

BIRLA INSTITUTE OF TECHNOLOGY, MESRA, RANCHI
(MID SEMESTER EXAMINATION SP/2025)

CLASS: B.Tech.
BRANCH: PIE

SEMESTER: VI
SESSION: SP/2025

SUBJECT: PE338 PRODUCTION ECONOMICS AND FINANCIAL MANAGEMENT

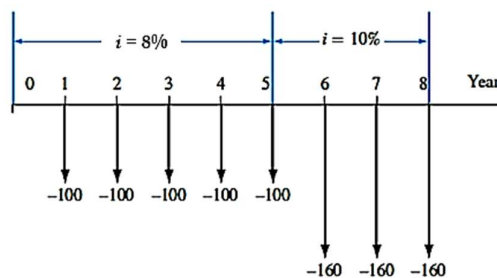
TIME: 02 Hours

FULL MARKS: 25

INSTRUCTIONS:

1. The question paper contains 5 questions each of 5 marks and total 25 marks.
2. Attempt all questions.
3. The missing data, if any, may be assumed suitably.
4. Tables/Data handbook/Graph paper etc., if applicable, will be supplied to the candidates

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|---|-----|----|----|
| Q.1(a) What is the difference between incremental and marginal cost? Explain with a suitable example. | [2] | 1 | 2 |
| Q.1(b) A product is manufactured in batches of 500. The direct material cost is ₹ 15,000, the direct labor cost is ₹ 20,000, and factory overheads are 40 percent of the prime cost. If the selling expenses are 30 percent of the factory cost, what would be the selling price of each product so that profit is 20 percent of the total cost? | [3] | 1 | 3 |
| Q.2(a) With suitable diagrams explain the effect of different variables on BEP. | [2] | 1 | 2 |
| Q.2(b) The fixed costs for the year 2019-20 are ₹ 5,00,000, and the variable cost per unit is ₹ 25. The estimated sales for the period are valued at ₹ 15,00,000. Each unit sells at ₹ 150. Determine: <ol style="list-style-type: none"> (i) Break-even point. (ii) ₹ 12,00,000 will be the likely sales turnover for the next budget period, calculate the estimated contribution and profit. (iii) If a profit target of ₹ 6,50,000 has been budgeted, compute the turnover required. | [3] | 1 | 3 |
| Q.3(a) What is the effective interest rate if the nominal interest rate is 13% compounded monthly with a time interval of two years? | [2] | 2 | 3 |
| Q.3(b) Find the discounted and future values for the negative cash flows shown in the diagram. | [3] | 2 | 4 |



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| Q.4(a) In multiple compounding periods within a year, the interest is 8% compounded quarterly; if someone borrows Rs.1000 for one year, how much must be repaid? | [2] | 2 | 3 |
| Q.4(b) A major repair on the suspension system of a 5-year-old car cost \$2000 because the warranty expired after 3 years of ownership. The cost of periodic maintenance has been \$800 every 2 years. If the owner donates the car to charity after 8 years of ownership, what is the equivalent annual cost of the repair and maintenance in the 8-year period of ownership? Use an interest rate of 8% per year and assume that the owner paid the \$800 maintenance cost immediately before donating the car in year 8. | [3] | 2 | 4 |

- Q.5(a) Bob, a philanthropist, is not sure what rate of return his gifts may realize once donated to his favorite charity. Determine the capitalized cost of \$10,000 every 5 years forever, starting 5 years from now at an interest rate of (a) 8% and (b) 10% per year. [2] 3 4
- Q.5(b) Midwest Power and Light operates 14 coal-fired power plants in several states around the United States. The company recently settled a lawsuit by agreeing to pay \$60 million in mitigation costs related to acid rain. The settlement included \$21 million to reduce emissions from barges and trucks in the Ohio River Valley, \$24 million for projects to conserve energy and produce alternative energy, \$3 million for Chesapeake Bay, \$2 million for Shenandoah National Park, and \$10 million to acquire ecologically sensitive lands in Appalachia. The question of how to distribute the money over time has been posed. Plan A involves spending \$5 million now and the remaining \$55 million equally over a 10-year period (that is, \$5.5 million in each of years 1 through 10). Plan B requires expenditures of \$5 million now, \$25 million 2 years from now, and \$30 million 7 years from now. Determine which plan is more economical on the basis of a present worth analysis over a 10-year period at an interest rate of 10% per year. [3] 3 4

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