

Name:	
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, December 2018**

**Course: Microeconomics**  
**Course Code: ECON 7005**

**Semester: I**

**Programme: MA Economics**  
**Time: 03 hrs.**

**Max. Marks: 100**

**Instructions:** Answer **all** the questions from Section A, **Four** questions from Section B, **Two** questions from Section C and Section D is **compulsory**.

**SECTION A (5\*4 = 20 marks)**

S. No.		Marks	CO
Q 1	Let the production function be $Q = 5K^{0.4}L^{0.8}$ , where Q represents level of output, K and L denotes capital and labour respectively.  Find the degree of homogeneity and determine the returns to scale for the given production function.	4	2
Q 2	What is elasticity of substitution ( $\sigma$ ). How to measure it? What will be the value of $\sigma$ if the two inputs are perfect substitutes?	4	2
Q 3	The total cost of production of $x$ units of commodity is given as  $C(x) = x^3 - 90x^2 + 7500x, x \geq 0$ .  (a) Compute the marginal cost function $C'(x)$ . (b) Find the level of output $x$ at which marginal cost is minimum.	4	3
Q 4	Calculate the marginal rate of substitution ( $MRS_{xy}$ ) for the utility function $u(x_1, x_2) = x_1^c x_2^d$	4	2
Q 5	Show that when price elasticities are the same price discrimination is not profitable.	4	2

**SECTION B (4\*5 = 20 marks)**

Q 1	Prove that the relationship between marginal revenue (MR) and price elasticity $e$ is $MR = P(1 - \frac{1}{e})$ , where $P$ denotes price.	5	1
Q 2	Explain the derivation of demand curve using indifference curve approach.	5	1
Q 3	Describe different types of price discrimination.	5	1
Q 4	What are the necessary conditions for the implementation of price discrimination?	5	1

Q 5	Describe the relationship between marginal cost and average (total) cost.	5	1
<b>SECTION-C (2*15 = 30 marks)</b>			
Q 1	Explain Slutsky's theorem of decomposing price effect into substitution effect and income effect using graphs.	15	2
Q 2	Let the utility function is given as $u(x_1, x_2) = x_1^a x_2^b$ and the price of $x_1$ and $x_2$ are given as $P_1$ and $P_2$ respectively. The total income of the consumer is $M$ . the budget constraint. Find the demand function for $x_1$ and $x_2$ using the Lagrangian method.	15	4
Q 3	Assume that the production function is $Q = AL^a K^b$ , where $Q$ is level of output, $A$ is a constant, and $L$ and $K$ denote labour and capital respectively.  Compute the marginal product of $L$ and $K$ , the marginal rate of substitution $MRS_{L,K}$ and the elasticity of substitution $\sigma$ .	15	3
<b>SECTION-D (2*15 = 30 marks)</b>			
	Assume that the market demand and the costs of the duopolists are as given below. Market demand: $P = 100 - 0.5(X_1 + X_2)$ , where $P$ is market price, $X_1$ and $X_2$ are output of firm 1 and firm 2 respectively. Cost function of firm 1: $C_1 = 5X_1$ Cost function of firm 2: $C_2 = 0.5X_2^2$		
Q 1	Find the reaction functions for both the firms.	15	4
Q 2	Find total output in the market, market price and profits of the duopolists.	15	4