UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2019

Course: Business Mathematics
Semester: I
Program: BBA T &HM   **Time: 03 Hours**
Course code: DSQT1001   **Max. Marks: 100**
Instructions:

SECTION A

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

(b) $nax^{n-1} + c$

(c) $a(\frac{nx^{n-1}}{n-1}) + c$

(d) Can't determined

VI. If x, x+2, 2x are in arithmatic progression, then the value of x can be
    (a) 1
    (b 4
    (c) Both (a) and (c)
    (d) Can't determine

VII. If $\begin{vmatrix} x & 2 \\ 4 & 3 \end{vmatrix} = \begin{vmatrix} 1 & 2 \\ 2 & 8 \end{vmatrix}$, then value of x will be
    (a) 3
    (b) 1
    (c) The given relation is not true
    (d) Can't determine

VIII. If u and v are the functions of x then by product rule of differentiation
    (a) $\frac{d}{dx}(u.v) = \frac{d}{dx}u + \frac{d}{dx}v$
    (b) $\frac{d}{dx}(u.v) = \frac{d}{dx}u - \frac{d}{dx}v$
    (c) $\frac{d}{dx}(u.v) = u\frac{d}{dx}v + v\frac{d}{dx}u$
    (d) $\frac{d}{dx}(u.v) = u\frac{d}{dx}u + v\frac{d}{dx}v$

IX. Marginal cost is equal to
    (a) Rate of change of total cost
    (b) Rate of change of average cost
    (c) Both (a) & (b)
    (d) None of these

X. If a, b, c are in geometric progression, then which of the following is true
    (a) 2b=a+c
    (b) b^2=a+c
    (c) b^2=ac
    (d) None of the above

SECTION B

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

4.	Find the derivative of $\left(x + \dfrac{1}{3}\right)(x - 7)$ using product rule.	5	CO1
5.	Find two terms between $\dfrac{1}{3}$ and $\dfrac{1}{81}$ such that the series are in G.P.	5	CO4
6.	Integrate the function $ax^2 + bx + d$ with respect to x, where a, b and d are constants.	5	CO1

SECTION-C

Q	Answer any four questions.		
3.	Find the local maximum and minimum values of the function $(2x^2 - 3x + 5)$.	7.5	CO3
4.	Find elasticity of demand of the function x=100-5p at p=15.	7.5	CO2
6.	Find the second order derivative of $\left(4x^3 + \dfrac{3}{2}x^2 - \dfrac{2}{9}x + 4\right)$.	7.5	CO2
7.	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
8.	Find elasticity of the function $y = a\sqrt{x - b}$.	7.5	CO2

SECTION-D

Q	Answer the following question.		
9.	Integrate the following. a) $\int 2x(x + 4)dx$ b) $\int_0^1 (x^2 + 1)dx$	10	CO2
10.	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
11.	(a) If $y = \dfrac{x}{x+2}$ find $\dfrac{dy}{dx}$. (b) If $y = (2x^2 + 3x - 2)^7$ then find $\dfrac{dy}{dx}$ using chain rule.	10	CO2