B.Tech DEGREE EXAMINATION, NOVEMBER 2023

Seventh Semester

18CHC402T - PROCESS ECONOMICS AND PROJECT MANAGEMENT

(For the candidates admitted during the academic year 2020 - 2021 & 2021 - 2022)

Note:

i. **Part - A** should be answered in OMR sheet within first 40 minutes and OMR sheet should be handed over to hall invigilator at the end of 40th minute.

ii. **Part - B** and **Part - C** should be answered in answer booklet.

Time: 3 Hours   **Max. Marks: 100**

PART - A (20 × 1 = 20 Marks)
Answer **all** Questions

		Marks	BL	CO

1. The amount deposited one year ago to have $1000 at an interest rate of 5% per year has a value of _____ now   **1   3   1**
   (A) $950.3   (B) $ 952.4
   (C) $955.4   (D) $960.4

2. The graphical representation of the receipt and debit on a time scale is called   **1   1   1**
   (A) Cash plot   (B) Cash flow diagram
   (C) Cash time diagram   (D) Balance statement

3. _____ value implies that an asset can no longer be used and has to be dismantled and sold as   **1   1   1**
   (A) Current value   (B) Book value
   (C) Original value   (D) Scrap value

4. Original cost of a property minus all depreciation charged up to certain time is referred to as _____   **1   1   1**
   (A) market value   (B) current value
   (C) book value   (D) salvage value

5. Paying off debt amount with a fixed repayment schedule in regular installments over time is referred as   **1   1   2**
   (A) Depletion   (B) Amortization
   (C) Continuous compounding   (D) Depreciation

6. Following the six-tenth factor rule, if a log-log plot of capacity of the equipment vs. cost of the equipment is made, then a straight line is obtained, whose slope is equal to   **1   1   2**
   (A) 1   (B) 0.6
   (C) log (0.6)   (D) exp(0.6)

7. Loss is equal to total costs minus   **1   2   2**
   (A) Book value   (B) Total revenues
   (C) Operating cost   (D) Depreciation

8. For a chemical engineering project, the net cash flow is zero at the   **1   2   2**
   (A) End of service life   (B) Break even point
   (C) Start up   (D) End of design step

9. The method that compares annual worth of each alternative over its life cycle is called __ method   **1   1   3**
   (A) Annual cost   (B) Present worth
   (C) Rate of return   (D) Payback period

10. In rate of return method of selecting economic alternatives, the alternative that gives the ____ rate of return is selected as the best alternative — 1 1 3
    (A) Lowest   (B) Highest
    (C) Zero   (D) Negative

11. In comparing the alternatives, if comparison is made for all the relevant annual direct costs and capital recovery costs, then the method is — 1 1 3
    (A) Annual cost method   (B) Present worth method
    (C) Rate of return method   (D) Payback method

12. Estimate the future value of Rs.1000/- after 3 years, if the interest rate is 10% — 1 1 3
    (A) 1610   (B) 1331
    (C) 3221   (D) 1882

13. In doing economic balance of a process, the total cost is obtained by adding _____ and _____ — 1 1 4
    (A) Total cost; Fixed cost   (B) Annual cost; Variable cost
    (C) Fixed cost; Direct cost   (D) Utilities cost ; Fixed cost

14. Which of the following is a cyclic process? — 1 1 4
    (A) Continuous production using PFR   (B) Product withdrawal from a CSTR
    (C) Process in which the process   (D) Smelting of iron
        variables remain unchanged

15. To find the minimum cost for a cost function in economic balance — 1 1 4
    (A) First derivative = 0   (B) First derivative > 0
    (C) First derivative < 0   (D) First derivative can be > 0 or < 0

16. The value of instantaneous production rate in a cyclic process can lie between — 1 1 4
    (A) -1 to -0.5   (B) 0 to infinity
    (C) -1 to 0   (D) -0.5 to 0

17. Two types of managers in workplace are — 1 1 5
    (A) Functional and non-functional   (B) Functional and project
    (C) Project and contractor   (D) Functional and contractor

18. The role of ____ managers is to accomplish a specific task. — 1 1 5
    (A) Project   (B) Contractor
    (C) Supervisor   (D) Operator

19. PERT refers to ____ in project management — 1 1 5
    (A) Project Evaluation and Review   (B) Project Economics and Review
        Technique   Task
    (C) Project Evaluation and Regression   (D) Project Economics and Rate
        Technique   Taxation

