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Question Paper Code : 31603

B.E./B.Tech. DEGREE EXAMINATION, NOVEMBER/DECEMBER 2013.

Eighth Semester

Mechanical Engineering

MG 2451/080120038/GE 1451/MG 81 — ENGINEERING ECONOMICS AND COST ANALYSIS/ENGINEERING ECONOMICS AND FINANCE

(Regulation 2008)

(Common to PTMG 2451 – Engineering Economics and Cost Analysis for B.E. (Part – Time) Seventh Semester – Mechanical Engineering, Regulation 2009)

(Common to Production Engineering)

Time : Three hours

Maximum : 100 marks

(Use of Statistical Tables are permitted)

Answer ALL questions.

PART A — (10 × 2 = 20 marks)

1. Differentiate 'technical efficiency' and 'economic efficiency'.
2. Define break-even point.
3. Mention the criteria for make decision.
4. Mention any two applications of various interest formulas.
5. What is the basic concept of 'present worth method of comparison'?
6. What is the basic concept of 'annual equivalent method of comparison'?
7. List the different types of maintenance.
8. What are the reasons for replacement?
9. What is meant by depreciation?
10. Write any two differences in evaluating alternatives of private and public sector organisations.

PART B — (5 × 16 = 80 marks)

11. (a) (i) Mention the factors influencing demand and supply. (8)
(ii) Explain the method of deriving the selling price of a product. (8)

Or

- (b) (i) In the design of a jet engine part, the designer has a choice of specifying either an aluminum alloy casting or a steel casting. Either material will provide equal service, but the aluminum alloy casting will weigh 1.2 kg as compared with 1.35 kg for the steel casting. The aluminum can be cast Rs.80/kg and the steel for Rs.35/kg. The cost of machining per unit is Rs.150 for aluminum and Rs.170 for steel. Every kg of excess weight is associated with a penalty of Rs.1,300 due to increased fuel consumption. Which material should be specified and what is the economic advantage of the selection per unit? (8)
(ii) Explain the steps in process planning. (8)
12. (a) (i) Mention the basic steps of value engineering. (8)
(ii) A person deposits a sum of Rs 20,000 at the interest rate of 18% compounded annually for 10 years. Find the maturity value after 10 years. Use single-payment compound amount formula. (8)

Or

- (b) (i) Write short notes on the time value of money. (8)
(ii) A company has to replace a present facility after 15 years at an outlay of Rs.5,00,000. It plans to deposit an equal amount at the end of every year for the next 15 years at an interest rate of 18% compounded annually. Find the equivalent amount that must be deposited at the end of every year for the next 15 years. Use equal-payment series sinking fund formula. (8)
13. (a) Alpha industry is planning to expand its production operation. It has identified three different technologies for meeting the goal. The initial outlay and annual revenues with respect to each of the technologies are summarized in table. Suggest the best technology which is to be implemented based on the present worth method of comparison assuming 20% interest rate, compounded annually. (16)

	Initial outlay (Rs.)	Annual revenue (Rs.)	Life (years)
Technology 1	12,00,000	4,00,000	10
Technology 2	20,00,000	6,00,000	10
Technology 3	18,00,000	5,00,000	10

Or

- (b) A company is planning to purchase an advanced machine centre. Three original manufacturers have responded to its tender whose particulars are tabulated as follows:

Manufacturer	Down payment (Rs.)	Yearly equal installment (Rs.)	No. of installments
1	5,00,000	2,00,000	15
2	4,00,000	3,00,000	15
3	6,00,000	1,50,000	15

Determine the best alternative based on the annual equivalent method by assuming $i = 20\%$, compounded annually. (16)

14. (a) (i) Write short notes on 'economic life' of an equipment. (8)
- (ii) A firm is considering replacement of equipment, whose first cost is Rs. 4,000 and the scrap value is negligible at the end of any year. Based on experience, it was found that the maintenance cost is zero during the first year and it increases by Rs. 200 every year thereafter. When should the equipment be replaced if $i = 0\%$? (8)

Or

- (b) Two years ago, a machine was purchased at a cost of Rs. 2,00,000 to be useful for eight years. Its salvage at the end of its life is Rs. 25,000. The annual maintenance cost is Rs. 25,000. The market value of the present machine is Rs. 1,20,000. Now, a new machine to cater to the need of the present machine is available at Rs. 1,50,000 to be useful for six years. Its annual maintenance cost is Rs. 14,000. The salvage value of the new machine is Rs. 20,000. Using an interest rate of 12%, find whether it is worth replacing the present machine with the new machine. (16)

15. (a) (i) Distinguish between declining balance method of depreciation and double declining balance method of depreciation. (8)
- (ii) A company has purchased an equipment whose first cost is Rs. 1,00,000 with an estimated life of eight years. The estimated salvage value of the equipment at the end of its lifetime is Rs. 20,000. Determine the depreciation charge and book value at the end of various years using the straight line method of depreciation. (8)

Or

- (b) A state government is planning a hydroelectric project for a river basin. In addition to the production of electric power, this project will provide flood control, irrigation and recreation benefits. The estimated benefits and the cost that are expected to be derived from this project are as follows:

Initial cost = Rs. 8,00,00,000

Annual power sales = Rs. 60,00,000

Annual flood control savings = Rs. 30,00,000

Annual irrigation benefits = Rs. 50,00,000

Annual recreation benefits = Rs. 20,00,000

Annual operating and maintaining cost = Rs. 30,00,000

Life of the project = 50 years

Check whether the state government should implement the project
(assume $i = 12\%$). (16)