

Q.1. A _____ is an ordered collection of objects.

- (a) Relation
- (b) Function
- (c) Set
- (d) Proposition

Ans. (c) Set

Q.2. Which of the following represents the statement "The number 5 is not a member of the set A"?

- (a) $5 \in A$
- (b) $5 \notin A$
- (c) $A \notin 5$
- (d) $A \in 5$

Ans. (b) $5 \notin A$

Q.3. What is Floor function?

- (a) It maps the real number to the greatest previous integer
- (b) It maps the real number to the smallest previous integer
- (c) It maps the real number to the smallest following integer
- (d) None of the mentioned

Ans. (a) It maps the real number to the greatest previous integer

Q.4. What is Ceil function?

- (a) It maps the real number to the greatest previous integer
- (b) It maps the real number to the smallest previous integer
- (c) It maps the real number to the smallest following integer
- (d) None of the mentioned

Ans. (c) It maps the real number to the smallest following integer.

Q.5. What is the value of $\text{Floor}(8.4) + \text{Ceil}(9.9)$?

- (a) 18
- (b) 19
- (c) 20
- (d) 17

Ans. (a) 18

Q.6. If a and b are two positive numbers that are less than one, then the maximum value of $\text{Floor}(a+b)$ and $\text{Ceil}(a+b)$ is?

- (a) $\text{Floor}(a+b)$ is 0 and $\text{Ceil}(a+b)$ is 1.
- (b) $\text{Floor}(a+b)$ is 1 and $\text{Ceil}(a+b)$ is 0.
- (c) $\text{Floor}(a+b)$ is 1 and $\text{Ceil}(a+b)$ is 2.
- (d) $\text{Floor}(a+b)$ is 2 and $\text{Ceil}(a+b)$ is 1

Ans. (c) $\text{Floor}(a+b)$ is 1 and $\text{Ceil}(a+b)$ is 2.

Q.7. How many relations exist from set X to set Y if the set X and set Y has 7 and 8 elements?

- (a) 2^{56}
- (b) 2^{72}
- (c) 3^{56}
- (d) 56

Ans. (a) 2^{56}

- Q.8. The number of reflexive closure of the relation $\{(0,1), (1,1), (1,3), (2,1), (2,2), (3,0)\}$ on the set $\{0, 1, 2, 3\}$ is _____.
(a) 36 (b) 8
(c) 6 (d) 2^6

Ans. (c) 6

- Q.9. The number of transitive closure exists in the relation $R = \{(0,1), (1,2), (2,2), (3,4), (5,3), (5,4)\}$ where $\{1, 2, 3, 4, 5\} \in A$ is _____.
(a) $\{(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)\}$
(b) $\{(0,0), (4,4), (5,5), (1,1), (2,2), (3,3)\}$
(c) $\{(0,1), (1,2), (2,2), (3,4)\}$
(d) $\{(0,1), (5,3), (5,4), (1,1), (2,2)\}$

Ans. (a) $\{(0,1), (0,2), (1,2), (2,2), (3,4), (5,3), (5,4)\}$

Q.10. Which statement is incorrect if X and Y are the two non-empty relations on the set S.

- (a) If X and Y are transitive, then the intersection of X and Y is also transitive.
(b) If X and Y are reflexive, then the intersection of X and Y is also reflexive.
(c) If X and Y are symmetric, then the union of X and Y is not symmetric.
(d) If X and Y are transitive, then the union of X and Y is not transitive.

Ans. (d) If X and Y are transitive, then the union of X and Y is not transitive.

Q.11. Which of the following is infinite set?

- (a) Set of days of week
(b) Set of points on a line
(c) Set of months in a year
(d) Set of prime numbers less than 99

Ans. (b) Set of points on a line

Q.12. Set of letters of English alphabet is _____

- (a) empty set (b) singleton set
(c) finite set (d) infinite set

Ans. (c) finite set

Q.13. Which of the set is singleton set?

