Roll No. ☐☐☐☐☐☐☐☐☐☐☐☐ **Total No. of Pages :02**

Total No. of Questions : 07

M.Sc.(Mathematics) (2018 Batch) (Sem.-2)

REAL ANALYSIS-II

Subject Code :MSM-202-18

M.Code :75963

Date of Examination : 06-07-22

Time : 3 Hrs. **Max. Marks :70**

INSTRUCTIONS TO CANDIDATES :

1. **SECTION-A is COMPULSORY consisting of FIVE questions carrying TWO marks each.**
2. **SECTION - B &C. have THREE questions each.**
3. **Attempt any FOUR questions from SECTION B& C carrying FIFTEEN marks each.**
4. **Select atleastTWO questions from SECTION - B &Ceach.**

SECTION-A

1. Write short notes on :

a) Show that a set consisting of one point is measurable and its measure is zero.

b) Prove that every continuous function is measurable.

c) State implicit function theorem.

d) Define Convex Functions

e) When is a subset A of R said to be a set of measure zero.

SECTION-B

2. State and prove the implicit function theorem.

3. a) Define Disjoint collection. If E1 and E2 are measurable,then prove that E1 $\cap$ E2 is measurable.

   b) Prove that the interval $(a, \infty]$ is measurable.

4. a) If f = r almost everywhere, and f is a measurable function, then prove that g is also measurable.

   b) State and prove Egoroff's theorem.

SECTION-C

5. a) Every Bounded Riemann integrable function over $[a,b]$ is lebesgue integrable and the two integrals are equal.

   b) State and prove Monotone convergence theorem.

6. a) Define Borel set. Give an example of a measurable set which is not a Borel set.

   b) State and prove classical lebesgue dominated convergence theorem.

7. State and prove Lebesgue differentiation theorem.

NOTE : Disclosure of Identity by writing Mobile No. or Making of passing request on any page of Answer Sheet will lead to UMC against the Student.