Online Examinations (Even Sem/Part-I/Part-II Examinations 2020 - 2021

Course Name - –General Topology
Course Code -MSCMC205

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Answer all the questions. Each question carry one mark.

9. 1. A topological space is said to be T1 then T1

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- contains cofinite topology
- contained in cofinite topology
- contains cocountable topology
- contained in cocountable topology

10. 2. The set [0,1) in the set R with usual topology is

Mark only one oval.

- open
- closed
- both open and closed
- neither open nor closed

11. 3. The upper limit topology is generated by which of the following form of an interval

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- a, b)
- [a, b)
- (a, b]
- [a, b]

12. 4. Which of the following subsets in R is open in co-countable topology?

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- Q
- R\Q
- Z
- Any finite set

13. 5. The number of points in a finite discrete topological space is always a/an

Mark only one oval.

- prime number
- even number
- odd number
- none of these

14. 6.

The set $[0,1)$ in the set N with usual sub-space topology is

Mark only one oval.

- Open
- closed
- both open and closed
- neither open nor closed

15. 7.If A is a finite subset of R then the derived set of A is

Mark only one oval.

- an empty set
- A
- R
- none of these

16. 8.A topological space is said to be T1 then T1

Mark only one oval.

- contains cofinite topology
- contained in cofinite topology
- contains cocountable topology
- contained in cocountable topology

17. 9. If X is a Hausdorff space then the number of limits of a convergent sequence is

Mark only one oval.

- 0
- 1
- 2
- infinitely many

18. 10. A metric space is

Mark only one oval.

- T1 but not T2
- T2 but not T1
- both T1 and T2
- neither T1 nor T2

19. 11. If X is first countable and Hausdorff if every convergent sequence has

Mark only one oval.

- no limit
- unique limit
- finite number of limits
- infinite number of limits

20. 12.A regular space is always

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- 1 but not T2
- T2 but not T1
- may not be T1 and T2
- both T1 and T2

21. 13.A T4 space is

Mark only one oval.

- T1 but not normal
- normal but not T1
- both T1 and normal
- neither normal nor T1

22. 14. A metric space is:

Mark only one oval.

- T1 but not normal
- normal but not T1
- both T1 and normal
- neither normal nor T1

23. 15. A space is T3 if

Mark only one oval.

- T1 but not regular
- regular but not T1
- both T1 and regular
- neither regular nor T1

24. 16. A T4 space is:

Mark only one oval.

- T2 but not normal
- normal but not T2
- both T2 and normal
- neither normal nor T2

25. 17. The Uryshon’s lemma is applicable for two disjoint

Mark only one oval.

- closed sets
- open sets
- both open and closed sets
- None of these

26. 18. By applying the Uryshon’s lemma, we get a...... map that separate disjoint closed sets.

Mark only one oval.

- open
- closed
- continuous
- identity

27. 19. The number of accumulation point of a finite subset in a topological space is always

Mark only one oval.

- zero
- one
- more than one
- None of these

28. 20. Every finite T1 space is a

Mark only one oval.

- indiscrete space
- discrete space
- No such space exist
- Depends on the structure

29. 21. Every finite subset of R with usual topology

Mark only one oval.

- open
- closed
- both open and closed
- neither open nor closed

30. 22. Let X be a discrete finite topological space with 4 elements. Then the number of open sets of X is

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- 2
- 4
- 8
- 16

31. 23. Let X be an indiscrete finite topological space with 5 elements. Then the number of open sets of X is

Mark only one oval.

- 2
- 4
- 25
- 32

32. 24. Let X be an indiscrete finite topological space with 5 elements. Then the number of subsets of X, which are neither open nor closed is

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- 0
- 2
- 10
- 30

33. 25.

Let $X = \left\{ \frac{1}{n} : n \in Z \right\}$ with co-countable topology. Then the number of open subsets of X is

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- zero
- finite
- countable
- uncountable

34. 26.Which of the following statement is true?

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- The upper limit topology is weaker than the usual topology
- The upper limit topology is stronger than the usual topology
- The upper limit topology is not comparable with the usual topology
- None

35. 27. The set of interior points of A is:

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- the largest open set containing A
- the smallest open set containing A
- the largest open set contained in A
- the smallest open set contained in A

36. 28.

$$\left\{1,\frac{1}{2},\frac{1}{3},\dots\right\}^{\circ}=?$$

Mark only one oval.

$[0,1]$

Option 1

$\left\{0,1,\frac{1}{2},\frac{1}{3},\dots\right\}$

Option 2

$\{0\}$

Option 3

Empty set

37. 29.Closure set of the set Q of all rational number is:

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- Q
- R
- R\Q
- Empty set

38. 30.

Let A and B be subsets of a topological space X. Then $(A \cup B)'$

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$A' \cup B'$

- Option 1

$A' \cap B'$

- Option 2

$(A \cap B)'$

- Option 3

$(A \cup B)$

- Option 4

39. 31.

