TYBSc(Mathematics) Subject:-MTH-501:Metric SpacesQuestion BankIIn Discrete Metric space $(X, d), d(x, y) = 0, \text{ if }$ a. $x = y$ b. $x < y$ c. $x > y$ d. $x \neq y$ 2.The Set A is countable if A is a. Finite b. Denumerable c. either finite or denumerable d. None of TheseC3.If a set A is equivalent to the set of natural numbers, then A is set. a. Denumerable c. UncountableA4.The set Z of integers is a. Finite b. Denumerable c. Not Denumerable c. Not Denumerable d. None of These.B5.A proper subset of Countable set is a. Uncountable c. Not Denumerable d. None of TheseB5.A proper subset of Countable set is a. Uncountable c. Not Denumerable d. None of TheseB6.The set $\mathbb{Q} \times \mathbb{Q}$ is a. Finite b. Denumerable c. InfiniteB7.If $p:M \times M \to [0, \infty)$ is pseudo metric in M then which of the following is a false statement? a. $p(x, y) = p(y, x),  \forall x, y \in M$ c. $p(x, y) = p(y, x),  \forall x, y, z \in M$ c. $p(x, y) = p(x, y),  \forall x, y, z \in M$ d. $p(x, y) = p(x, y),  \forall x, y, z \in M$ d. $p(x, y) = 0,  \forall x, y \in M$ c. $p(x, y) = p(x, y),  \forall x, y, z \in M$ B8.If $d: M \times M \to [0, \infty)$ defined as $d(A, B) =  det A - det B ,  \forall A, B \in M$ where M is s set of all $n \times n$ matrices over reals then a. $a \neq b$ b. $a > b$ c. $a < b$ d. $a = b$ D	Q.N		Ans.
Question Bank1.In Discrete Metric space $(X, d), d(x, y) = 0, \text{ if }$ a. $x = y$ b. $x < y$ c. $x > y$ d. $x \neq y$ A2.The Set A is countable if A is a. Finite b. Denumerable c. either finite or denumerable d. None of TheseC3.If a set A is equivalent to the set of natural numbers, then A is set. a. Denumerable b. Infinite c. Uncountable d. None of These.A4.The set Z of integers is a. Finite b. Denumerable c. Not Denumerable d. None of These.B5.A proper subset of Countable set is a. Uncountable c. Infinite d. None of TheseB5.A proper subset of Countable set is a. Uncountable b. Denumerable c. Not Denumerable d. None of TheseB6.The set $\mathbb{Q} \times \mathbb{Q}$ is a. a. Finite b. Denumerable c. Not denumerable c. Not denumerable d. None of TheseB7.If $p: M \times M \to [0, \infty)$ is pseudo metric in M then which of the following is a false statement?Ca. $p(x, y) \ge \rho(y, x), \forall x, y \in M$ b. $\rho(x, y) \ge 0, \forall x, y \in M$ c. $\rho(x, y) = 0 \Rightarrow x = y, \forall x, y \in M$ c. $\rho(x, y) = 0 \Rightarrow x = y, \forall x, y \in M$ d. $\rho(x, y) \ge \rho(x, 2) + \rho(2, y), \forall x, y, z \in M$ B8.If $(M \times M \to [0, \infty)$ is pseudo metric in M then which of the following is a false set of all $n \times n$ matrices over reals then a. $a$ is a metric on M b. $a$ is a metric on M c. Both a and b d. None of TheseD9.If $f: A \to B$ is one-one function and $f(a) = f(b)$ then a. $a < b$ b. $a > b$ c. $a < b$ D		TYBSc(Mathematics)	
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8. If $d: M \times M \to [0, \infty)$ defined as $d(A, B) =  \det A - \det B $ , $\forall A, B \in M$ where M is set of all $n \times n$ matrices over reals then a. d is a metric on M b. d is pseudo metric on M c. Both a and b d. None of These 9. If $f: A \to B$ is one-one function and $f(a) = f(b)$ then a. $a \neq b$ b. $a > b$ c. $a < b$ D			
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a. d is a metric on M b. d is pseudo metric on M c. Both a and b d. None of These $A = f(b)$ then9. If $f: A \to B$ is one-one function and $f(a) = f(b)$ then a. $a \neq b$ b. $a > b$ c. $a < b$ $D$	01		_
b. d is pseudo metric on Mc. Both a and bd. None of These9. If $f: A \rightarrow B$ is one-one function and $f(a) = f(b)$ thena. $a \neq b$ b. $a > b$ c. $a < b$			
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d. None of These $\blacksquare$ 9. If $f: A \to B$ is one-one function and $f(a) = f(b)$ then $D$ a. $a \neq b$ $b. a > b$ b. $a > b$ $c. a < b$			
9. If $f: A \to B$ is one-one function and $f(a) = f(b)$ then a. $a \neq b$ b. $a > b$ c. $a < b$			
a. $a \neq b$ b. $a > b$ c. $a < b$	9		D
b. $a > b$ c. $a < b$			
c. $a < b$			
		$\begin{array}{c} c. & a < b \\ d. & a = b \end{array}$	

	A set A is said equivalent to a set B if $f: A \to B$ is	С
	a. One-one	
	b. Onto	
	c. Both a and b	
	d. None of These	
11.	If a Cauchy sequence has a convergent subsequence then it is	B
	a. divergent	
	b. convergent	
	c. Both convergent and divergent	
	d. Not convergent	
12.	Anysubset in a metric space is bounded.	B
	a. infinite	
	b. finite	
	c. finite and infinite both	
	d. None of these	
13.	In a metric space $(M, \rho)$ , an open sphere of radius $r$ about $a$ , $S(a, r) = \cdots$	D
15.		