- (a) Set of odd prime numbers
(b) Set of even prime numbers
(c) Set of odd numbers
(d) Set of prime numbers

Ans. (b) Set of even prime numbers

Q.14. Finite set _____ empty set.

- (a) is same as (b) is an
(c) is not (d) may or may not

Ans. (d) may or may not

Q.15.Which of the following is an infinite set?

- (a) A set of girls in a college
- (b) A set of players in a cricket team
- (c) A set of points in a Line
- (d) A set of edges in a square

Ans. (c) A set of points in a Line

Q.17.Which of the following is true?

- (a) A finite set has an infinite number of elements
- (b) An empty set is a finite set
- (c) An empty set is neither finite nor infinite
- (d) An infinite set has a countable number of elements

Ans. (b) An empty set is a finite set

Q.18.Which of the following is a finite set?

- (a) Set of points in a line
- (b) Set of natural numbers
- (c) Set of mothers in a family
- (d) Set of prime numbers

Ans. (c) Set of mothers in a family

Q.19 Find the odd one out.

- (a) Null set (b) Void set
- (c) Infinite set (d) Empty set

Ans. (c) Infinite set

Q.20.Which of the following is an empty set?

- (a) Prime numbers up to 10
- (b) Even numbers up to 10
- (c) Prime numbers divisible by 2
- (d) Prime numbers divisible by 3

Ans. (d) Prime numbers divisible by 3

Q.21.Find the number of points common to parallel lines.

- (a) Three points (b) One point
- (c) Two point (d) No point

Ans. (d) No point

Q.22.A set with no elements in it is called?

- (a) Equivalent Set (b) Empty Set
- (c) Equal Set (d) Infinite Set

Ans. (b) Empty Set

Q.23.Which of the following is an empty set?

- (a) The set of dogs with six legs
- (b) The set of books in the library
- (c) The set of boys in a school
- (d) The set of a square with 4 sides

Ans. (a) The set of dogs with six legs

Q.24.How to define a set?

- (a) A collection of well-defined objects or element

- (b) A collection of unordered objects or element
 - (c) Any random elements
 - (d) A collection of special characters
- Ans. (a) A collection of well-defined objects or element

Q.25. How is a set denoted?

- (a) () (b) {}
- (c) [] (d) **

Ans. (b) {}

Q.26. How to solve for x , if $|x-1| \geq 3$?

- (a) $(-\infty, -2) \cup (4, \infty)$
- (b) $(-\infty, -2) \cup [4, \infty)$
- (c) $(0, -2) \cup (4, 0)$
- (d) $(-\infty, \infty) - \{-2, 4\}$

Ans. (b) $(-\infty, -2) \cup [4, \infty)$

Q.27. What is the interval of $f(x) = (x-1)(x-2)(x-3)/(x^3 + 6x^2 + 11x + 6)$ where $f(x)$ is positive?

- (a) $(-\infty, -3) \cup (3, \infty)$
- (b) $(3, -2) \cup (1, 1) \cup (2, 3)$
- (c) $(-\infty, -3) \cup (2, -1) \cup (1, 2) \cup (3, \infty)$
- (d) $(-\infty, \infty)$

Ans. (c) $(-\infty, -3) \cup (2, -1) \cup (1, 2) \cup (3, \infty)$

Q.28. What is the interval of $f(x) = (x-1)(x-2)(x-3)/(x^3 + 6x^2 + 11x + 6)$ where $f(x)$ is negative?

- (a) $(-\infty, -3) \cup (3, \infty)$
- (b) $(3, -2) \cup (1, 1) \cup (2, 3)$
- (c) $(-\infty, -3) \cup (-1, 1) \cup (1, 2) \cup (3, \infty)$
- (d) $(-\infty, \infty)$

Ans. (b) $(3, -2) \cup (1, 1) \cup (2, 3)$

Q.29. Which one of the following set is not possible?

