



S-2634

M. Sc. (Sem. I) Examination

March / April – 2011

Topology : Paper - 403

Time : Hours]

[Total Marks : 70

Instructions :

(1)

नीचे दशांशिक निशानीवाणी विगतो उत्तरवही पर अवश्य लपवी.
Fillup strictly the details of signs on your answer book.

Name of the Examination :
M. Sc. (SEM. I)

Name of the Subject :
TOPOLOGY : 403

Subject Code No. : 2 6 3 4 Section No. (1, 2,.....) : Nil

Seat No. :

Student's Signature

- (2) Attempt all questions.
(3) Each question is of 14 marks
(4) Notations used are standard.

1 Attempt any two :

- (a) Let X be the topological space and \cap be any sub set of X then prove that. 7
(i) $\overline{A} = A \cup D(A)$ and .
(ii) A is closed $\Leftrightarrow A \supseteq D(A)$.
- (b) Let X be topological space and Y be subspace of X then prove that subspace S of Y is closed in Y if and only if there exists a closed set F in X such that $S = F \cap Y$. 7
- (c) (i) Prove that separable matrix space is second countable. 7
(ii) Prove that cofinite topological space X is separable.

2 Attempt any two :

- (a) Prove that closed subspace of a compact space is compact. 7
- (b) Prove that a topological space is compact if every basic open cover has a finite subcover. 7
- (c) Show that a metric space is compact if and only if it has the BWP. 7

- 3** Solve any **two** :
- (a) State and prove Lebesgue covering lemma. 7
 - (b) Prove A metric space is compact if and only if it is complete and totally bounded. 7
 - (c) prove that. 7
 - (i) Every cofinite topological space is compact.
 - (ii) If $\{x_i\}$ is a finite class of compact subspaces of topological space X then prove that $\bigcup_i X_i$ is also a compact subspace of X .
- 4** Attempt any **two** :
- (a) Prove that : 7
 - (i) Every subspace of T_2 space is T_2 space.
 - (ii) Every compact subspace of T_2 space is closed.
 - (b) Every closed subspace of a normal space is normal. 7
 - (c) Let X be a compact topological space and Y be a T_2 space. Prove that every continuous one-one and into mapping from $X \rightarrow Y$ is homeomorphism. 7
- 5** Attempt any **two** :
- (a) Prove that every continuous image of a connected space is connected . 7
 - (b) Prove that every continuous image of a compact space is compact. 7
 - (c) State and prove Heine-Borel theorem. 7
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