Registration No : | | | | | | | | | | |

Total Number of Pages : 01 M.Sc.I

FMCE207

2nd Semester Back Examination 2018-19

MATHEMATICS-II

BRANCH : M.Sc.I(AC)

Time : 3 Hours

Max Marks : 70

Q.CODE : F508

Answer Question No.1 which is compulsory and any FIVE from the rest.

The figures in the right hand margin indicate marks.

Q1 **Answer the following questions :** **(2 x 10)**

a) What is the density of rational and irrational numbers in R.
b) How to find limit points of a sequence ?
c) What is Quotient Groups ?
d) Write difference between Countable and uncountablesets
e) Show that Every convergent sequence is bounded ?
f) Define Limit point of a set ?
g) Write difference between limit interior and limitsuperior ?
h) What is cosets ?
i) Define closure of a set ?
j) What are the Algebraic structures ?

Q2 a) Define&prove Archimedian property of R . **(5)**
b) Prove that there is no largest and no smallestreal number. **(5)**

Q3 a) State and prove Bolzano- Weierstrass Theorem for sets. **(5)**
b) Prove that N is a Normal subgroup of G iff $gNg^{-1} \in N$ for every $g \in G$ and $n \in N$ **(5)**

Q4 a) Find all normal subgroups in S_4. **(5)**
b) Prove, If Φ is a Homomorphism of G into $G^{/}$ with kernel K then K is a normal subgroup **(5)**

Q5 a) Every countable set is countable. **(5)**
b) Test the convergence of the series $\frac{n(n+3)}{(n+1)2}$ **(5)**

Q6 Prove that a 2 X 2 symmetric matrix form a group find its identity and inverse. **(10)**

Q7 Prove that the set of algebraic numbers is countable infinite. **(10)**

Q8 **Write short answer on any TWO :** **(5 x 2)**

a) Cauchy's general principle ofconvergence.
b) A Counting Principle with suitable examples.
c) Difference between Homomorphisms and Automorphisms,