Name: **Enrolment No:**		UPES

UNIVERSITY OF PETROLEUM AND ENERGY STUDIES
End Semester Examination, December 2018

Course: Business Mathematics
Semester: I
Programme: BBA Oil & Gas , Aviation and Operation **Time: 03 hrs.**
Max. Marks: 100
Instructions:

SECTION A

S. No.			Marks	CO
Q	**Select most appropriate answer.**			
1.	The second order derivative of log x is (a) $\frac{1}{x}$ (b) $-\frac{1}{x^2}$ (c) Zero (d) None of these		**2**	**CO1**
2.	If A={1,2,3,4,6} and B={6,7,8} then $A \cap B$ will be (a) {1,2,3,4,6} (b) {6,7,8} (c) { } (d) {6}		**2**	**CO2**
3.	Derivative of e^{ax+b}. (a) e^{ax+b} (b) ae^{ax} (c) ae^{ax+b} (d) axe^{ax+b}		**2**	**CO1**
4.	If a and r are the first term and common ratio of a geometric progression, then the sum of first n terms is (a) $\frac{a(1-r)^n}{1-r}$ (b $\frac{a(1-r^n)}{1-r}$		**2**	**CO1**

	(c) $\frac{a}{1-r}$ (d) None of these			
5.	Value of $\int x^n dx$ (a) $nx^{n-1}+c$ (b) $\frac{x^{n+1}}{n+1}+c$ (c) $\frac{nx^{n-1}}{n-1}+c$ (d) Can't determined		**2**	**CO1**
6.	If $\begin{vmatrix} x & 4 \\ -3 & 2 \end{vmatrix}$=10 then the value of x will be (a) -1 (b) 0 (c) $\begin{vmatrix} -1 & 4 \\ -3 & 2 \end{vmatrix}$ (d) Can't determined		**2**	**CO2**
7.	The price elasticity of demand (ita) is defined as (a) $\frac{dx}{dp}.\frac{x}{p}$ (b) $-\frac{dx}{dp}.\frac{x}{p}$ (c) $\frac{dx}{dp}.\frac{p}{x}$ (d) $-\frac{dx}{dp}.\frac{p}{x}$		**2**	**CO1**
8.	*The sum of first 15 terms of the series 10,15,20,25……will be* *(a) 675* *(b) 15* *(c) -675* *(d) 80*		**2**	**CO2**
9.	If a, b, c are in geometric progression then which of the following is correct. (a) $\frac{a}{b}=\frac{c}{b}$ (b) b-a=c-a (c) $b^2=ac$ (d) None of these		**2**	**CO4**
10.	For two square matrices A and B which of the following is incorrect		**2**	**CO1**

	(a) $(A+B)^T = A^T + B^T$ (b) $(AB)^T = A^T B^T$ (c) $(A^T)^T = A$ (d) $(kA)^T = kA^T$			
	SECTION B			
Q	**Attempt any four questions.**			
11.	Differentiate the function $x^n e^x$ using product rule.		**5**	**CO1**
12.	Integrate the function $ax^2 + bx + d$ with respect to x, where a, b and d are constants.		**5**	**CO2**
13.	If A=$\begin{bmatrix} 2 & 4 & -1 \\ -1 & 0 & 2 \end{bmatrix}$ and B=$\begin{bmatrix} 3 & 4 \\ -1 & 2 \\ 2 & 1 \end{bmatrix}$ find $(AB)^T$.		**5**	**CO2**
14.	If y= $(3x^3 + 5x^2 - 9)$ find second order derivative of y at x=3.		**5**	**CO4**
15.	Which term of the series 20,16,12,……. is -96.		**5**	**CO3**
	SECTION-C			
Q	**Answer any three questions**.			
16.	Three shopkeepers Ram, Shyam and Mohan go to a store to buy stationery. Ram purchases 12 dozen notebooks, 5 dozen pens, 6 dozen pencils. Shyam purchases 10 dozen notebooks, 6 dozen pens, 7 dozen pencils. Mohan purchases 11 dozen notebooks, 13 dozen pens, 8 dozen pencils. A notebook costs 12 rupees, a pen cost 8 rupees and a pencil cost 2 rupees. Use matrix method to calculate their individual's bill.		**10**	**CO3**
17.	Find the local maximum and minimum values of the function $(2x^2 - 3x + 5)$.		**10**	**CO2**
18.	A manufacturer produces two types of products X and Y. Each product is first processed in machine M_1 and then sent to another machine M_2 for finishing. Each unit of X requires 20 minute time on machine M_1 and 10 minute time on M_2, whereas each unit of Y requires 10 minutes time on machine M_1 and 20 minute time on 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.		**10**	**CO4**

19.	Integrate the following. $\int (x+4)(2x+5)dx$ $\int_0^1 (x^2+1)dx$		**10**	**CO1**
	SECTION-D			
Q	**Answer any five questions.**			
20.	For what value of m, the terms $2(4m+7)$, $6m+\frac{1}{2}$, $12m-7$ forms an arithmetic progression.		**6**	**CO4**
21.	If $I=\begin{bmatrix}1 & 0\\ 0 & 1\end{bmatrix}$, $X=\begin{bmatrix}0 & 1\\ 0 & 0\end{bmatrix}$ show that $(aI+bX)^2 = a^2I+2abX$.		**6**	**CO2**
22.	Evaluate the price elasticity of demand of the function $p=-2x^2+3x+150$ at $x=5$.		**6**	**CO1**
23.	Find the derivative of $\frac{1+x^2}{x+2}$.		**6**	**CO1**
24.	Explain the importance of mathematics in business.		**6**	**CO3**
25.	Evaluate $\int e^{ax^2+bx+c}(2ax+b)dx$ using substitution method.		**6**	**CO2**