**Department of Mathematics**

M.Sc. (I Year/ I Sem) Question Bank

**Paper – III** (103), Subject: **Topology**

**Unit – III**

1. X = {1, 2} T={ then this topologyX is [ ]

A) Hausdorff space

B) T1 – Space

C) Hausdorff space and T1-space

D) Compact Space

E) None of these

2. A Topological Space is a T1-Space ⇔ each point is \_\_\_\_\_ set [ ]

A) Open Set

B) Closed Set

C) Derived Set

D) Open & Closed

E) None of these

3. Every Completely regular space is a [ ]

A) T1-Space

B) Hausdorff space

C) Compact Space

D) T1-Space and Hausdorff space

E) None of these

4. Which of the following statement is true [ ]

A) Every T1-Space is a Hausdorff Space

B) Every discrete topological space is not T1-space

C) Every Hausdorff space is a T1-Space

D) Every Indiscrete topological space is a T1-Space

5. Any compact Subspace of a Hausdorff space is [ ]

A) Closed

B) Open

C) Open and Closed

D) Compact

E) None of these

6. A mapping f : X→Y (where X & Y are T.S.) is Homeomorphism if [ ]

A) f is continuous

B) f is one-one

C) f is onto

D) f is open mapping

E) All of these

7. Let X be a topological space and given any pair of distinct points [ ] x, y if two neighborhoods G, H of x, y respectively such that

then we say that X is

A) Hausdorff Space

B) Normal Space

C) Compact Space

D) T1-Space

E) None of these

8. X = {1, 2, 3} T={ then

this topology X is [ ]

A) Hausdorff Space

B) Not Hausdorff Space

C) T1-Space

D) Not T1-Space

E) None of these

9. X = {1, 2, 3} T = ={ then this topology X is [ ]

A) T1-Space

B) Not T1-Space

C) Hausdorff Space

D) Not Hausdorff Space

E) None of these

10. Let X be a topological space and given any pair of distinct points x, y if

two neighborhoods G, H of x, y respectively such that x∈G y∈H & GH= then

we say that X is [ ]

1. Hausdorff Space
2. T1-space
3. Normal Space
4. Compact space
5. None of these

11. Every discrete topological space is a [ ]  
A) Hausdorff Space

B) Not Hausdorff space

C) T1-Space

D) Not T1-Space

E) None of these

12. Every Indiscrete topological space is a [ ]  
A) Hausdorff Space B) Not Hausdorff space

C) T1-Space D) Not T1-Space

E) None of these

13. In a Hausdorff space any point and disjoint compact subspace can

be separated by [ ]  
A) derived Set

B) Closed Set

C) Open Set

D) Open and Closed Set

E) None of these

14. Every Hausdorff space is [ ]

A) Normal Space

B) Not Normal Space

C) Not T1-Space

D) T1-Space

E) None of these

15. Every T1-Space need not be a [ ] A) Hausdorff Space

B) Not Hausdorff Space

C) Normal Space

D) Not Normal Space

E) None of these

16. A \_\_\_\_\_\_ Continuous mapping of a compact space onto a Hausdorff

Space is a Homeomorphism [ ]

A) Onto

B) Not onto

C) One – One

D) Not One – One

E) Name of these

17. A Normal space is a T1-Space in which each pair of disjoint closed

sets can be separated by [ ]

A) Closed Sets

B) Derived Sets

C) Disjoint Sets

D) Open Sets

E) None of these

18. Every compact Hausdorff Space is [ ]

A) Hausdorff

B) T1-Space

C) Normal

D) Completely regular space

E) None of these

19. Which of the following is a dyadic rational number [ ]

A) t = m/2 where m = 1, 2, …… (2n-1)

B) t = ½n where n = 1, 2……

C) t=m/2n where m, n = 1,2 ……

D) t=m/2n where m = 1,2, …… (2n-1), n=1, 2, ….

E) None of these

20. Let X be a normal space and let A and B be disjoint closed subspace

Of X then [ ]

A) There exists a continuous real function ‘f’ defined on X

B) All of whose values lie in the closed unit [0,1]

C) f (A) = 0

D) f (B) = 1

E) All of these

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**Unit – iii answers**

|  |  |  |
| --- | --- | --- |
| 1 | b | T1 – Space |
| 2 | b | Closed set |
| 3 | b | Hausdorff space |
| 4 | c | Every Hausdorff space is a T1-Space |
| 5 | a | Closed |
| 6 | e | All of these |
| 7 | d | T1-Space |
| 8 | c | T1-Space |
| 9 | b | Not T1-Space |
| 10 | a | Hausdorff Space |
| 11 | c | T1-Space |
| 12 | d | Not T1-Space |
| 13 | c | Open Set |
| 14 | d | T1-Space |
| 15 | a | Hausdorff Space |
| 16 | c | One – One |
| 17 | d | Not One – One |
| 18 | c | Normal |
| 19 | d | t=m/2n where m = 1,2, …… (2n-1) n=1, 2, …. |
| 20 | e | All of these |

**Unit – IV**

1. A topological space x is disconnected if [ ]

A) It can be represented as the union of two disjoint non-empty closed sets

B) It can be represented as the intersection of two disjoint non-empty open sets

C) It can be represented as the union of two disjoint non-empty open sets

D) It can be represented as the intersection of two disjoint non-empty closed sets