$\overline{A \cup B}$

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$\subset \overline{A} \cup \overline{B}$

Option 1

$= \overline{A} \cup \overline{B}$

Option 2

$\supset \overline{A} \cup \overline{B}$

Option 3

Other

40. 32. Every finite subset of a metric space X is:

Mark only one oval.

- open
- closed
- both open and closed
- neither open nor closed

41. 33.Any subspace of a second countable space is:

Mark only one oval.

- always second countable
- may not be first countable
- may not be second countable
- may not be separable

42. 34.Derived set of the set Q of all rational number is:

Mark only one oval.

- Q
- R
- R\Q
- Empty set

43. 35. Which of the following topological space is not second countable under usual subspace topology?

Mark only one oval.

- Q
- R
- R\Q
- None of these

44. 36.Which is a countable dense set of R under usual topology?

Mark only one oval.

- Q
- R\Q
- Z
- R has no countable dense subset

45. 37. The boundary of Q is

Mark only one oval.

- Q
- R
- R\Q
- Empty set

46. 38. The boundary of (0,1] is

Mark only one oval.

- (0, 1)
- {0,1}
- {0}
- {1}

47. 39.Which of the following is not a neighbourhood of 0 under usual topology?

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- (0, 1)
- [-0,5,1)
- [-1,1]
- (-1, 1)

48. 40.

Let $f : X \to Y$ be a continuous map and V is a closed subset of Y. Then $f^{-1}(V)$

Mark only one oval.

- open in X
- closed in X
- open in Y
- closed in Y

49. 41. Which of the following space is homeomorphic to the space R with usual topology?

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- (0, 1)
- [0, 1)
- [0, 1]
- Q

50. 42.

Let $f: X \to Y$ be a continuous map and X and Y are homeomorphic via f. Then f^{-1} is

Mark only one oval.

- always continuous
- always discontinuous
- may not be continuous
- No conclusion

51. 43. Let X and Y are discrete topological spaces. Then X and Y are not homeomorphic

Mark only one oval.

- only if they have same cardinality
- if they have same cardinality
- if and only if they have same cardinality
- None of these

52. 44.Which of the following is not homeomorphic to the space [0,1]?

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- (0,1)
- [2,3]
- [0, 1)U(0.5, 2]
- None of these

53. 45. Which of the following subsets of R is not compact?

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- a finite subset
- a bounded set containing all its limit points
- an open set which is closed
- a closed set which is bounded

54. 46.

A mapping $f: X \rightarrow Y$ is said to be an open map if

Mark only one oval.

- it sends an open set to an open set
- it sends an open set to entire Y set
- the inverse function sends an open set an open se
- the inverse function sends an open set to the entire X

55. 47. A function which maps every closed set to a closed set is called a/an

Mark only one oval.

- continuous map
- open map
- closed map
- None of these

56. 48. A function which maps every singleton set of a discrete topological space to an open sets in any topological space is called a/an

Mark only one oval.

- continuous map
- open map
- closed map
- clopen map

57. 49. Arbitrary product of compact set is

Mark only one oval.

- always compact
- compact if closed
- may be compact
- never compact

58. 50. If the inverse image of every open set is open then the mapping is called

Mark only one oval.

- continuous map
- open map
- closed map
- clopen map

59. 51. Which of the following set is compact in R under usual topology?

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- [0, 1]
- (0, 1)
- [0, 1)
- (0, 1]

60. 52. If the identity function from a topological space (X, S) to (Y, T) is continuous, then

Mark only one oval.

- T is finer than S
- S is finer than T
- T is not comparable to S
- T=S

61. 53.Let F be a continuous function then the inverse image of every members of subbase is

Mark only one oval.

- open
- closed
- both open and closed
- neither open nor closed

62. 54. Let f be a function from a topological space to the unit interval [0, 1]. Then

Mark only one oval.

- f is always continuous
- f is an open map
- f is a closed map
- None of these

63. 55.

A function $f : X \to X$ is continuous then

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$f(\overline{A}) = \overline{f(A)}$

- Option 1

$f(\overline{A}) \subset \overline{f(A)}$

- Option 2

$f(\overline{A}) \supset \overline{f(A)}$

- Option 3

$f(\overline{A}) \cap \overline{f(A)} = \phi$

- Option 4

64. 56.

A function $f: X \to X$ is continuous then

Mark only one oval.

- f is continuous at every points in X
- f is not continuous at some points in X
- f--1is continuous at every point in X
- Other

65. 57.

The function $f(x) = x^2$ is an open map if the topology on R is

Mark only one oval.

- usual topological space
- lower-limit topological space
- upper-limit topological space
- None of these

66. 58. Every projection map on a product space is always

Mark only one oval.

- open but not continuous
- continuous but not open
- both open and continuous
- neither open nor continuous

67. 59.Which of the following is not topologically invariant?

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- accumulation point
- interior point
- boundary point
- None of these

68. 60. None of these

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$f(A^\circ) = f(A)^\circ$

Option 1

$f(A^\circ) \subset f(A)^\circ$

Option 2

$f(A^\circ) \supset f(A)^\circ$

Option 3

$f(A^\circ) \cap f(A)^\circ = \phi$

Option 4