School of Basic and Applied Sciences
Mathematics
ETE - Jun 2023

Time : 3 Hours   Marks : 50

Sem II - MSCM201 - Abstract Algebra
Your answer should be specific to the question asked
Draw neat labeled diagrams wherever necessary

1.	Show that a non-zero idempotent can't be nilpotent.	K2 CO1 (2)
2.	Define a Solvable group with an example.	K1 CO1 (2)
3.	Show that every abelian group is solvable as well as nilpotent.	K1 CO1 (2)
4.	Find the basis and dimension of $Q(\sqrt{3},\sqrt{5})$ over Q.	K2 CO1 (2)
5.	Describe quotient module with example.	K2 CO1 (2)
6.	Define a nilpotent and solvable group. Further, show that every nilpotent group is solvable.	K4 CO3 (6)
7.	Prove that $\sin(m^\circ)$ is an algebraic number for every integer m.	K3 CO2 (5)
8.	A field K is algebraically closed if and only if every algebraic extension of K is K itself.	K3 CO2 (5)
9.	Prove that the internal and external direct product of subgroups are isomorphic.	K3 CO3 (8)
10.	**Show that the direct product of nilpotent groups is nilpotent**	K4 CO4 (8)
11.	Show that the sum and the intersection of two sub modules is again a sub module. What about the union?	K4 CO4 (8)