E) None of these

2. Let X = {a, b, c} T = { [ ]

A) X is connected

B) X is disconnected

C) X is compact

D) Neither X is connected nor disconnected

E) None of these

3. X = {1, 2} T = { isT.S. then X is [ ]

A) Connected

B) Disconnected

C) Compact

D) Neither Connected nor disconnected

E) None of these

4. A topological Space X is connected if [ ]

A) It cannot be represented as the union of two disjoint non-empty open sets

B) It cannot be represented as the intersection of two disjoint non empty open sets

C) It cannot be represented as the union of two disjoint non empty closed sets

D) It cannot be represented as the intersection of two disjoint non empty closed sets

E) None of these

5. X = {a, b} T = { and let Y = {a, b} then the relative

Topology on ‘Y’ is TY = [ ]

A) {

B) {

C) {

D) {

E) None of these

6. X = {1, 2, 3} T= { and let Y = {1, 2} then the relative

Topology on Y is TY  = [ ]

A) {

B) {

C) {

D) {

E) None of these

7. X = {a, b, c} T = { and let Y = {b, c} then the relative

Topology on Y is TY = [ ]

A) {

B) {

C) {

D) {

E) None of these

8. A set E in R is said to be on interval if [ ]

A) x, y E and x < z < y ⇒ z ∈E

B) x, y E and x > z > y ⇒ z ∈E

C) x, y E and x ≤ z ≤ y ⇒ z ∈E

D) x, y E and x ≥ z > y ⇒ z ∈E

E) None of these

9. Which of the following is an interval [ ]

A) (1, 2) (2, 4)

B) {1, 2, 3}

C) (1, 3) (3,4)

D) (1, 3) (3, 4)

E) None of these

10. A subspace of the real line R is connected iff [ ]

A) It is an open set

B) It is a closed set

C) It is an interval

D) It is a derived set

E) None of these

11. Any continuous image of connected space is [ ]

A) Disconnected

B) Connected

C) Interval

D) Not an interval

E) None of these

12. The range of continuous real function defined on a connected space is an [ ]

A) Open Set

B) Closed Set

C) Derived Set

D) Interval

E) None of these

13. Let X be a T.S. and let A, B are connected Subspaces of

Then is a [ ]

A) Connected Subspace

B) Connected Space of X

C) Disconnected Space of X

D) Disconnected Subspace of X

E) None of these

14. Which of a topological space is called a component of the space [ ]

A) A maximal connected space

B) A maximal disconnected space

C) A maximal Connected Subspace

D) A maximal disconnected subspace

E) None of these

15. X = {1, 2, 3} & T = { which of the set is

called component of X [ ]

A) {2, 3} B) {1, 2}

C) {1, 2, 3} D) {1}

E) {2}

16. X = {1, 2, 3} & T = { which of the set is called

component of X [ ]

A) {1, 2} B) X

C) {1, 2, 3} D) X and {1, 2, 3}

E) None of these

17. X = {1, 2, 3} T= { which of

the set is not component of x [ ]

A) X B) {1}

C) {2} D) {3}

E) None of these

18. Every Discrete topological space is always [ ]

A) Connected B ) Disconnected

C) Compact D) Connected and compact

E) None of these

19. In every discrete topological space every singleton set is [ ]

A) Connected

B) Disconnected

C) Component

D) Connected and Component

E) None of these

20. Which of the following Subspace of Rn is compact [ ]

A) Closed

B) Bounded

C) Open

D) Unbounded

E) Closed and bounded

21. The product of any non-empty class of compact space is [ ]

A) Connected

B) Disconnected

C) Compact

D) Not Compact

E) None of these

22. The product of any non-empty class of Hausdroff space is [ ] A) T1-Space

B) Normal Space

C) Complete regular Space

D) Hausdorff space

E) None of these

23. The product of any non-empty class of Hausdroff space is [ ]

A) Disconnected

B) Connected

C) Compact

D) Disconnected and Compact

E) None of these

24. Which of the following spaces are connected [ ]

A) Rn B) Cn

C) Q D) Rn and Cn

E) None of these

25. Which of the following statements are true in a topological space X [ ]

A) Each component of X is open

B) Each component of X is closed

C) Each connected subspace of x is contained in a component of X

D) Each component of x is closed and Each connected subspace of X

is contained in a component of X

E) None of these

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**Unit – iV answers**

|  |  |  |
| --- | --- | --- |
| 1 | c | It can be represented as the union of two disjoint non-empty open sets |
| 2 | b | X is disconnected |
| 3 | b | Disconnected |
| 4 | a | It cannot be represented as the union of two disjoint non-empty open sets |
| 5 | d | { |
| 6 | c | { |
| 7 | b | { |
| 8 | a | x, y E and x < z < y ⇒ z ∈E |
| 9 | d | (1, 3) (3, 4) |
| 10 | c | It is an interval |
| 11 | b | Connected |
| 12 | d | Interval |
| 13 | a | Connected Subspace |
| 14 | c | A maximal Connected Subspace |
| 15 | a | {2, 3} |
| 16 | d | X and {1, 2, 3} |
| 17 | a | X |
| 18 | b | Disconnected |
| 19 | d | Connected and Component |
| 20 | c | Open |
| 21 | c | Compact |
| 22 | d | Hausdorff space |
| 23 | b | Connected |
| 24 | d | Rn and Cn |
| 25 | d | Each component of X is closed and Each connected subspace of X is contained in a component of X |