## 四川师范大学数学与软件科学学院数学与应用数学专业 2005-2006 学年度第二学期期末考试

## 《拓扑学》 试卷一

答卷说明:本试卷共4页,5个大题,满分100分,120分钟完卷。

题号	-	1	lu lu	四	五	总分	总分人
分数							

得分	评卷人

-. (15 points) Assume R with the standard topology. Is the set  $\{1/n: n=1,2,...\}$  open in R? Is the set closed in R? Give your reasons.

得分	评卷人

—. (15 points) Let Y be a subspace of a topological space X and K⊂Y. Show that the topology K inherits as a subspace of Y is the same as the topology K inherits as a subspace of X.

得分	评卷人

 $\equiv$ . (20 points) Let f be a continuous map from a topological space X to a topological space Y. Prove that if X is connected, then f(X) is connected in Y.

得分	评卷人

- 四. (30 points) Let (X, d) be a metric space and K be a subset of X. Prove that
- (i) The collection  $\{B(x, r): x \in X, r>0\}$  is a basis for a topology on X;
- (ii)  $x_n \to x \Leftrightarrow \forall \varepsilon > 0, \exists N$ , when n>N,  $d(x_n, x) < \varepsilon$ ;
- (iii) *x* belongs to the closure of K if and only if there exists a sequence of points of K converging to *x*.

得分	评卷人

 $\pm$  . (20 points) Let Y be a subspace of a Hausdorff topological space X and x be not in Y. Prove that if Y is compact, then there exist disjoint open sets U and V such that  $x \in U$  and  $Y \subset V$ .