B. Tech.
4nd Semester (*2022AB & Back*)
Spring 2023-2024

MID SEMETER EXAMINATION, SPRING 2023-2024
EVALUATION SCHEME
Subject: Engineering Economics
Code: HS30101

Full Marks: 20 **Time: 90 minutes**

Answer any FOUR QUESTIONS including question No. 1 which is compulsory.
The figures in the margin indicate full marks.
Candidates are required to give their answers in their own words as far as practicable. All parts of a question should be answered at one place only.

Q.1	Answer the following Questions	Marks	CO
a)	Mention the importance of Engineering Economics. **ANS: It will help the technocrats to know how to make efficient or best utilization of limited resources.** **It will also help them in taking economic decision in the selection of best project out of alternative projects.**	**1**	CO1
b)	From the following table find out Marginal utility (MU). Explain how MU is related to total utility (TU).	**1**	CO1

Units of commodity consumed(Q)	TU
1	14
2	24
3	32
4	38
5	42
6	44
7	44
8	40

ANS:

Units of commodity consumed(Q)	**TU**	**MU**
1	**14**	**14**
2	**24**	**10**
3	**32**	**8**
4	**38**	**6**

	5	42	4
	6	44	2
	7	44	0
	8	40	-2

Students will have to write the definition of MU and TU.

Then the formula of MU i.e. MU = dTU/dU

c)	Define market demand schedule. If there are two consumers in a market having their respective demand functions as $Q_1 = 50 – 5P$ and $Q_2 = 70 – 7P$ (1 and 2 are the two individual consumers), then find out the market demand function. **ANS: Students have to write the definition of market demand schedule.** **Market demand function: $Q_M = Q_1 + Q_2 = 120 -12P$**	**1**	CO1
d)	Explain whether the price of a commodity per unit is the average revenue (AR) of a producer. ANS: Yes. TR = P X Q TR = AR XQ ⇨ P = AR	**1**	CO2
e)	Distinguish between compound interest rate and effective interest rate. **ANS: Definition of both compound interest rate and effective interest rate.** **Respective formulae of the two-interest rate.**	**1**	CO3

Q.2		**Marks**	**CO**
a)	Explain how indifference curve is different from the budget line with the help of suitable diagrams. **ANS: Students will have to write the definition of indifference curve budget line and then have to draw the diagram of indifference curve and budget line.**	**3**	CO2
b)	(i) A company has following demand and supply functions. Find out equilibrium price and quantity. $Q_d = 800 – 10P$ $Q_s = 500 + 20P$	**2**	CO2

	(ii)Find out new equilibrium price and quantity if supply remaining constant demand increases to $Q_d = 1000 - 15P$ **ANS: At equilibrium point $Q_d = Qs \Rightarrow 300 = 30P$** **$\Rightarrow P = 10, Q = 700$** **New equilibrium price will be $1000 - 15P = 500 + 20P$** **$\Rightarrow P_1 = 14.28, Q_1 = 785.8$**		

Q.3		Marks	CO
a)	A consumer purchases 100 units of a commodity when his income is ₹ 40,000 per month. Find out income elasticity of demand for the commodity if now the consumer is purchasing 200 units of it due to increase in his income to ₹ 50,000 per month. Mention the nature of the commodity with reasons. **ANS: $E_Y = dQ/dY \times Y/Q = 100/10,000 \times 40,000/100$** **$= 4$** **The commodity is a normal good as here demand for the commodity increases with the increase in income of the consumer.**	3	CO2
b)	If quantity demand for a commodity declines from 500 to 300 units due to a rise in the price from ₹ 30 to ₹ 40 per unit, find out price elasticity of demand for the commodity with the help of arc method. **ANS: $e_{arc} = dQ/dP \times P1 + P2 / Q1 + Q2$** **$= - 200/10 \times 70/800 = \lvert -4.25 \rvert = 4.25$**	2	CO2

Q.4		Marks	CO
a)	A person deposits ₹ 8,00,000 in a bank for 8 years at 6% interest rate. Find out maturity amount of his account if the compounding is monthly. **ANS: $F_{12} = P (1 + i/12)^{12x8} = 12,91,314.166$**	2.5	CO3
b)	Find out future value of ₹ 10,00,000 after 9 years at 7.5% interest rate with the help of simple interest rate. **ANS: $F = P (1 + IN) = 16,75,000$**	2.5	CO3

Q.5		Marks	CO
a)	A person needs ₹ 60,00,000 after 10 years to renovate her company. Find out how much money the person has to deposit now to get ₹	2.5	CO3

	60,00,000 after 10 years if the interest rate is 8% compounded annually along with the cash-flow diagram. **ANS: $P = F\,[1/(1+i)^n] = 27,79,160.928$**		
b)	A person invests an equal amount of ₹ 25,000 at the end of every year for 20 years in an insurance company. Find the maturity amount of his account if the interest rate is 10% compounded annually. Draw the cash-flow diagram from the insurance company's point of view. **ANS: $F = A\,[(1+i)^n - 1/i] = 14,31,874.987$**	**2.5**	CO3

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