- (a) Honest persons
- (b) Prime numbers up to 100
- (c) Even numbers up to 100
- (d) Letters forming the word SCHOOL

Ans. (a) Honest persons

Q.30. Which of the following is not a set of letters of word PRINCIPAL?

- (a) {P, R, I, N, C, A, L}
- (b) {C, A, P, I, N, R, L}
- (c) {P, R, I, N, C, I, P, A, L}
- (d) {L, N, I, P, C, A, R}

Ans. (c) {P, R, I, N, C, I, P, A, L}

Q.31. Write solution set of equation $x^2 - 3x + 2 = 0$ in roster form.

- (a) {1, 3}
- (b) {2, 4}
- (c) {1, 4}
- (d) {1, 2}

Q.32. Write the set {12, 23, 34, 45, 56} in set builder form.

- (a) $\{x : x = nn+1 \text{ where } n \text{ is a natural number less than } 6\}$
(b) $\{x : x = n+1n+2 \text{ where } n \text{ is a natural number less than } 6\}$
(c) $\{x : x = n+1n \text{ where } n \text{ is a natural number less than } 6\}$
(d) $\{x : x = nn+1 \text{ where } n \text{ is a natural number less than } 5\}$
Ans. (a) $\{x : x = nn+1 \text{ where } n \text{ is a natural number less than } 6\}$

Q.33. Write the set $\{x : x \text{ is an integer and } x^2 - 9 = 0\}$ in roster form.

- (a) {3} (b) {-3} (c) {3, -3} (d) {9, 3}

Ans. (c) {3, -3}

Q.34. Write the set $\{x : x \text{ is a natural number and } x^2 - 9 = 0\}$ in roster form.

- (a) {3} (b) {-3} (c) {3, -3} (d) {9, 3}

Ans. (a) {3}

Q.35. Let $A = \{1, 2, 3, 4, 5\}$. Insert appropriate symbol in 2 _____ A.

- (a) = (b) < (c) ∈ (d) ∉

Ans. (c) ∈

Q.36. Let $X = \{1, 2, 3, 4, 5, 6\}$. Insert appropriate symbol in 9 _____ X.

- (a) = (b) < (c) ∈ (d) ∉

Ans. (d) ∉

Q.37. Which of the following does not belong to set $\{x : x \text{ is a vowel in English alphabet}\}$?

- (a) e (b) b (c) i (d) o

Ans. (b) b

Q.38. The number of elements in set $\{x : x \text{ is a letter of word TRIGONOMETRY}\}$ is _____

- (a) 8 (b) 9 (c) 9 (d) 10

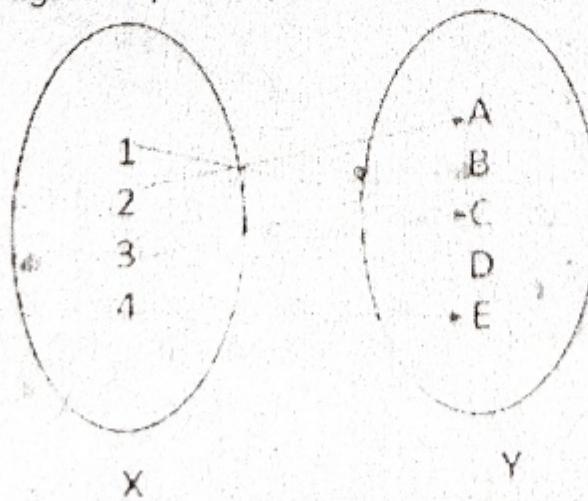
Ans. (c) 9

Q.39. What is the solution set of the equation $x^2 + 3x + 2 = 0$ in roster form?

- (a) {-1, 2} (b) {-1, -2} (c) {1, -2} (d) {1, 2}

Ans. (b) {-1, -2}

Q.40. The following figure depicts which type of function?



