SHRI RAMSWAROOP MEMORIAL UNIVERSITY

End Semester Examination (2021-22)-Odd Semester

Diploma - CS/EC/ME (Auto & Prod)/CE/EE – I Year (I Sem)	
Course Name:Basic Mathematics	Code: DMA1001
Time: 02 Hours	Max Marks: 60

University Roll No.															
(To be filled by the Student)															

Note: Please read instructions carefully:

a) The question paper has 03 sections and it is compulsory to attempt all sections.

b) All questions of Section A are compulsory; questions in Section B and C contain choice.

Section A: Very Short Answer type Questions **Attempt all the questions.**		**BL**	**CLO**	**Marks (10)**
1.	Simplify : $\left(\frac{x^a}{x^b}\right)^{a^2+ab+b^2}\left(\frac{x^b}{x^c}\right)^{b^2+bc+c^2}\left(\frac{x^c}{x^a}\right)^{c^2+ca+a^2}$	BL4	CLO1	02
2.	Prove that:$\tan x + \tan(-y) - \tan(180^0 - y) = \tan x$	BL5	CLO2	02
3.	Define permutation and combination. Find the value of n, if $p(n,4) : P(n-1,3) = 9 : 1$.	BL1	CLO1	02
4.	Find the 5th term of $(2x - y/3)^{10}$.	BL1	CLO1	02
5.	Write the direction ratio of the vector $\vec{r} = \hat{\imath} - \hat{\jmath} + 2\hat{k}$ and hence calculate its direction cosines.	BL1	CLO4	02
Section B: Short Answer Type Questions **Attempt any 03 out of 06 questions.**		**BL**	**CLO**	**Marks (30)**
1.	Find x, y and z if $\begin{bmatrix} x+y & x+z \\ y-z & 2x-y \end{bmatrix} = \begin{bmatrix} 5 & 4-z \\ 2 & y-x \end{bmatrix}$	BL1	CLO1	10
2.	Solve the given equations using Cramer's rule of order 2: $4x - 7y = 20,\ 3x + 2y = 7$.	BL3	CLO1	10
3.	Find the partial fractions of $\frac{3x-1}{(x-4)(2x+1)(x-1)}$.	BL1	CLO1	10
4.	Show that the lines $3x + 2y - 5 = 0$ and $2x - 3y + 4 = 0$ are perpendicular lines.	BL1	CLO3	10
5.	Find the equation of a circle having centre at the point (–2, 3) and passing through the point (3, 1).	BL1	CLO3	10
6.	Find the projection of the vector $\vec{a} = \hat{\imath} + 2\hat{\jmath} + \hat{k}$ on the vector $\vec{b} = 2\hat{\imath} - \hat{\jmath} + 3\hat{k}$. Also find projection of $\vec{b}$ on $\vec{a}$ and projection of $\vec{a}$on $\vec{b}$.	BL1	CLO4	10
Section C: Long Answer Type Questions/Case Study **Attempt any 01 out of 04 questions.**		**BL**	**CLO**	**Marks (20)**
1.	Verifythat$A.adjA = adjA.A = \|A\|.I$ for $A = \begin{bmatrix} 1 & 2 & 3 \\ -1 & 1 & -1 \\ 3 & -1 & 3 \end{bmatrix}$	BL5	CLO1	20
2.	Prove that$\frac{\sin(n-1)A+\sin nA}{\cos(n-1)-\cos nA} = \cot\frac{A}{2}$.	BL5	CLO2	20
3.	Find the distance between two parallel lines $2x + 3y - 7 = 0$ and	BL1	CLO3	20

	$2x + 3y + 5 = 0$.			
4.	Prove that $\vec{a} \times (\vec{b} + \vec{c}) + \vec{b} \times (\vec{c} + \vec{a}) + \vec{c} \times (\vec{a} + \vec{b}) = \vec{0}$	BL5	CLO4	20
