

Dr. B.R. Ambedkar Open University
Faculty of Science, Department of Mathematics

M.Sc I year (Mathematics) 2017-18

Course-1, Algebra

Assignment-1

Max.Marks:15

Min.Marks:6

Section: A

Answer any one of the following:

(10marks)

1. (a) What do you mean by semigroup? State and prove generalized associative law in a semigroup.
(b) State and prove generalized commutative law in a commutative semigroup.
2. Define the concept of an ideal of a ring. State and prove Chinese Remainder theorem.

Section: B

Answer any one of the following:

(5marks)

3. Let H, K be normal subgroups of a group G such that $K \subseteq H$. Show that H/K is a normal subgroup of G/K and $(G/K) / (H/K) \cong G/H$.
4. State and prove first sylow's theorem.

Dr.B.R.Ambedkar Open University
Faculty of Science, Department of Mathematics
I year M.Sc (Mathematics) 2017-18
Course-1, Algebra
Assignment-2

Max.Marks:15

Min.Marks:6

Section: A

Answer any one of the following:

(10marks)

1. Prove that every principal ideal domain is a unique factorization domain.
2. State and prove fundamental theorem of Galois Theory.

Section: B

Answer any one of the following:

(5 marks)

3. If $f(x)$ and $g(x)$ are primitive polynomials, then prove that $f(x)g(x)$ is also a primitive polynomial.
4. If E is a finite normal extension of a field F , then prove that E is a splitting field of some polynomial $f(x) \in F[X]$.