- (a) one-one (b) onto
(c) many-one (d) both one-one and onto

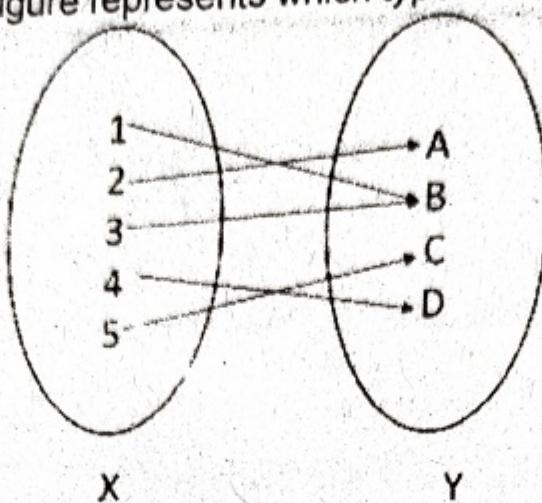
Ans. (a) one-one

Q.41. A function $f: N \rightarrow N$ is defined by $f(x) = x^2 + 12$. What is the type of function here?

- (a) bijective
- (b) subjective
- (c) injective
- (d) neither subjective nor injective

Ans. (3) injective

Q.42. The following figure represents which type of function?



- (a) one-one
- (b) onto
- (c) many-one
- (d) neither one-one nor onto

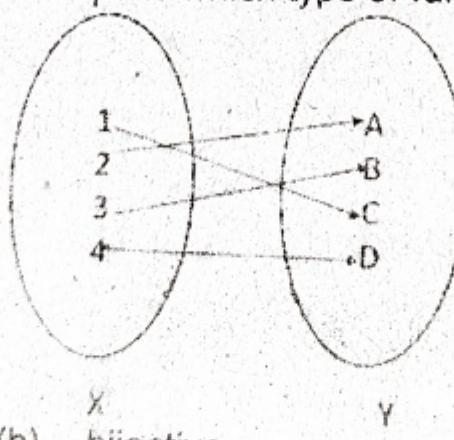
Ans. (b) onto

Q.43. A function $f: R \rightarrow R$ is defined by $f(x) = 5x^3 - 8$. The type of function is _____

- (a) one-one
- (b) onto
- (c) many-one
- (d) both one-one and onto

Ans. (c) many-one

Q.44. The following figure depicts which type of function?



- (a) injective
- (b) bijective
- (c) surjective
- (d) neither injective nor surjective

Ans. (b) bijective

Q.45. Let $A = \{1, 2, 3\}$ and $B = \{4, 5, 6\}$. Which one of the following functions is bijective?

- (a) $f = \{(2, 4), (2, 5), (2, 6)\}$
- (b) $f = \{(1, 5), (2, 4), (3, 4)\}$
- (c) $f = \{(1, 4), (1, 5), (1, 6)\}$
- (d) $f = \{(1, 4), (2, 5), (3, 6)\}$

Ans. (d) $f = \{(1, 4), (2, 5), (3, 6)\}$

Q.46. Let $P=\{10,20,30\}$ and $Q=\{5,10,15,20\}$. Which one of the following functions is one-one and onto?

- (a) $f=\{(10,5),(10,10),(10,15),(10,20)\}$
- (b) $f=\{(10,5),(20,10),(30,15)\}$
- (c) $f=\{(20,5),(20,10),(30,10)\}$
- (d) $f=\{(10,5),(10,10),(20,15),(30,20)\}$

Ans. (b) $f=\{(10,5),(20,10),(30,15)\}$

Q.47. Let $M=\{5,6,7,8\}$ and $N=\{3,4,9,10\}$. Which one of the following functions is neither one-one nor onto?

