Name: Enrolment No:	UPES UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination (Online) – March, 2021

Program: MA (Eco) **Semester: III**
Subject/Course: Optimization **Max. Marks: 100**
Course Code: **Duration: 3 Hours**

IMPORTANT INSTRUCTIONS

1. *The student must write his/her name and enrolment no. in the space designated above.*
2. *The questions have to be answered in this MS Word document.*
3. *After attempting the questions in this document, the student has to upload this MS Word document on Blackboard.*

Q.No	Section A (All are compulsory)	Marks	COs
1	The techniques of optimization include a) Marginal analysis b) Calculus c) Linear programming d) All of the above	2	CO1
2	The equation of a straight line is 2x+3y=6. Which of the following is true of the intercept and slope of this line? a) Intercept=6, slope = 2/3 b) Intercept=2, slope = -2/3 c) Intercept=6, slope = -2/3 d) Intercept=3, slope = -2/3	2	CO1

	e) Intercept=2/3, slope = 3		
3	What first derivative ($\frac{dy}{dx}$)of any function explains; (a)relative change in variables (change in y in relation to x) (b) absolute change in the variables (c). Both (a) & (b) (d). None of the above	2	CO1
4	In economics, which of the following are application of optimization; a). Cost minimization (b). Profit maximization (c). Both (a) & (b) (d). None of the above.	2	CO1
5	Which one of the following is the first derivative of log(x); (a). $\frac{1}{x}$ (b). x^2 (c). $\sqrt{x}$ (d). All of the above.	2	CO1
6	Which expansion is represented by the following series $f(x) =$ $f(a) + f'(a)(x-a) + \frac{f''(a)}{2!}(x-a)^2 + \frac{f^{(3)}(a)}{3!}(x-a)^3 + \ldots + \frac{f^{(n)}(a)}{n!}(x-a)^n + \ldots.$ (a). *Taylor expansion* (b). *Maclaurin's Series* (c). Both (a) & (b) (d). None of the above	2	CO1
7	Identify convex in given options a).	2	CO1

	(b).  (c).  (d). None of the above		
8	If $\pi(q) = R(q) - C(q)$(Where $\pi = profit, R = Revenue\ and\ C\ is\ cost$) what is profit maximizing condition a). $\frac{d\pi}{dq} = 0$ (b). $\frac{d^2\pi}{dq^2} < 0$ (c). Both (a) & (b) (d). None of the above	2	CO1
9	If $\begin{vmatrix} 1 & 3 \\ 7 & 8 \end{vmatrix}$=? a). 0 (b). 13 (c). 11 (d). None of the above	2	CO1
10	Difference between the usage of symbolsΔ and δ a).Δ is used to denote change in variable having distinct values (whole numbers) (b). δ is used to denote change in continuous variables (c). 11 (d). None of the above	2	CO1
Section B (All are compulsory)			

1	Explain the necessary and sufficient conditions for reaching the optimal solution of any function.	5	CO2
2	"We can reach optimal value proposition of function by using only first order(first derivative) condition" Defend the statement using appropriate example.	5	CO2
3	Find two positive numbers whose sum is 300 and whose product is a maximum.	5	CO2
4	Illustrate difference between constrained and unconstrained optimization.	5	CO2
	Section C		
4	Explain following terms with examples i-optimization ii-objective function iii-constraints iv-decision variables	10	CO4
5	Find the relative extrema of the function. $y = f(x) = x^3 - 12x^2 + 36x + 8$	10	CO4
6	Explain the graphical conditions where derivative method for optimization fails. Or Illustrate applications of optimization technique in economics	10	CO4
	Section D		
1	Explain utility of Hessian Matrix to find the optimal solution.	15	CO5
2	Calculate the optimal solution for $z = f(x, y) = 8x^3 - 2xy + 3x^2 + y^2 + 1$ Or Explain the attitude toward risk using derivative of utility function.	15	CO5

ANSWERS