

NATIONAL INSTITUTE OF TECHNOLOGY KARNATAKA, SURATHKAL
SCHOOL OF HUMANITIES, SOCIAL SCIENCES AND MANAGEMENT

Register No.

2110491

V SEMESTER B. TECH (E&E, IT, CHEMICAL, E&C, CSE) AND VII SEMESTER (CSE)
MID SEMESTER EXAMINATIONS- SEPTEMBER/OCTOBER 2023
SM300 - ENGINEERING ECONOMICS

Duration: 1 hour 30 minutes

Maximum Marks: 50

Answer any TEN of the following questions.

(10 × 5 = 50)

1. Explain the diamond water paradox.
2. Why should engineers be concerned about the economic interpretation of engineering proposals?
3. What is an indifference curve? Explain the concept of marginal rate of substitution in the context of the indifference curve.
4. Explain some factors that can cause a shift in the demand curve.
5. Why is the notion of sustainable development more relevant than the concept of economic growth in the present world?
6. How do the income and substitution effects of a price change explain the downward-sloping demand curve for a normal good?
7. Describe the relationship among marginal cost, average variable cost and average total cost curves. Why short-run cost curves are U-shaped?
8. Explain different components of the Human Development Index. Comment on the methodology used to measure income.
9. The monthly demand for Biscuits is given by the equation $D = 100 - 5P + 4P_o + 6A$ where D is the demand for Biscuits, P is the price of Biscuit and P_o is the price of other related products, Cookies, and A is advertisement expenditure in thousands of rupees. The price of Biscuits is Rs. 25, the price of Cookies is Rs. 30 and advertisement expenditure is Rs. 20,000. Calculate the own-price elasticity of demand for Biscuits. Is the demand for Biscuits elastic or inelastic at this price? Further, calculate the cross-price elasticity of demand for Biscuits with respect to Cookies.
10. Consider the following table on marginal utilities of consumption of two products, A and B. If the price of product A is Rs. 100 per unit, the price of product B is Rs. 50 per unit, and the income to be spent on these two products is Rs. 1000, then find the quantities of the two products to be consumed such that the consumer equilibrium will be maximised.

	Unit of Consumption									
	First	Second	Third	Fourth	Fifth	Sixth	Seventh	Eighth	Nineth	Tenth
MU for A	5000	4600	4000	3600	3300	2600	2000	1800	1500	1000
MU for B	2000	1800	1500	1200	1100	1000	750	700	600	500

11. What are the objectives of demand forecasting?

Year	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Sales	22734	24731	31489	44685	55319	91021	146234	107887	127483	97275

Estimate the linear regression equation and forecast sales for 2021 & 2022.

12. Answer the following questions based on the understanding of elasticity of demand and supply i) if government wants to maximize the tax revenue, what kind of products government should select for imposing higher tax? ii) What should be the public policy on hazardous products like tobacco and alcohol?

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V SEMESTER B. TECH (E&E, IT, CHEMICAL, E&C, CSE) AND VII SEMESTER
(CSE) END SEMESTER EXAMINATIONS- DECEMBER 2023
SM300 - ENGINEERING ECONOMICS

Duration: 3 hours

Maximum Marks: 100

Instructions: 1. Read all the questions carefully before answering.
2; Your answer should include all steps.

I Answer all the following questions.

10 X 10 = 100

1. An R&D laboratory would like to purchase a Transformer Ohmmeter with an initial investment of Rs. 9 Lakhs and an annual operating and maintenance cost of Rs. 5000 for a life of 10 years. The device can earn a testing consultancy-based income of Rs. 1 Lakh in the first year, which is likely to increase by 12 per cent annually from the second year onwards. The salvage value of the device is Rs. 8000 at the end of its life. Perform an annual worth analysis at an 8% interest rate and decide whether the laboratory should purchase this device.
- 2/ Why do companies use the Rate of Return (ROR) approach for comparing alternative investment options? What are the steps to perform ROR analysis to choose in the case of mutually exclusive equal-life multiple alternatives?
3. Why a replacement study is performed? Explain the basic concepts of replacement analysis and data used for a replacement study. Why the actual original cost of an asset is neglected when performing a replacement analysis?
4. A town's local government plans to reclaim a garden to build a library. The initial cost of the construction is expected to be Rs. 5 Lakhs. The annual maintenance cost of the library will be Rs. 8000, which is expected to increase by Rs. 1000 per year from the fourth year onwards. The life of the building is 20 years, and the salvage value is zero. The expected benefits from constructing this library are Rs. 45,000 per year, which is likely to increase by Rs. 5000 per year from the sixth year onwards. The expected annual disbenefits to the residents near the library are Rs. 10,000. At an 8% interest rate, perform a conventional

benefit-cost analysis and decide whether the plan to build the library should be undertaken.

