SRM Institute of Science and Technology Department of Mathematics 18MAB302T-Discrete Mathematics2021-2022 Odd Unit – IV: GroupsTutorial Sheet - I		
S. No.	**Questions**	**Answers**
Part – A [3 Marks]		
1	Define identity and idempotent elements of an algebraic system.	
2	Define group with an example	
3	Define the order of a group and order of an element of a group.	
4	Show that the set {1, 2, 3} is not a group under multiplication modulo 4.	
5	Show that the multiplication group $\{1, \omega, \omega^2\}$ where ω is a complex cube root of unity is a cyclic group	
Part – B [6 Marks]		
6	List the properties of group.	
7	If (G, *) is an abelian group, show that $(a*b)^n = a^n * b^n$ for all $a, b \in G$ where n is a positive integer.	
8	If the permutation of the elements of {1, 2, 3, 4, 5}are given by $\alpha = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 2 & 3 & 1 & 4 & 5 \end{pmatrix}, \beta = \begin{pmatrix} 1 & 2 & 3 & 4 & 5 \\ 1 & 2 & 3 & 5 & 4 \end{pmatrix}$ find $\alpha\beta$, $\beta\alpha$, α^{-1}. Also solve the equation $\alpha x=\beta$.	
9	Prove that the intersection of two subgroups of a group G is also a subgroup of G. Give an example to show that the union of two subgroups of G need not be a subgroup of G.	
10	If R and C are additive groups of real and complex numbers respectively and if the mapping $f:C\rightarrow R$ is defined by $f(x+iy)=x$. Show that f is a homomorphism. Find also the kernel of f.	