	a. $\{x \in M : \rho(x, a) \le r\}$	
	b. $\{x \in M : \rho(x, a) \neq r\}$	
	c. $\{x \in M : \rho(x, a) > r\}$	
	d. $\{x \in M : \rho(x, a) < r\}$	
14.	In a metric space $(M, \rho)$ , an closed sphere of radius $r$ about $a$ , $S[a, r] = \cdots$	Α
	a. $\{x \in M : \rho(x, a) \le r\}$	
	b. $\{x \in M : \rho(x, a) \neq r\}$	
	c. { $x \in M : \rho(x, a) > r$ }	
	d. $\{x \in M : \rho(x, a) < r\}$	
15.	The open sphere $S(x_0, r)$ for usual metric is	В
101	a. $(x_0, r)$	
	b. $(x_0 - r, x_0 + r)$	
	c. $[x_0 - r, x_0 + r]$	
10	$\frac{d}{dt} \begin{bmatrix} x_0, r \end{bmatrix}$	C
16.	Let $(M, \rho)$ be a metric space and $a \in M$ them the set $\{x \in \rho(x, a) \le r\}$ is called	C
	a. Open Set	
	b. Closed Set	
	c. Closed Sphere	
	d. Open Sphere	
17.	If A is an open set in a metric space, $(M, \rho)$ , then $A^C$ is in $(M, \rho)$	Α
	a. Closed Set	
	b. Open Set	
	c. Both a and b	
	d. None of these	
18	In Interval $[a, b]$ in the usual metric space is	R
18.	In Interval [a, b] in the usual metric space is	B
18.	a. Open set	B
18.	<ul><li>a. Open set</li><li>b. Closed Set</li></ul>	B
18.	<ul><li>a. Open set</li><li>b. Closed Set</li><li>c. Half open Set</li></ul>	B
	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul>	
18. 19.	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul> If <i>A</i> and <i>B</i> are open subset of <i>R</i> , then <i>A</i> × <i>B</i> is	B
	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul> If A and B are open subset of ℝ, then A × B is <ul> <li>a. Open in ℝ<sup>2</sup></li> </ul>	
	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul> If A and B are open subset of R, then A × B is <ul> <li>a. Open in R<sup>2</sup></li> <li>b. Open in R</li> </ul>	
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19.	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul> If <i>A</i> and <i>B</i> are open subset of ℝ, then <i>A</i> × <i>B</i> is <ul> <li>a. Open in ℝ<sup>2</sup></li> <li>b. Open in ℝ</li> <li>c. Closed in ℝ</li> <li>d. Closed in ℝ<sup>2</sup></li> </ul> The characteristic function χ <sub>G</sub> is at each point of <i>G</i> . Where <i>G</i> is open set in ℝ.	A
19.	<ul> <li>a. Open set</li> <li>b. Closed Set</li> <li>c. Half open Set</li> <li>d. Hale Closed Set</li> </ul> If A and B are open subset of R, then A × B is <ul> <li>a. Open in R<sup>2</sup></li> <li>b. Open in R</li> <li>c. Closed in R</li> <li>d. Closed in R<sup>2</sup></li> </ul> The characteristic function χ <sub>G</sub> is at each point of G. Where G is open set in R.	A

	d. None of these	
21.	If f and g are continuous real valued functions on the metric space X. Then the set $A =$	С
	$\{x \in X : f(x) < g(x)\}$ is	
	a. Closed	
	b. Half-open	
	c. Open	
	d. Half-closed	
22.	If $a \in \mathbb{R}$ then $[a, \infty)$ is a subset of $\mathbb{R}$ .	B
	a. Open	
	b. Closed	
	<ul><li>c. Half-open</li><li>d. Half Closed</li></ul>	
23.		В
23.	A function $f: X_1 \to X_2$ is called as isometry if	Б
	a. $d_1(x, y) \neq d_2(f(x), f(y))  \forall x, y \in X_1$	
	b. $d_1(x, y) = d_2(f(x), f(y))  \forall x, y \in X_1$	
	c. $d_1(x, y) < d_2(f(x), f(y))  \forall x, y \in X_1$	
	d. $d_1(x, y) > d_2(f(x), f(y))  \forall x, y \in X_1$	
24.	A subset A of X is said to be dense in X if $\overline{A} = \dots$	D
	a. A	
	b. $A^C$	
	c. $\overline{X}$	
	d. <i>X</i>	
25.	A mapping $T: X \to X$ is a contradiction on X it there exists a real number $\alpha$ ,	Α
	independent of $x, y \in X$ with $0 \le \alpha < 1$ .	