20. The acronym DPR refers to ____ in context of project management — 1 1 5
    (A) Detailed project report   (B) Diversification process report
    (C) Depletion plan report   (D) Distance placement report

PART - B (5 × 4 = 20 Marks)
Answer any 5 Questions

                                                           Marks BL CO

21. List out all the equations for economic studies. — 4 1 1

22. A company wants to set up a reserve which will help the company to have an annual equivalent amount INR 10 lakhs for 20 years for employee welfare measure. The reserve is assumed to grow at the rate of 15 % annually. Find the single payment (deposit) that must be made now. — 4 3 2

23. List out the balance sheet ratios and its physical significance. — 4 2 2

	Marks	BL	CO

24. What are the four methods for the selection of economic alternatives? — 4 2 3

25. Explain on economic balance in cyclic operation with an example. — 4 2 4

26. Elaborate the project life cycle. — 4 1 5

27. A small scale company plans an expansion involving Rs.300000 with installation of new equipment's. Depreciable life is 10 years and is expected the net return or profit of Rs75000. Determine the economic pay out time when i=8% and 4% in annuity equation. Which alternative allows minimum time to recover the investment? — 4 3 3

PART - C ($5 \times 12 = 60$ Marks)
Answer all Questions

28. (a) An amount of $10,000 is borrowed to meet a financial obligation at an interest rate of 8% p.a. in 5 years. Construct an amortization table for the following plans:
(i) pay interest due at end of each year and principal at end of 5th year (ii) pay in five equal end of year payments. — 12 1 1

(OR)

(b) The original value of a machine is Rs.33,000, completely installed and ready for use. The salvage value for the equipment is estimated to be Rs 3,000 at the end of the service life of 10 years. Construct the depreciation table for the given data using the following methods: (i) straight line method and (ii) sum-of-the years digits method.

29. (a) The following data are available for a company with no funded debt, current assets 250, $current liabilities$ 40, Stock 8 million shares with par value per share 50, $quick assets$ 150 million, surplus (earnings retained) 610. $Fixed assets$ 1200 and other assets none. Prepare a balance sheet for the above data (All the USD ($) values are in millions). Compute all the possible balance sheet ratios for the above problem. — 12 3 2

(OR)

(b) Data from XYZ Chemical Corporation in the ended fiscal year 2018-2019 is as follows: Gross income is 31,168, $excise taxes are nil$, $Total cost of sales is$ 3,718, and Income tax is 12% of gross profit. The percentage distributions of profit for financial costs, dividends are 6, and 60 respectively. Construct an income statement for the given data. Compute all the possible income statement ratios for the above problem.

30. (a) Two alternatives are under consideration by a manufacturing company. Alternative X will have a first cost of 40,000, $an annual operating cost of$ 25,000 and a 10,000 $salvage value after 4 years$. $Alternative Y will have a first cost of$ 75,000, an annual operating cost of 15,000 $and a$ 7,000 salvage value after its 6 year life. The annual interest rate is 12%. (a) Which alternative should be selected on the basis of an annual worth analysis? (b) If the owner of the company plans to sell after 3 years, which alternative is best, assuming the salvage value will be 14,000 $for X and$ 20,000 for Y at that time? — 12 3 3

(OR)

(b) Evaluate the present worth values for the following two paper making machines and determine which alternative should be preferred, if money is worth 8%? Machine A costs 12,000, $has a life of 14 years, salvage of$ 2000 and annual operating costs of 3000. $Machine B has a life of 14 years, operating costs of$ 4000 per year, costs 8000 $and has a salvage value of$ 1000.

31. (a) A cylindrical vessel is used to hold 20π m^3, The material for the top and bottom of the vessel cost Rs 10 per sq.m. and the material for the side costs Rs 8 per sq.m. Find the optimum radius 'r' and height 'h' for the vessel construction for minimum cost of material.   12   3   4

(OR)

(b) The cost of two independent process variables x and y determines the total cost cT (in INR lakhs) or a chemical process according to the following expression

cT= $100x + (1000/xy) + 20y^2 +50$. Find the optimal values of x and y for minimizing the total cost and also find the corresponding minimum total cost.

32. (a) Describe the various aspects of scoping, planning and approvals in project management.   12   2   5

(OR)

(b) Elaborate the procurement and planning in execution of chemical engineering projects with example.

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