- (a) $f=\{(5,3),(5,4),(6,4),(8,9)\}$
- (b) $f=\{(5,3),(6,4),(7,9),(8,10)\}$
- (c) $f=\{(5,4),(5,9),(6,3),(7,10),(8,10)\}$
- (d) $f=\{(6,4),(7,3),(7,9),(8,10)\}$

Ans. (a) $f=\{(5,3),(5,4),(6,4),(8,9)\}$

Q.48. If $f: R \rightarrow R$, $g(x)=3x^2 + 7$ and $f(x)=\sqrt{x}$, then $gof(x)$ is equal to _____

- (a) $3x-7$
- (b) $3x-9$
- (c) $3x+7$
- (d) $3x-8$

Ans. (c) $3x+7$

Q.49. Let the function f be defined by $f(x)=9+3x^2-2x$, then $f^{-1}(x)$ is _____

- (a) $9-3x^2+2x$
- (b) $7x-92x+3$
- (c) $2x-73x+9$
- (d) $2x-37x+9$

Ans. (2) $7x-92x+3$

Q.50. For an inverse to exist it is necessary that a function should be _____

- (a) injection
- (b) bijection
- (c) surjection
- (d) none of the mentioned

Ans. (b) bijection

Q.51. If $f(x) = y$ then $f^{-1}(y)$ is equal to _____

- (a) y
- (b) x
- (c) x^2
- (d) none of the mentioned

Ans. (b) x

Q.52. A function $f(x)$ is defined from A to B then f^{-1} is defined _____

- (a) from A to B
- (b) from B to A
- (c) depends on the inverse of function
- (d) none of the mentioned

Ans. (b) from B to A

Q.53. If the longest chain in a partial order is of length l , then the partial order can be written as _____ disjoint antichains.

- (a) l^2
- (b) $l+1$
- (c) l
- (d) l^1

Ans. (c) l

- Q.54. Suppose $X = \{a, b, c, d\}$ and π_1 is the partition of X . $\pi_1 = \{\{a, b, c\}, d\}$. The number of ordered pairs of the equivalence relations induced by _____
- (a) 15 (b) 10 (c) 34 (d) 5
- Ans. (b) 10

Q.55. A partial order P is defined on the set of natural numbers as follows. Here a/b denotes integer division.

- (i) $(0, 0) \in P$.
- (ii) $(a, b) \in P$ if and only if $a \% 10 \leq b \% 10$ and $(a/10, b/10) \in P$. Consider the following ordered pairs:
- (a) $(101, 22)$ (b) $(22, 101)$
 (c) $(145, 265)$ (d) $(0, 153)$

The ordered pairs of natural numbers are contained in P are _____ and _____

- (a) $(145, 265)$ and $(0, 153)$
 (b) $(22, 101)$ and $(0, 153)$
 (c) $(101, 22)$ and $(145, 265)$
 (d) $(101, 22)$ and $(0, 153)$

Ans. (d) $(101, 22)$ and $(0, 153)$

Q.56. The inclusion of _____ sets into $R = \{\{1, 2\}, \{1, 2, 3\}, \{1, 2, 5\}, \{1, 2, 4\}, \{1, 2, 3, 4, 5\}\}$ is necessary and sufficient to make R a complete lattice under the partial order defined by set containment.

- (a) $\{1\}, \{2, 4\}$
 (b) $\{1\}, \{1, 3\}$
 (c) $\{1\}$
 (d) $\{1\}, \{1, 3\}, \{1, 2, 3, 4\}, \{1, 2, 3, 5\}$

Ans. (c) $\{1\}$

Q.57. Suppose relation $R = \{(3, 3), (5, 5), (5, 3), (5, 5), (6, 6)\}$ on $S = \{3, 5, 6\}$. Here R is known as _____

- (a) equivalence relation (b) reflexive relation
 (c) symmetric relation (d) transitive relation

Ans. (a) equivalence relation

Q.58. Consider the congruence $45 \equiv 3 \pmod{7}$. Find the set of equivalence class representatives.

