Quiz-II
MTH-204, MTH-204A
ABSTRACT ALGEBRA
Fall-2014
Date: 28th October 2014

Time Allowed: 45 mins Max. Marks: 15

Write your answer in the space provided and explain all the major steps

1. The group $SL_2(\mathbb{R})$ acts on $\mathbb{R}^2$ by $A.X = AX$, where X is a column vector in $\mathbb{R}^2$. Find the orbits under this action. What is the stabilizer of the column vector $(1,0)^T$? [4]

2. How many elements of order 7 are there in a simple group of order 168 ? [3]

3. Let G be an abelian group which has 8 elements of order 3, 18 elements of order 9, and no other elements besides the identity. Find the decomposition of G as a direct product of cyclic groups. [3]

4. Prove or disprove that the homomorphic image of an ideal is an ideal. [2]

5. Let x be an element of a ring R such that $x^n = 0$ for some n. Prove that $1 + x$ is a unit in R. [3]
