



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)

उत्तराखण्ड मुक्त विश्वविद्यालय, हल्द्वानी (नैनीताल)

M.A./M.Sc. Mathematics
ASSIGNMENT-FIRST YEAR

*Last Date of Submission: 15 May*जमा करने की अन्तिम तिथि: 15 मई

Course Title: Real analysis and topology

Course Code: MAT 502

Year: 2013-14

Maximum Marks : 40

Section 'A'**भाग क**

Section 'A' contains 08 short answer type questions of 5 marks each. Learners are required to answers 4 questions only. Answers of short answer-type questions must be restricted to 250 words approximately.

Briefly discuss the following:

1. If A and B are any two disjoint subsets of R , then
 $m^*(A \cup B) = m^*(A) + m^*(B)$
2. If $\langle f_n \rangle$ is a sequence of measurable function, then show that $\limsup \langle f_n \rangle$ is also measurable
3. If the function f and g are lebeque integrable over the measurable set E and if $f(x) < g(x)$ a.e. on E , then

$$\int_E f(x)dx \leq \int_E g(x)dx$$

4. Define Hilbert space with an example
5. Let A and B be subsets of a topological space X . Then show that
 - (i) A is closed in X iff $\overline{A} = A$
 - (ii) $\overline{A \cup B} = \overline{A} \cup \overline{B}$
6. Define Base for a topology.
Show that the set of all open intervals in R form a base for the usual topology on R .

7. Show that Homomorphism is an equivalence relation in the family of topological spaces.
8. Define with an example concept of connected and disconnected space.

Section 'B'

• Section 'B' contains 04 long answer-type questions of 10 marks each.

Learners are required to answers 02 questions only.

1. Show that the union of two measurable sets is a measurable set.
2. Show that the L^p -space is a metric space.
3. The property of a space being a Hausdorff space is a hereditary property.
4. Show that closure of a connected set is connected.