5. A machine purchased three years ago for Rs. 45,000 is harder to maintain than expected. It can be sold now for Rs. 30,000 or kept for a maximum of three more years. In that case, its annual operating cost will be Rs. 10,000 each year. The salvage value of the machine will be 15,000 next year, which will decrease yearly by Rs. 5000 for the remaining period of its life. A suitable alternative is a fixed contract of Rs. 25,000 per year, available today and in the following years. At an 8% interest rate, perform a replacement analysis this year to decide when to replace the machine.
6. A coal mining company wants to decide the location of its centralized warehouse where it can store coal mined from multiple sources. Explain a suitable method that this company can use to decide where to locate this centralized facility.
7. Why do organizations depreciate their assets? What can be depreciated? If a company invests in an asset of Rs. 60000, which has a life of 4 years and a salvage value of zero, what will be the amount depreciated each year if the company uses the double declining balance method to depreciate its asset?
8. A company wants to decide whether to make or buy a specific component required in its production process. If the company decides to make the product, then it will incur an initial investment cost of setting up the factory for Rs. 10 Lakhs and an annual maintenance cost of Rs. 20000. The raw material and operating cost per unit of production of the component will be around Rs. 25. The life of the factory will be 15 years. Alternatively, the company can buy the component at a unit price of Rs. 55. It is assumed that the component will be available in the market for the next 15 years. What is the break-even quantity between make and buy options? $r = 8\%$
9. A company has to choose one project between two cost alternatives. The first project has a life of 10 years with an initial investment of Rs. 5 Lakhs, an annual operating cost of Rs. 4000. The salvage value is Rs. 5,000 at the end of its life. The second project is an infinite-duration project with an initial investment of Rs. 10 Lakhs, an annual operating cost of Rs. 7000, and zero salvage value. Perform capitalized cost analysis at an 8% interest rate to choose between the two alternatives.

10. Imagine that you are the production manager of a company. With the help of suitable examples explain any two methods of forecasting that your company could use to forecast the demand for its products. **OR**

What is cost estimation? Explain the cost estimation methods used in engineering economy studies.

Interest Rate Table $i = 8\%$

N	F/P	P/F	F/A	P/A	A/F	A/P	P/G	A/G
1	1.0800	0.9259	1.0000	0.9259	1.0000	1.0800	0.0000	0.0000
2	1.1664	0.8573	2.0800	1.7833	0.4808	0.5608	0.8570	0.4808
3	1.2597	0.7938	3.2464	2.5771	0.3080	0.3880	2.4450	0.9487
4	1.3605	0.735	4.5061	3.3121	0.2219	0.3019	4.65	1.404
5	1.4693	0.6806	5.8666	3.9927	0.1705	0.2505	7.372	1.8465
6	1.5869	0.6302	7.3359	4.6229	0.1363	0.2163	10.523	2.2763
7	1.7138	0.5835	8.9228	5.2064	0.1121	0.1921	14.024	2.6937
8	1.8509	0.5403	10.6366	5.7466	0.094	0.174	17.806	3.0985
9	1.999	0.5002	12.4876	6.2469	0.0801	0.1601	21.808	3.491
10	2.1589	0.4632	14.4866	6.7101	0.069	0.149	25.977	3.8713
11	2.3316	0.4289	16.6455	7.139	0.0601	0.1401	30.266	4.2395
12	2.5182	0.3971	18.9771	7.5361	0.0527	0.1327	34.634	4.5957
13	2.7196	0.3677	21.4953	7.9038	0.0465	0.1265	39.046	4.9402
14	2.9372	0.3405	24.2149	8.2442	0.0413	0.1213	43.472	5.2731
15	3.1722	0.3152	27.1521	8.5595	0.0368	0.1168	47.886	5.5945
16	3.4259	0.2919	30.3243	8.8514	0.033	0.113	52.264	5.9046
17	3.700	0.2703	33.7502	9.1216	0.0296	0.1096	56.588	6.2037
18	3.996	0.2502	37.4502	9.3719	0.0267	0.1067	60.843	6.492
19	4.3157	0.2317	41.4463	9.6036	0.0241	0.1041	65.013	6.7697
20	4.661	0.2145	45.762	9.8181	0.0219	0.1019	69.09	7.0369
30	10.0627	0.0994	113.2832	11.2578	0.0088	0.0888	103.456	9.1897