Qn. Set Code-1

Semester: 3rd
Programme: B.Tech
Branch: CSE, IT, CSCE, CSSE, CE, E&TC

AUTUMN END SEMESTER EXAMINATION-2022

3rd Semester B.Tech

ENGINEERING ECONOMICS

HS2002 / HS_2002 / HS-2002

(For 2022 (L.E), 2021 & Previous Admitted Batches)

Time: 3 Hours | Full Marks: 50

Answer any SIX questions.
Question paper consists of four SECTIONS i.e. A, B, C and D.
Section A is compulsory.
Attempt minimum one question each from Sections B, C, D.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable and all parts of a question should be answered at one place only.

SECTION-A

1. Answer the following questions. [1 × 10]

(a) The demand schedule for winter garments in Delhi market is given below

Price (P)	70	72	74	76	78
Demand (D)	100	90	80	70	60

Write the demand equation for the above demand schedule.

(b) Price elasticity of demand for fine wine in Washington market is 0.9. What advice you will give to the wine sellers if they want to increase their Total Revenue (TR)?

(c) What will be the effect of increase in the cost of production of a product on the market supply condition? Show this with the help of supply curves.

(d) Draw a suitable diagram to explain the Decreasing Marginal Rate of Technical Substation of Labour for Capital ($DMRTS_{LK}$).

(e) Prove that Marginal Cost (MC) is not affected by the Total Fixed Cost (TFC).

(f) Write an expression for Effective Interest rate using the following notations
R = Effective interest rate per year
i = Nominal interest rate per year
m = No. of compounding periods per annum

(g) Write the expression to find NDP_{MP} when GNP_{FC} is given.

(h) Write an expression for getting the Book Value of an asset for any specific period t by Sinking Fund method, given
P = Cost of the asset
F = Salvage value of the asset
i = interest rate
n = Life period of the asset

(i) TATA Company has the following long run production function
Q = 100 kL
Check the return to scale. Do the Diseconomies outweigh the Economies of scale in the company?

(j) Find the amount of National Income given the following information
GDP_{MP} = ₹ 20,000 Crore
NIT = ₹ 500 Crore
NFIA = ₹ 300 Crore
Depreciation = ₹ 100 Crore
NB:
NIT = Net Indirect Tax
NFIA = Net Factor Income from Abroad

SECTION-B

2. (a) The Average Revenue (AR) function of a company is given as [4]

$AR = 7000 - 4Q$

(i) Find the Output (Q) beyond which Total Revenue (TR) declines.

(ii) Draw the Average Revenue (AR) and Marginal Revenue (MR) lines on the basis of relation between AR and MR functions of the company.

(b) A manufacturing unit is facing the following market demand and supply functions for its product [4]

$Q = 10000 - 2P$ (Demand)

$Q = 7000 + 2P$ (Supply)

(i) Currently the company sells the product at ₹ 750 per unit. If a GST of ₹ 100 is imposed by the Government what would be the revised price?

(ii) Draw a suitable diagram to exhibit the distribution of tax between the consumer and the seller.

3. (a) Russia-Ukraine war wave is going on. Since both are neighbouring countries their demand function for wheat is estimated to be [4]

$Q = 25000 - 8P + 0.8Y$

where

Q = demand for wheat

P = Price of wheat

Y = Per Capita Income

(i) Find the price elasticity and income elasticity of demand for wheat at P = \$2000 and Y = \$2000.

(ii) How a 50% decrease in income in Ukraine and 10% increase in price of wheat in Russia will affect the demand for wheat?

(b) Dindi and Dew want to spend their pocket money of $19 on two goods burger (X) and lollipop (Y). The price of burger is $3 per unit and price of lollipop is $2 per unit. The marginal utility schedule of two goods (MU_X and MU_Y) is given below.

Units of goods	MU_X	MU_Y
1	24	12
2	21	9
3	19.5	7
4	18	5
5	13.5	3
6	8.1	2

(i) Find the combination of goods at which they will maximize their utility.

