Debt	\$21,000,000	\$5,373,000,000
<b>Total Current Liabilities</b>	<b>\$9,321,000,000</b>	<b>\$9,856,000,000</b>
Long-Term Liabilities		
Long-Term Debt	\$835,000,000	\$854,000,000
Other Liabilities	\$1,004,000,000	\$902,000,000
Deferred Long Term Liability Charges	\$358,000,000	\$498,000,000
<b>Total Liabilities</b>	<b>\$11,518,000,000</b>	<b>\$12,110,000,000</b>
Shareholders' Equity		
Common Stock	\$870,000,000	\$867,000,000
Retained Earnings	\$21,265,000,000	\$20,773,000,000
Treasury Stock	(\$13,293,000,000)	(\$13,160,000,000)
Capital Surplus	\$3,196,000,000	\$2,584,000,000
Other Stockholder Equity	(\$2,722,000,000)	(\$1,551,000,000)
<b>Total Stockholder Equity</b>	<b>\$9,316,000,000</b>	<b>\$9,513,000,000</b>

(OR)

- (b) With a case study elucidate the economic balance approach for heat transfer operation. (16)