

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-IV EXAMINATION – WINTER 2025

Subject Code:3144201

Date:26-11-2025

Subject Name:Engineering Economics

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1	(a) Define opportunity cost with an example.	03
	(b) Explain the Law of Demand with a Graph.	04
	(c) Explain two types of efficiency and what are the ways of improving Economic efficiency.	07
Q.2	(a) Draw a cost-dominated cash flow diagram for the future worth method using a suitable example.	03
	(b) ABC Associates has the following details: Fixed cost = Rs. 20,00,000 Variable cost per unit = Rs. 100 Selling price per unit = Rs. 200 Find (a) The break-even sales quantity, (b) The break-even sales (c) If the actual production quantity is 60,000, find (i) contribution; and (ii) margin of safety.	04
	(c) In the design of a jet engine part, the designer has a choice of specifying either an aluminium alloy casting or a steel casting. Either material will provide equal service, but the aluminium casting will weigh 1.2 kg as compared with 1.35 kg for the steel casting. The aluminium can be cast for Rs. 80.00 per kg. and the steel one for Rs. 35.00 per kg. The cost of machining per unit is Rs. 150.00 for aluminium and Rs. 170.00 for steel. Every kilogram 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?	07
	OR	
	(c) Two alternatives are under consideration for a tapered fastening pin. Either design will serve the purpose and will involve the same material and manufacturing cost except for the lathe and grinder operations. Design A will require 16 hours of lathe time and 4.5 hours of grinder time per 1,000 units. Design B will require 7 hours of lathe time and 12 hours of grinder time per 1,000 units. The operating cost of the lathe including labour is Rs. 200 per hour. The operating cost of the grinder including labour is Rs. 150 per hour. Which design should be adopted if 1,00,000 units are required per year and what is the economic advantage of the best alternative?	07
Q.3	(a) Explain the time value of money.	03

- (b) A finance company advertises two investment plans. In plan 1, the company pays Rs. 12,000 after 15 years for every Rs. 1,000 invested now. In plan 2, for every Rs. 1,000 invested, the company pays Rs. 4,000 at the end of the 10th year and Rs. 4,000 at the end of 15th year. Select the best investment plan from the investor's point of view at $i = 12\%$, compounded annually. **04**
- (c) Distinguish between breakdown maintenance and preventive maintenance. **07**

OR

- Q.3** (a) Describe the concept of challenger and Defender **03**
- (b) Novel Investment Ltd. accepts Rs. 10,000 at the end of every year for 20 years and pays the investor Rs. 8,00,000 at the end of the 20th year. Innovative Investment Ltd. accepts Rs. 10,000 at the end of every year for 20 years and pays the investor Rs. 15,00,000 at the end of the 25th year. Which is the best investment alternative? Use present worth base with $i = 12\%$. **04**
- (c) Define the 'economic life' of an equipment with the help of a graph. **07**

- Q.4** (a) Discuss the reasons for replacement. **03**
- (b) Describe the sinking-fund method of depreciation **04**
- (c) A company has purchased 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. **07**

OR

- Q.4** (a) The first cost of a road laying machine is Rs. 80,00,000. Its salvage value after five years is Rs. 50,000. The length of road that can be laid by the machine during its lifetime is 75,000 km. In its third year of operation, the length of road laid is 2,000 km. Find the depreciation of the equipment for that year. **03**
- (b) Explain sum of the years—digits method of depreciation **04**
- (c) Distinguish between declining balance method of depreciation and double declining balance method of depreciation. **07**

- Q.5** (a) What is the meaning of inflation **03**
- (b) Explain the significance of Environmental, Social and Governance **04**
- (c) Explain the meaning of Business ethics with its need in Engineering Economics. **07**

OR

- Q.5** (a) Explain the steps in the process planning. **03**
- (b) Explain the procedure to adjust the inflation **04**
- (c) Describe the significance of Corporate Social Responsibility **07**
