



UTTARAKHAND OPEN UNIVERSITY, HALDWANI (NAINITAL)
उत्तराखंड 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: 2012-13

Maximum Marks : 40

Section 'A'

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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 f and g are extended real valued measurable functions on a measurable space X , then so also $f+g$ and fg .
2. A mean fundamental sequence $\{f_n\}$ of integrable function is fundamental in measure.
3. The indefinite integral of an integrable function is absolutely continuous.
4. Every closed subset of a locally compact topological space is locally compact.
5. Show that the intersection of two topologies for a set X is also a topology for X .
6. In the lower limit topological space (\mathbb{R}, τ) , show that for each point $x \in \mathbb{R}$, The collection, $B_x = \{[x-a, x+a] : a \in \mathbb{R}\}$, form a local base at x .
7. A topological space (X, τ) is disconnected iff X is the union of two non- empty disjoint τ -open sets.
8. Every T_3 - space is a T_2 - space.

Section 'B'

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Section 'B' contains 04 long answer-type questions of 10 marks each. Learners are required to answers 02 questions only.

1. State and prove Holder- Minkowski's inequality.
2. Show that closure of a connected set is connected.
3. If E is a measurable set of finite measure, and if $\{f_n\}$ is a sequence of a.e. finite valued measurable functions which converges a.e. on E to a finite valued measurable function f , then, for every $\epsilon > 0$, there exist a measurable subset F of E such that $\mu(F) < \epsilon$ and such that the sequence $\{f_n\}$ converges to f uniformly on $E-F$.
4. Homeomorphism is an equivalence relation in the collection of all topological spaces.