

Name:	 <b>UPES</b> UNIVERSITY WITH A PURPOSE
Enrolment No:	

**UNIVERSITY OF PETROLEUM AND ENERGY STUDIES**  
**End Semester Examination, Dec-2019**

**Course: Business Mathematics**

**Semester: I**

**Program: BBA FAS**

**Course code: DSQT1001**

**Time: 03 Hours**

**Max. Marks: 100**

**Instructions:**

**SECTION A**

		<b>Marks</b>	<b>CO</b>
<b>Q</b>	Choose an appropriate answer.	<b>2*10</b>	
1.	<p>I. The members of the set <math>S = \{x \mid x \text{ is the square of an integer and } x &lt; 50\}</math> is</p> <p>(a) <math>\{0, 2, 4, 5, 9, 49, 12\}</math>            (b) <math>\{0, 1, 4, 9, 16, 25, 36, 49\}</math>            (c) <math>\{1, 4, 9, 16, 25, 36\}</math>            (d) <math>\{0, 1, 4, 9, 16, 25, 36, 49\}</math></p> <p>II. If A and B are two matrices, then which of the following property is true?</p> <p>(a) <math>A + B \neq B + A</math>            (b) <math>(A^t)^t \neq A</math>            (c) <math>AB \neq BA</math>            (d) all are true</p> <p>III. We can add two matrices having real numbers A and B if their</p> <p>(a) order is same            (b) rows are same            (c) columns are same            (d) elements are same</p> <p>IV. Derivative of <math>\log x</math> is</p> <p>(a) 1            (b) <math>1/x</math>            (c) <math>1/\log x</math>            (d) None of the above</p> <p>V. Value of <math>\int ax^n dx</math></p> <p>(a) <math>a\left(\frac{x^{n+1}}{n+1}\right) + c</math></p>	<b>20</b>	<b>CO1</b>

	<p>(b) <math>nax^{n-1} + c</math></p> <p>(c) <math>a\left(\frac{nx^{n-1}}{n-1}\right) + c</math></p> <p>(d) Can't determined</p> <p>VI. If <math>x, x+2, 2x</math> are in arithmetic progression, then the value of <math>x</math> can be</p> <p>(a) 1</p> <p>(b) 4</p> <p>(c) Both (a) and (c)</p> <p>(d) Can't determine</p> <p>VII. If <math>\begin{vmatrix} x &amp; 2 \\ 4 &amp; 3 \end{vmatrix} = \begin{vmatrix} 1 &amp; 2 \\ 2 &amp; 8 \end{vmatrix}</math>, then value of <math>x</math> will be</p> <p>(a) 3</p> <p>(b) 1</p> <p>(c) The given relation is not true</p> <p>(d) Can't determine</p> <p>VIII. If <math>u</math> and <math>v</math> are the functions of <math>x</math> then by product rule of differentiation</p> <p>(a) <math>\frac{d}{dx}(u \cdot v) = \frac{d}{dx}u + \frac{d}{dx}v</math></p> <p>(b) <math>\frac{d}{dx}(u \cdot v) = \frac{d}{dx}u - \frac{d}{dx}v</math></p> <p>(c) <math>\frac{d}{dx}(u \cdot v) = u \frac{d}{dx}v + v \frac{d}{dx}u</math></p> <p>(d) <math>\frac{d}{dx}(u \cdot v) = u \frac{d}{dx}u + v \frac{d}{dx}v</math></p> <p>IX. Marginal cost is equal to</p> <p>(a) Rate of change of total cost</p> <p>(b) Rate of change of average cost</p> <p>(c) Both (a) &amp; (b)</p> <p>(d) None of these</p> <p>X. If <math>a, b, c</math> are in geometric progression, then which of the following is true</p> <p>(a) <math>2b=a+c</math></p> <p>(b) <math>b^2=a+c</math></p> <p>(c) <math>b^2=ac</math></p> <p>(d) None of the above</p>		
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**SECTION B**

	Solve any four questions.		
1.	Find the rank of the matrix $A = \begin{bmatrix} 1 & 3 & 4 & 3 \\ 3 & 9 & 12 & 3 \\ 1 & 3 & 4 & 1 \end{bmatrix}$ .	<b>5</b>	<b>CO2</b>
2.	Explain the importance of mathematics in business.	<b>5</b>	<b>CO4</b>

3.	Find the derivative of $\left(x + \frac{1}{3}\right)(x - 7)$ using product rule.	5	CO1
4.	Find two terms between $\frac{1}{3}$ and $\frac{1}{81}$ such that the series are in G.P.	5	CO4
5.	Integrate the function $ax^2 + bx + d$ with respect to $x$ , where $a$ , $b$ and $d$ are constants.	5	CO1
<b>SECTION-C</b>			
	Answer any four questions.		
1.	Find the local maximum and minimum values of the function $(2x^2 - 3x + 5)$ .	7.5	CO3
2.	Find elasticity of demand of the function $x=100-5p$ at $p=15$ .	7.5	CO2
3.	Find the second order derivative of $\left(4x^3 + \frac{3}{2}x^2 - \frac{2}{9}x + 4\right)$ .	7.5	CO2
4.	Find the sum of first 10 terms of an increasing arithmetical progression, the sum of whose first 3 terms is 27 and the sum of their squares is 275.	7.5	CO4
5.	Find elasticity of the function $y=a\sqrt{x-b}$ .	7.5	CO2
<b>SECTION-D</b>			
	Answer the following question.		
1.	Integrate the following. a) $\int 2x(x + 4)dx$ b) $\int_0^1 (x^2 + 1)dx$	10	CO2
2.	A manufacturer produces two types of products X and Y. Each products is first processed in machine $M_1$ and then sent to another machine $M_2$ for finishing. Each unit of X requires 20 minutes time on machine $M_1$ and 10 minute time on machine $M_2$ , whereas each unit of Y requires 10 minutes time on machine $M_1$ and 20 minutes time on machine $M_2$ . The total time available on each machine is 600 minutes and is fully utilized in the production of X and Y. Calculate the number of units of two types of products produced by constructing a matrix equation of the form $AX=B$ and then solve it by using Cramer rule.	10	CO3
3.	(a) If $y=\frac{x}{x+2}$ find $\frac{dy}{dx}$ .  (b) If $y= (2x^2 + 3x-2)^7$ then find $\frac{dy}{dx}$ using chain rule.	10	CO2