	a. $d(Tx, Ty) \le \alpha d(x, y)$	
	b. $d(Tx,Ty) > \alpha d(x,y)$	
	c. $d(Tx,Ty) = \alpha d(x,y)$	
	d. $d(Tx,Ty) < \alpha d(x,y)$	
26.	If $T: X \to X$ is defined as $Tx = x^2$ , where $X = \left[0, \frac{1}{3}\right]$ then T is	D
	a. Not Continuous on $\left[0, \frac{1}{3}\right]$	
	b. A contraction on $\left[0, \frac{1}{3}\right]$	
	c. Continuous $\left[0, \frac{1}{3}\right]$	
	d. Both b and c	
27.	If A is totally bounded subset of a metric space, $(M, \rho)$ then $\overline{A}$ is	B
	a. Not totally bounded	
	b. Totally bounded	
	c. Not bounded	
20	d. None of These	р
28.	If A is an infinite set in a discrete metric space, then X with respect to discrete metric space	B
	a. Bounded and totally bounded	
	<ul><li>b. Bounded but not totally bounded</li></ul>	
	c. Unbounded and totally bounded	
	d. None of these	
29.	The metric space [0, 1] with absolute value metric space is	D
_>.	a. Not bounded	
	b. Totally bounded	
	c. Complete	
	d. Both b and c	
30.	If the metric space $(M, \rho)$ is both totally bounded and complete, then it is	С
	a. Connected	

	b. Discrete	
	c. Compact	
	d. Not Compact	
31.	The continuous image of a compact metric space is	B
	a. Not compact	
	b. Compact	
	c. Disconnected	
	d. None of these	
32.	The function $f: (0, 1) \to \mathbb{R}$ defined by $f(x) = \frac{1}{x}$ is	С
	a. Both continuous and Uniformly continuous	
	b. Uniformly continuous but not continuous	
	c. Continuous but not Uniformly continuous	
	d. Neither continuous nor Uniformly continuous	
33.	If $A_1$ and $A_2$ are connected subsets of a metric space X then $A_1 \cup A_2$ is also connected if	B
	a. $A_1 \cap A_2 = \phi$	
	b. $A_1 \cap A_2 \neq \phi$	
	c. $A_1 \cap A_2 = X$	
	d. None of These	
34.	The series $A = \{x \in \mathbb{R} : x > 0\}$ and $B = \{x \in \mathbb{R} : x < 0\}$ are set.	B
	a. Connected	
	b. Separated	
	c. Not connected	
	d. None of These	
35.	If <i>A</i> and <i>B</i> are subset of <i>M</i> and $A \subset B$ then	С
	a. $\bar{A} = \bar{B}$	
	b. $\overline{A} \supset \overline{B}$	
	c. $\overline{A} \subset \overline{B}$	
	d. None of These	
36.	If A and B are subset of M then choose correct	Α
	a. $\overline{A \cap B} \subset \overline{A} \cap \overline{B}$	
	b. $\overline{A \cap B} \supset \overline{A} \cap \overline{B}$	
	c. $\overline{A \cap B} = \overline{A} \cap \overline{B}$	
	d. None of These	
37.	In any metric space every subset of $\mathbb{R}$ is totally bounded.	С
	a. Bounded below	
	b. Bounded above	
	c. Bounded	
20	d. Unbounded	0
38.	On metric space every continuous function is uniformly continuous.	C
	a. Not Complete	
	b. Not Compact	
	<ul><li>c. Compact</li><li>d. Not totally bounded</li></ul>	
39.	If <i>B</i> is a countable subset of an uncountable set <i>A</i> then $(A - B)$ is	В
57.	a. Countable	D
	b. Uncountable	
	c. Denumerable	
	d. None of These	
	Which of the following set is not compact?	D
40		
40.		
40.	a. The set of real number	
40.		

