Name: Enrolment No:	

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

Course: Quantitative Techniques for Decision Making   **Semester: I**
Programme: BBA LLB(Hons.), 2019   **Time: 03 hrs.**
Course Code: CLNL 1005   **Max. Marks: 100**
Instructions: Scientific calculators are allowed for the examination

SECTION A

S. No.		Marks	CO
Q 1	If $\begin{bmatrix} x + 10y & -1 \\ 9 + x & 4 \end{bmatrix} = \begin{bmatrix} 4 & -1 \\ 0 & 4 \end{bmatrix}$, find the values of x and y.	02	CO1
Q 2	Find $\dfrac{d^3 y}{dx^3}$, where $y = e^{2x}$.	02	CO1
Q3	Evaluate the integral $\int 6x \cos(x)\, dx$.	02	CO1
Q4	If $B = \begin{bmatrix} 3 & 2 & 5 \\ 4 & 1 & 3 \\ 0 & 6 & 7 \end{bmatrix}$, Calculate BB^T.	02	CO1
Q5	If $P = \begin{bmatrix} 9 & 1 \\ 4 & 3 \end{bmatrix}$ and $Q = \begin{bmatrix} 1 & 5 \\ 7 & 12 \end{bmatrix}$, find the matrix R such that $5P + 3Q + R$ is a null matrix.	02	CO1

SECTION B

Q 6	In how many ways can a team of 5 persons be formed out of a total of 10 persons such that two particular persons should be included in each team?	10	CO2
Q 7	What is the minimum no. of terms needed so that the sum of 54, 51, 48, 45, ……. exceed the no. 500. **OR** Sum to infinity of GP is thrice the sum of the first two terms. Find possible values of the common ratio.	10	CO2

SECTION-C

Q 8	A. Find $\dfrac{dy}{dx}$ at $x = 0$, where $y = \dfrac{x^{\frac{1}{2}}}{8+x^{\frac{5}{2}}}$. B. Evaluate the integral $\int 4x^3\sqrt{x^4+3}\ dx$.	(5×2)= 10	CO1
Q 9	Find the extremum for $y = sin\ x\ (1 + cos\ x)$.	10	CO3

<div align="center">SECTION-D</div>

Q 10	Find the rank of the following matrix: $$\begin{bmatrix} 3 & 0 & 1 & 2 & 4 \\ 6 & 1 & 0 & 0 & 1 \\ 12 & 1 & 2 & 4 & 0 \\ 6 & 0 & 2 & 4 & 8 \\ 9 & 0 & 1 & 2 & 6 \end{bmatrix}$$	20	CO1
Q 11	A man invests a total sum of 20000 rupees on government bonds in 5 years. If these investments are in A.P and the sum of squares of the investments is 2500000 rupees. Find the investment made each year respectively. It is also known that he always invest more than the previous year.	20	CO4
Q 12	The demand function of a commodity is given by $p = \dfrac{150}{x^2+2} - 4$, where p is price per unit and x denotes quantity. Determine the marginal revenue function.	10	CO4