(ii) Show their utility maximizing condition by an appropriate diagram.

SECTION-C

4. (a) Delisha, an entrepreneur is facing the following short-run production function

$Q = f(L)$

$Q = 100L + 500L^2 - 5L^3$

where

Q = output

L = units of Labour

(i) Beyond what labour unit the Total Product of Labour will increase at a decreasing rate?

(ii) Find the Labour unit after which Delisha will enter into the stage of Decreasing Return in the short run.

(b) Sanchit manufacturing unit faces the following Total Variable Cost (TVC) condition [4]

$TVC = 300Q - 30Q^2 + Q^3$

(i) Determine the output (Q) where Marginal Cost (MC) curve cuts the Average Variable Cost (AVC) curve.

(ii) Find the output after which MC rises.

5. (a) KASIA DAS and BABY DAS are two contractors. Both of them want to take one project in which an initial investment of ₹ 8,00,00,000 is required. An annual benefit of ₹ 2,70,00,000 can be received from the project for 5 years. The personal MARR (Minimum Attractive Rate of Return) of KASIA is 25% and that of BABY DAS is 17.5% percent. Find the Rate of Return (ROR) of the project. Between KASIA and BABY who should not take the project? [4]

(b) The cost of a machine is ₹25,00,000. The salvage value of the machine at the end of its useful life of 8 years is 10% of the purchase value. Tabulate the annual depreciation and Book value of the asset for each year by Declining Balance method at the depreciation rate of $\frac{2}{N}$ (N is the life of the asset). [4]

6. (a) You are the Project Manager of a company and you find the following information about a proposal. [4]

Particulars	Amount of Cash Flows ($)
Initial Cost	10,00,000
Cost at the end of 9th year to maintain the productivity	4,00,000
Annual O/M cost	25,000
Equivalent receipt at the end of each year	1,60,000
Additional benefit at the end of 11th year for better production	1,60,000
Salvage Value	25,000
Life (years)	20

Find the Annual Worth (AW) amount of Costs and Benefits separately at the discount rate of 10% compounded per annum. Should the proposal be implemented on the basis of AW analysis?

(b) The Fixed Cost incurred by a company is $100000. The Average Variable Cost is $40 and the selling price per unit is $100.

(i) Find the break-even sales value using the P/V ratio of the company.

(ii) What is the Margin of Safety (MOS) percentage when Actual Production Quantity is 2000 units? Graphically depict the MOS by the use of break-even production quantity and actual production quantity of the company?

SECTION-D

7. (a) The Hanging Bridge of Gujurat state collapsed recently. The Government of Gujurat has decided to construct another bridge in its place with latest technology. The initial cost of the bridge is ₹50,00,00,000. The annual maintenance cost of the bridge is ₹20,00,000 during the first phase of the life of 20 years. At the end of 12^{th} year the Government has to incur an additional cost of ₹5,00,00,000 to increase the strength of the bridge. The annual public benefit from the use of the bridge is estimated to be ₹4,50,00,000. An additional benefit of ₹5,00,00,000 will be received at the end of 10^{th} year because of festive season. Determine the Benefit-Cost ratio of this proposal at the interest rate of 8% compounded annually. Should the bridge be constructed? (Use PW analysis)

(b) With the help of right figures clearly demonstrate the Demand-Pull and Cost-Push inflation. Between Demand-Pull and Cost-Push which one do you consider to be more responsible for inflationary situation in your economy?

8. (a) A monopolist is facing the following demand and cost conditions [4]

$Q = 450 - 5P$

$C = 5000 + 2Q$

(i) Determine the equilibrium Price and Quantity of the monopolist. Is the monopolist earning profit?

(ii) Illustrate the profit condition of the monopolist with a correct diagram.

(b) Monetary measures are always instrumental in controlling the inflationary situation of an economy. In light of this explain the following monetary measures taken by the apex bank for curbing inflationary pressure [4]

(i) Statutory Liquidity Ratio

(ii) Cash Reserve Ratio

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