MTL 507 TOPOLOGY

MINOR - I

Maximum Credit : 20 February 8, 2018

The numbers on the right indicate maximum credit for the corresponding problems. JUSTIFY YOUR ANSWERS.

Q.1 Let (X, τ) be a topological space, $A \subseteq X$ and $x \in X$. Show that $x \in \bar{A}$ if and only if there exists a net (x_λ) in A such that $x_\lambda \to x$. [5]

Q.2. Let $f : (X, \tau) \to (Y, \sigma)$ be a map between two topological spaces and $x_0 \in X$. Show that f is continuous at x_0 if and only if whenever $x_\lambda \to x_0$ in (X, τ), then $f(x_\lambda) \to f(x_0)$ in (Y, σ). [5]

Q.3. Show that a topological space (X, τ) is Hausdorff if and only if every convergent net in (X, τ) has a unique limit. [6]

Q.4. Let $f, g : (X, \tau) \to (Y, \sigma)$ be two continuous maps between two topological spaces. Further, suppose (Y, σ) is Hausdorff. Show that $A = \{x \in X : f(x) = g(x)\}$ is closed in (X, τ). [4]

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