41.	Which of the following is a countable set?	B
	a. Set of real numbers	
	b. Set of rational numbers	
	c. Set of irrational numbers	
42.	d. None of theseIn Metric space $(M, \rho), \ \rho(x, y) \dots \rho(x, z) + \rho(z, y),  \forall x, y \in M$	C
42.	a. >	C
	b. =	
	c. <	
	$d. \neq$	
43.	If $A_1, A_2, \dots, A_n$ are denumerable sets, then $\bigcup_{n=1}^{\infty} A_n$ is	D
	a. Finite Set	
	b. Non-Countable set	
	c. Non-Denumerable	
	d. Denumerable	
44.	In Discrete metric space $(X, d), d(x, y) = 1$ , if	С
	a. $x < y$	_
	b. $x > y$	
	c. $x \neq y$	
	d. $x = y$	
45.	The Set $\mathbb{N} \times \mathbb{N}$ is	В
	a. Finite	
	b. Denumerable	
	c. Non-Denumerable	
	d. None of These	
46.	In a metric space $(M, \rho)$ , $\rho(x, y) = 0$ if and only if	Α
	a. $x = y$	
	b. $x \neq y$	
	c. $x < y$	
	d. $x > y$	
47.	If A is denumerable set, then A is equivalent to the set of	В
	a. Integers	
	b. Natural Numbers	
	c. Real Numbers	
	d. Rational Numbers	
48.	If $(X, d)$ is a metric space and $d_1(x, y) = \frac{d(x, y)}{1 + d(x, y)}$ , $\forall x, y \in X$ . Then $(X, d_1)$ is	C
	metric space	
	a. Unbounded	
	b. Discrete	
	c. Bounded	
	d. Pseudo	
49.	A metric space $(\mathbb{R}, \rho)$ where $\rho(x, y) =  x - y , \forall x, y \in \mathbb{R}$ is called as	B
49.	A metric space $(\mathbb{R}, \rho)$ where $\rho(x, y) =  x - y , \forall x, y \in \mathbb{R}$ is called as a. Discrete metric space	B
49.	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> </ul>	B
49.	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> </ul>	B
	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> </ul>	
49. 50.	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> <li>The subset [0, 1] of ℝ is</li> </ul>	B
	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> </ul> The subset [0, 1] of ℝ is <ul> <li>a. Countable</li> </ul>	
	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> </ul> The subset [0, 1] of ℝ is <ul> <li>a. Countable</li> <li>b. Finite</li> </ul>	
	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> </ul> The subset [0, 1] of ℝ is <ul> <li>a. Countable</li> <li>b. Finite</li> <li>c. Uncountable</li> </ul>	
	<ul> <li>A metric space (ℝ, ρ) where ρ(x, y) =  x - y , ∀x, y ∈ ℝ is called as</li> <li>a. Discrete metric space</li> <li>b. Usual Metric Space</li> <li>c. Pseudo metric space</li> <li>d. All of These</li> </ul> The subset [0, 1] of ℝ is <ul> <li>a. Countable</li> <li>b. Finite</li> </ul>	

	b. Closed set	
	c. Half-closed set	
	d. Half-open set	
52.	A metric $d: \mathbb{R} \times \mathbb{R} \to [0, \infty)$ defined as $d(x, y) =  x^2 - y^2 , \forall x, y \in \mathbb{R}$ is on $\mathbb{R}$ .	B
	a. Metric	
	b. Pseudo Metric	
	c. Not Countable	
	d. None of These	
53.	If A and B are two countable sets, then $A \times B$ is	В
	a. Uncountable	
	b. Countable	
	c. Not Countable	
	d. None of These	
54.	Let $(M, \rho)$ be a metric space and $x_0 \in M$ . The set $\{x \in M : \rho(x, x_0) < r\}$ is called	D
	a. Open Set	
	b. Closed Set	
	c. Closed Sphere	
	d. Open Sphere	
55.	If A is a closed set in a metric space, $(M, \rho)$ , then $(M - A)$ is	В
	a. Closed Set	
	b. Open Set	
	c. Both a and b	
	d. Half-closed set	
56.	A set $\{x\}$ in the usual metric space $(\mathbb{R}, \rho)$ is	В
	a. Half-open	
	b. Closed	
	c. Half-closed	
	d. Open Set	
57.	(a, b) in the usual metric space is	В
	a. Open set	
	b. Closed set	
	c. Semi-open set	
	d. None of These	
58.	If A and B are closed subsets of $\mathbb{R}$ , then $A \times B$ is	С
	a. Open in $\mathbb{R}^2$	
	b. Open in $\mathbb{R}$	
	c. Closed in $\mathbb{R}^2$	
	d. Closed in $\mathbb{R}$	