QUESTION BANK

MSC MATHEMATICS 1ST YEAR

SUBJECT:TOPOLOGY

1] Define - Cardinally Equivalent

2] Define- cardinal Number

3] show that the set of points in the closed interval [2,4]and in the open – interval (1,2) are cardinally equivalent.

4] The set of all integers I and the set of all rational numbers Q are equivalent .

5] The set of all integers I is countable .for by arranging the integers as0,-1,1,-2,2,-3,3,….

6]Theorem : The set of all real numbers is not enumerable i.e., R is not enumerable

7]Theorem. If a finite set of element is added to an infinite set , the power of the set is unaffected.

8] Prove a+α=α , α being any transfinite cardinal number.

9]Theorem: the power set ofany set has cardinality greater than the cardinality of the set itself.

10]Theorem: A finite product of countable set is countable.

11]Define topological space.

12]Define door space and give an example of door space.

13]Given an example to show that union of an infinite collection closed set in a topolocal space is not necessarily closed.

14]Determine whether or not each of the following intervals is a neighbourhood of 0 under the usual topology for the real line R.

15]Find the derived set of subset A={a,b,c} of X where X={a,b,c,d,e} and topology for X is given by

={X, ,{a},{c,d},{a,b,c},{b,c,d,e}}.

16] Every derived set in a topological space in closed.

17]A subset of a topological space is closed if and only if Ã=A.

18} prove that a set is closed if it contain its boundries and that is open if it is disjoint from its boundries.

19]Give an example of topological space different from the discrete space in which open sets are exactly the same as closed sets.

20]Let U be the ususal topology for R describe U-relative topology U*on the set of N of natural natural number.

21] show that the topological space(R,U)is second countable where U is usual topology .

22]To show that the discrete topology (R,D) on real line R is not second countable space.

23]Define with example of a first countable and a second countable.

24] A countable subset of space where topology has countable base. Then prove that some point of A is a limiting point A.

25]The property of being a first axion space is a hereditary property.

26]Show that every metric space is first countable.

27]The property of second axion space is a hereditary property .

28]The discrete topological space(R,D) is not separable , because the only dense subset of R is R itself but it is not countable.

29]show by means of a computer example that separability is not a hereditary property.

30]Let X and Y be topological spaces. A mapping f:X ->Y is continuous if and only if the inverse image under f of every open set in Y is open in X.

31]A mertric space is compact iff it is complete and totally bounded.

32]A subset A of a complete metric space (X,d) is compact iff A is closed and totally bounded.

33] X is second countable space then prove that any open base for X has a countable subspace which is also an open.

34]show that every discrete space is a T0-space.

35]show that the space (R,U) and (R,D)are not homeomorphic .

36]Theorem : homeomorphism is an equivalence relation in the class of topological spaces.\

37]Theorem : a topological space X is compact iff every collection of closed subsets of X with the finite intersection properties is fixed , that is ,has a non-empty intersection .

38]Theorem : if A is an infinite subset of a compact space X then A has limit point in x .

39]Theorem: The space (R,U) is not compact where U denotes the usual topology on R.

40]Define sequentially compact with example.