UNIVERSITY OF PETROLEUM AND ENERGY STUDIES

End Term Examination, December 2021

Course: Business Mathematics	**Semester: I**
Programme: Int.B.Com(H)	**Time: 03 hrs**
Max. Marks: 100	**Course Code: DSQT1001**

SECTION A

Each Question will carry 2 Marks

S. No.		Marks	CO
Q 1.	Select the most appropriate	**(2x10)**	
	1. The value of a determinant is not affected by the interchange of_____ ? a. Rows b. Colums c. both a and b d. None		**CO1**
	2. A square matix is said to be symmetric matrix if a. $A = A^T$ b. $A \neq A^T$ c. $A \leq A^T$ d. $A \geq A^T$		**CO1**
	3. If the order of matrix A is 4x3 and order of matrix B is 3x4, then the order of matrix AB is a. 4x4 b. 3x3 c. 4x3 d. 3x4		**CO1**
	4. Which of the following(s) is a set ? a.People in a class: { Aman, Banty, Harsh } b. Classes offered by a department: { GM, EM,TM,E&IB } c. Sets can cantain non-related elements: { 3, a, red, Mumbai } d. All of the above		**CO1**

5. If y = ax, then second derivative of y is a. 0 b. a c. a/2 d. 1		CO1
6. The 7th term of the GP 2,−6,18,.. is a. 1458 b. -1458 c. 1478 d. None		CO1
7. Which of the following(s) matix property is correct? a. A + B = B + A b. k(A+ B) = kA + kB c. (-1) A = -A d. All of the above		CO1
8. Which of the following(s) is not correct with respect to set ? a. Sets do not have duplicate elements b. Order does matter c. Sets are usually represented by a capital letter d. All of the above		CO1
9. For a set S = { 1, c ,a, b}which of the following is incorrect? a. a ∈ S b. c ∈ S c. 1 ∈ S d. 5 ∈ S		CO1
10. Which of the following is correct in case of sequence? a. It is finite only b. It is infinite only c. Finite and infinite d. None		CO1

SECTION B

	Each question will carry 5 marks	(5x4)	
Q 2.	Let A=$\begin{pmatrix} 3 & -4 \\ 0 & 2 \end{pmatrix}$, B=$\begin{pmatrix} 1 & 3 \\ -2 & 0 \end{pmatrix}$ Find each of the following: (i) $A - \dfrac{B}{2}$ (ii) 3A- B/2		CO2

Q 3.	If $A = \begin{bmatrix} 2 & -1 \\ 3 & 5 \end{bmatrix}$ then verify that A^{-1}A = I		CO2
Q 4.	Find derivative of each of the following functions : $$y = \frac{x^2 - 4x - 3}{7 + e^x} \text{ and } y = \frac{ax - b}{d - cx}$$		CO2
Q 5.	The 10th term of an A.P. is 30 and 16th term is 60. Find the (i) 18th term (ii) nth term		CO2
	SECTION-C		
	Each Question carries 10 Marks	10x3	
Q 6.	How matrix is different from determinant.Explain with eaxmples.Solve the following equations by using inverse matrix method. $$x - 2y + z = 4$$ $$x - y - z = -2$$ $$2x + y + z = 5$$		CO3
Q 7.	Solve the following system of equations, using cramer's rule: X + 2Y + 3Z = -5 3X + Y- 3Z = 4 -3X + 4Y+7Z = -7		CO3
Q 8.	Evaluate the following integrals: (i) $\int \frac{px^{b-1}}{qx^{a-2}} dx$ (ii) $\int (x \exp(x^2) \, dx$		CO3
	SECTION-D		
	Each Question carries 15 Marks	(15x2)	
Q 9.	The total cost function of a firm is given by C = x^3/3-5x^2+28x+10 where C is the total cost and x is the output of the product. A tax at the rate of \$2 per unit of product is imposed and the producer adds it to his cost. If the market demand function is given by p = 2530 − 5x , where p is the price per unit of output, find the profit maximizing output and price.		CO4

| Q 10. | There are 50 apple trees in an orchard. Each tree produces 800 apples. For each additional tree planted in the orchard, the output per tree drops by 10 apples. How many trees should be added to the existing orchard in order to maximize the total output of trees? | | CO4 |