INVERSITY OF PETROLEUM AND ENERGY STUDIES ONline End Semester Examination, June 2021 Course: Mathematical Economics II Program: BA (Hons.) Economics Course Code: ECON1018 Semester: II Program: BA (Hons.) Economics Course Code: ECON1018 SECTION A Each question carries 5 marks. SECTION A Each question carries 5 marks. CO1 (1) (2) Questions CO2 (2) (2) (2) (2)	Name:						
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	$MC = \frac{dTC}{dQ} = 25 + 30Q - 9Q^2$, where TC is total cost and Q is output. Fixed cost is 65.			
	Find total cost, average cost and variable cost functions.			
Q8	Given the demand function $P_d = 113 - Q^2$ and the supply function $P_s = (Q + 1)^2$, Find the consumers' surplus and producers' surplus if there is perfect competition in the market.			
Q 9	Solve the following differential equation. Check if it is an exact differential equation.			
	(12y + 7t + 6)dy + (7y + 4t - 9)dt = 0			
Q 10	Maximize the utility function $U = x^{0.25}y^{0.4}$ subject to the budget constraint			
	2x + 8y = 104, where x and y represent two different goods. Price per unit of x and y are Rs. 2 and Rs. 8, respectively. Income of the consumer is Rs. 104.	CO3		
	Find the value of x and y at which the utility function is maximum.			
Q 11	Find the demand function $Q = f(P)$ if price elasticity of demand $e = -c$, where c is a constant.	CO3		
Section C				
Each question carries 20 Marks. Answer any one question.				
Q12	(1) Given the following equations: $C_t = 300 + 0.87Y_{t-1}$ $I_t = 150 + 0.13Y_{t-1}$ and $Y_0 = 6000$			
	(a) Find the time path of national income Y_t			
	(b) Find the value of Y_t at $t = 1$			
	(c) Comment on the stability of the time path.			
	OR (2) The rate at which the population (P) of a country is growing is given by the equation $\frac{dP}{dt} = 0.02(400 - P)$, given that $P = 100$ at $t = 0$ (t is time in years).			
	(a) Solve the differential equation to obtain an expression for P in terms of t . (b) Calculate the time taken for the population to reach 1000.			