

## Assignment - 3

1. Show that an abelian group has a composition series if and only if it is finite. (1)
2. Give an example of an infinite group which has a composition series. (1)
3. Prove that the dihedral group  $D_n$  (of order  $2n$ ) is solvable. (1)
4. Give an example of a group  $G$  admitting an automorphism  $\phi$  of order 3 such that  $\phi^3 = 1$ ,  $\phi(x) = x \Leftrightarrow x = e$ , when  $G$  is finite as well as when  $G$  is infinite. (1).

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Submission : by 22/10/2022.