Quiz-2
Answer all questions.

1. Define an integral domain. Prove that every field is an integral domain.

[3]

2. Define Characteristic of an integral domain. Show that the characteristic of an integral domain is $0$ or $n > 0$ according as the order of any nonzero element regarded as a member of the additive group of the integral domain is either $0$ or $n$. [3]

3. Prove that $R = \{(a, b)/a, b \in \mathbb{R}\}$ is a commutative ring with zero divisirs under the adition and multiplication of ordered pairs defined as

$$(a, b) + (c, d) = (a + c, b + d)$$

$$(a, b).(c, d) = (ac, bd)$$

for all $(a, b), (c, d) \in R$. [4]