

Indian Statistical Institute
B.Math.(Hons.) II Year
First Semester 2006-07
Mid Semester Examination
Algebra III

Time: 3 hrs

Date:19-09-06

Total Marks : 50

Attempt all questions, each question carries 10 marks

1. Prove that $\mathbb{Z}[\sqrt{-2}]$ is an Euclidean domain.
2. Determine all maximal ideals of the ring $\mathbb{Z}[x]/(2, x^3 + 1)$.
3. Is the ring $\mathbb{Q}[x, y]/(x^2 + 1)$ a P.I.D?
4. Prove that the ideal $(x + y^2, y + x^2 + 2xy^2 + y^4)$ in $\mathbb{C}[x, y]$ is a maximal ideal.
5. Determine the units of the ring $R[x]$ where $R = \mathbb{Z}/4\mathbb{Z}$.