

Name:
Enrolment No:



UNIVERSITY WITH A PURPOSE

UNIVERSITY OF PETROLEUM & ENERGY STUDIES

End Semester Examination – DEC 2021

Program: B.A(ECO)2021(specialization in E commerce banking and insurance)

Semester: INPE 01

Subject/Course: Introduction to Mathematics

Max. Marks: 100

Course Code: MATH1043

Duration: 3 Hours

Q.No	Section A(multiple choice question)	Marks	COs
Q1.	<p>i) IF $R = \{(2, 1), (4, 3), (4, 5)\}$, then range of the function is? (a) Range $R = \{2, 4\}$ (b) Range $R = \{1, 3, 5\}$ (c) Range $R = \{2, 3, 4, 5\}$ (d) Range $R = \{1, 1, 4, 5\}$</p> <p>ii) Which of the following two sets are equal? (a) $A = \{1, 2\}$ and $B = \{1\}$ (b) $A = \{1, 2\}$ and $B = \{1, 2, 3\}$ (c) $A = \{1, 2, 3\}$ and $B = \{2, 1, 3\}$ (d) $A = \{1, 2, 4\}$ and $B = \{1, 2, 3\}$</p> <p>iii) IF $A = [5, 6, 7]$ and $B = [7, 8, 9]$ then $A \cup B$ is equal to (a) $[5, 6, 7, 8, 9]$ (b) $[5, 6, 7]$ (c) $[7, 8, 9]$ (d) None of these</p> <p>iv) The domain of the function $f(x) = 1/(x^2 - 3x + 2)$ is (a) $\{1, 2\}$ (b) R (c) $R - \{1, 2\}$ (d) $R - \{1, -2\}$</p> <p>v) The value of $\sqrt{-16}$ is (a) $-4i$ (b) $4i$ (c) $-2i$ (d) $2i$</p>	2* 10=20	CO1

	<p>vi) The value of x and y if $(3y - 2) + i(7 - 2x) = 0$ (a) $x = 7/2, y = 2/3$ (b) $x = 2/7, y = 2/3$ (c) $x = 7/2, y = 3/2$ (d) $x = 2/7, y = 3/2$</p> <p>vii) If $-2 < 2x - 1 < 2$ then the value of x lies in the interval (a) $(1/2, 3/2)$ (b) $(-1/2, 3/2)$ (c) $(3/2, 1/2)$ (d) $(3/2, -1/2)$</p> <p>viii) If A and B are square matrices then $(AB)' =$ (a) $B'A'$ (b) $A'B'$ (c) AB' (d) $A'B'$</p> <p>ix) If $\begin{bmatrix} 1-x & 2 \\ 18 & 6 \end{bmatrix} = \begin{bmatrix} 6 & 2 \\ 18 & 6 \end{bmatrix}$ then x = (a) ± 6 (b) 6 (c) -5 (d) 7</p> <p>x) $\int 1 \cdot dx =$ (a) $x + k$ (b) $1 + k$ (c) $x^2 + k$ (d) $\log x + k$</p>		
Q2.	<p style="text-align: center;">Section : B</p> <p>i) Express in the form of a+ib: $\frac{4+3i}{3+i}$</p> <p>ii) The cost function of a firm is given by $C = 2x^2 + x - 5$. Find the marginal cost, when $x = 4$</p>	5*4=20	CO2

	<p>iii) Differentiate : a)$20x^{-4} + 9$ b) $e^x + x^3 + 4x + 5$</p> <p>iv) In a survey of 200 students, it was found that 120 had taken mathematics, 90 had taken physics and 70 had taken chemistry, 50 had taken mathematics and chemistry, 40 had taken mathematics and physics, 30 had taken physics and chemistry and 20 had not taken any of three subjects. Find the number of students that had i) only chemistry ii) only mathematics</p>		
Q3.	<p style="text-align: center;"><u>Section : C</u></p> <p>i) A company produces three products every day. Their production on certain day is 45 tons. It is found that the production of the third product exceeds the production of first product by 8 tons while the total production of first and third product is twice the production of second product. Find the production level of each product using Cramer's rule</p> <p>ii) Find the range of values of x which satisfies $-8/3 \leq x+1/3 < 10/3$, $x \in \mathbb{R}$ Graph these values of x on the number line</p> <p>iii) Prove that with the principle of mathematical induction $1+2+3+\dots+n = n(n+1)/2$; $n \in \mathbb{N}$</p>	10*3=30	CO3

	<p style="text-align: center;">Or</p> <p>Prove that with the principle of mathematical induction</p> $1^2+2^2 + 3^2 + 4^2 + \dots + n^2 = n(n+1)(2n+1)/6 ; \quad n \in \mathbb{N}$		
Q4.	<p style="text-align: center;"><u>Section D</u></p> <p>i) The demand function of a monopolist is given by $p = 1500 - 2x - x^2$. Find : (i) the revenue function, (ii) the marginal revenue function (iii) the MR when $x = 20$</p> <p>ii) The marginal cost of production is $M C = 20 - 0.04x + 0.003x^2$, where x is the number of units produced. The fixed cost is Rs. 7000. Find the total cost and the average cost function.</p> <p style="text-align: center;">OR</p> <p>The marginal cost function of manufacturing x units of a product is $5 + 16x - 3x^2$. The total cost of producing 5 items is Rs. 500. Find the total cost function.</p>	15*2=30	CO4

