JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -2 EXAMINATION- 2024

B.Tech-VI Semester (CSE/IT/ECE/CE)

COURSE CODE(CREDITS): 23B1WHS631 (3) MAX. MARKS: 25

COURSE NAME: Engineering Economics

COURSE INSTRUCTORS: Bilal Khan MAX. TIME: 1 Hour 30 Minutes

Note: (a)All questions are compulsory.

(b)Marks are indicated against each question in square brackets.

(c) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.

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1. For the given Cobb-Doughlas production function of a firm:

$$Q=f(L, K) = AL^{\alpha}K^{\beta}$$

   Prove that: (CO2) [2+3=5]
   (a) Elasticity of Factor Substitution (σ) is 1
   (b) Marginal Product of Labour (MP_L) and Marginal Product of Capital (MP_K) are homogenous of degree 0, respectively.

2. Find the degree of homogeneity for the following production functions, and mention whether they exhibit increasing, decreasing or constant returns to scale: (CO3) [1X3=3]
   (a) $Q=f(L,K,T)= \frac{LK^2}{T} + 2LT$
   (b) $Q=f(L,K)= 10L^{1/2} + 5K^{1/2}$
   (c) $Q= f(L,K)= L^3 + 4L^2K + K^3$

3. The production function of a firm is given as $Q=2L^{1/3}K^{2/3}$. The price of labour is Rs. 8 per unit and the price of capital is Rs. 2 per unit. Using the langrage method, find the cost-minimizing combination of labour and capital to produce 64 units of output? Also find the total minimum cost for the firm. (CO3) [5]

4. Discuss the equilibrium of the industry in long run under perfect competition. (CO3) [4]

5. A monopolist sells his output in two different markets. His demand and cost functions are as follows: (CO4) [8]

Market I: $Q_1 = 21 - 0.1P_1$

Market II: $Q_2 = 50 - 0.4P_2$

TC=C= 2000+10Q= 2000+10 $(Q_1 + Q_2)$

Find:
(a) What is the profit maximizing level of output (Q) produced by the monopolist (i) with discrimination, and (ii), without discrimination?
(b) What price (P) will the monopolist charge: (i) with discrimination, and (ii) without discrimination.
(c) Compare the profit differentials (Π) between the discriminated market and non-discriminated market.
(d) Calculate the elasticity of demand (E_d) in discriminated markets.