B.E. / B.Tech. - DEGREE EXAMINATIONS, NOV / DEC 2025

Seventh Semester

Mechanical and Automation Engineering

20MUPE708 - ENGINEERING ECONOMIC ANALYSIS

Regulations - 2020

(Use of Interest Tables is permitted)

Duration: 3 Hours　　　　　　　　　　　　　　　　　　　Max. Marks: 100

PART - A (MCQ) (10 × 1 = 10 Marks)
Answer ALL Questions

		Marks	K-Level	CO
1.	The flow of money in the form of income and expenditure over different sectors are known as (a) Money flow　(b) Real flow　(c) Nominal flow　(d) Circular flow	1	K1	CO1
2.	Which of the following is NOT a component of break-even analysis? (a) Fixed costs　(b) Variable costs　(c) Sales volume　(d) Market demand	1	K1	CO1
3.	Which of the following is a primary goal of value engineering? (a) To increase product cost (b) To eliminate unnecessary costs while maintaining performance (c) To improve product aesthetics (d) To redesign the product from scratch	1	K1	CO2
4.	For which type of cash flow is the capital recovery factor (CRF) used? (a) A single future sum to be recovered (b) A single present sum to be recovered through equal payments (c) An accumulation of funds to be made up of equal payments (d) An irregular series of payments	1	K1	CO2
5.	While comparing mutually exclusive alternatives with different useful lives, the most preferred method for economic comparison is typically the: (a) Net Present Worth (NPW) analysis　　(b) Net Future Worth (NFW) analysis (c) Net Annual Worth (NAW) analysis　　(d) Payback Period	1	K1	CO3
6.	The Internal Rate of Return (IRR) method is used for which of the following? (a) To determine if a project is worth pursuing (b) To calculate the payback period of a project (c) To assess the company's liquidity (d) To measure the company's solvency	1	K1	CO3
7.	Maintenance performed on a regular basis to reduce the likelihood of failure is: (a) Routine maintenance　　　　　(b) Breakdown maintenance (c) Preventive maintenance　　(d) Predictive maintenance	1	K1	CO4
8.	For items that fail completely and suddenly, like a light bulb, which of the following is a common probabilistic model assumption? (a) The probability of failure decreases over time (b) The item deteriorates gradually before failing (c) The failure rate is constant over the item's useful life (d) The failure is deterministic and predictable.	1	K1	CO4
9.	Depreciation is charged on: (a) Fixed assets　(b) Current assets　(c) Liabilities　(d) Capital	1	K1	CO5
10.	Which of the following best describes the goal of inflation-adjusted decisions? (a) To maximize nominal returns on investments (b) To account for changes in purchasing power to make more realistic financial decisions (c) To ensure all assets are reported at their original purchase price (d) To increase the supply of money in the economy	1	K1	CO6

PART - B (12 × 2 = 24 Marks)
Answer ALL Questions

11. Write the formula to calculate engineering efficiency and economic efficiency.	2	K1	CO1
12. Outline the objectives of process planning.	2	K2	CO1
13. Illustrate the time value of money	2	K2	CO2
14. What is meant by effective interest rate?	2	K1	CO2
15. Write the potential sources of cash inflow over the project life.	2	K1	CO3
16. State the formula to calculate rate of return.	2	K1	CO3
17. Define economic service life of an asset?	2	K1	CO4
18. Discuss capital recovery cost.	2	K2	CO4
19. Outline the various methods used in depreciation calculation.	2	K2	CO5
20. What are the causes of depreciation?	2	K1	CO5
21. Define inflation.	2	K1	CO6
22. Explain the significance of timely maintenance.	2	K2	CO6

PART - C (6 × 11 = 66 Marks)
Answer ALL Questions

23. a) Explain the factors which influence demand and supply. `11  K2  CO1`

OR

b) What is meant by breakeven point? Draw a break-even chart and evaluate its components. `11  K2  CO1`

24. a) (i) A person deposits a sum of ₹20,000at the interest rate of 10% compounded annually for 10 years. Solve the maturity value after 10 years, by using single payment compound amount method. `5  K3  CO2`

(ii) A company has to replace a present facility after 15 years at an outlay of ₹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 9% compounded annually. Solve the equivalent amount that must be deposited at the end of every year for the next 15 years, by using equal payment series sinking fund method. `6  K3  CO2`

OR

b) Make use of cash flow diagrams, describe equal payment series capital recovery amount and Uniform gradient series annual equivalent factor. `11  K3  CO2`

25. a) Illustrate and construct any two cash flow diagrams for alternative with suitable examples. `11  K2  CO3`

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 (₹)	Yearly equal installment (₹)	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

`11  K2  CO3`

Compare the annual equivalent cost expression of the three manufacturer and describe the best alternative based on the annual equivalent method by assuming i=20%, compounded annually.

26. a) (i) What is meant by maintenance and replacement? Elucidate the various types of replacement problem. *6 K2 CO4*

   (ii) Distinguish between break down maintenance and preventive maintenance. *5 K2 CO4*

OR

   b) Two years ago, a machine was purchased at a cost of ₹2,00,000 to be useful for eight years. Its salvage value at the end of its life is ₹ 25,000. The annual maintenance cost is ₹ 25,000. The market value of the present machine is ₹ 1,20,000. Now a new machine to cater to the need of the present machine is available at ₹ 1,50,000to be useful for six years. Its annual maintenance cost is ₹ 14,000. The salvage value of the new machine is ₹ 2,00,000. Using an interest rate of 12%, find whether it is worth replacing the present machine with the new machine. *11 K2 CO4*

27. a) Build the term depreciation fund and develop the various methods of depreciation. *11 K3 CO5*

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 costs that are expected to be derived from this project are as follows:
   1. Initial cost = ₹8,00,00,000
   2. Annual power sales = ₹ 60,00,000
   3. Annual flood control savings= ₹ 30,00,000
   4. Annual irrigation benefits = ₹50,00,000
   5. Annual recreation benefits = ₹ 20,00,000
   6. Annual operating and maintenance costs = ₹30,00,000
   7. Life of the project = 50 years
      Check whether the state government should implement the project or should not implement the project. (Assume i= 12%). *11 K3 CO5*

28. a) Discuss on the concept and the scope of "Engineering Economics ". *11 K2 CO6*

OR

   b) Discuss economic service life of an asset and main causes of breakdown. *11 K2 CO6*