- (a) $\{\dots, 0, 7, 14, 28, \dots\}$ (b) $\{\dots, -3, 0, 6, 21, \dots\}$
 (c) $\{\dots, 0, 4, 8, 16, \dots\}$ (d) $\{\dots, 3, 8, 15, 21, \dots\}$

Ans. (a) $\{\dots, 0, 7, 14, 28, \dots\}$

Q.59. $f(x, y) = x^2 + xyz + z$ Find f_x at $(1, 1, 1)$

- (a) 0 (b) 1 (c) 3 (d) -1
- Ans. (c) 3

Q.60. $f(x, y) = \sin(xy) + x^2 \ln(y)$ Find f_{yx} at $(0, \frac{\pi}{2})$

- (a) 33 (b) 0 (c) 3 (d) 1
- Ans. (d) 1

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Q.61. $f(x, y) = x^2 + y^3$; $X = t^2 + t^3$; $y = t^3 + t^9$ Find $\frac{df}{dt}$ at $t=1$.
(a) 0 (b) 0 (c) -1 (d) 164
Ans. (d) 164

Q.62. $f(x, y) = \sin(x) + \cos(y) + xy^2$; $x = \cos(t)$; $y = \sin(t)$ Find $\frac{df}{dt}$ at $t = \frac{\pi}{2}$
(a) 2 (b) -2 (c) 1 (d) 0
Ans. (b) 2

Q.63. $f(x, y, z, t) = xy + zt + x^2 yzt$; $x = k^3$; $y = k^2$; $z = k$; $t = \sqrt{k}$. Find $\frac{df}{dt}$ at $k = 1$
(a) 34 (b) 16 (c) 32 (d) 61
Ans. (b) 16

Q.64. $f(x, y) = \sin(y + yx^2) / 1 + x^2$ Value of f_{xy} at $(0, 1)$ is
(a) 0 (b) 1 (c) 67 (d) 90
Ans. (a) 0

Q.65. $f(x, y) = \sin(xy + x^3y) / x + x^3$ Find f_{xy} at $(0, 1)$.
(a) 2 (b) 5 (c) 1 (d) Undefined

Ans. (c) 1

Q.66. The points A (1, 2, -1), B (5, -2, 1), C (8, -7, 4), D (4, -3, 2) form _____
(a) trapezium (b) rhombus
(c) square (d) parallelogram

Ans. (d) parallelogram

Q.67. Ritu can row downstream 20 km in 2 hours, and upstream 4 km in 2 hours. Her speed of rowing in still water and the speed of the current is:

- (a) 6km/hr and 3km/hr
- (b) 7km/hr and 4km/hr
- (c) 6km/hr and 4km/hr
- (d) 10km/hr and 6km/hr

Ans. (c) 6km/hr and 4km/hr

Q.68. The pair of equations $x = a$ and $y = b$ graphically represents lines which are
(a) parallel (b) intersecting at (b, a)
(c) coincident (d) intersecting at (a, b)

Ans. (d) intersecting at (a, b)

Q.69. What is the saddle point?
(a) Point where function has maximum value
(b) Point where function has minimum value
(c) Point where function has zero value
(d) Point where function neither have maximum value nor minimum value

Ans. (b) Point where function has minimum value

Q.70. The condition $a_1a_2 + b_1b_2 + c_1c_2 = 0$ is for the planes whose normals are _____ to each other.

- (a) integral (b) parallel
- (c) perpendicular (d) concentric

Ans. (c) perpendicular

Q.71. The condition $a_1/a_2 = b_1/b_2 = c_1/c_2$ is for the planes whose normals are _____ to each other.

- (a) perpendicular (b) parallel
- (c) differential (d) tangential

Ans. (a) perpendicular

Q.72. Find the angle between $2x + 3y - 2z + 4 = 0$ and $4x + 3y + 2z + 2 = 0$.

- (a) 38.2 (b) 19.64 (c) 89.21 (d) 54.54

Ans. (d) 54.54

Q.73. Which trigonometric function is used to find the angle between a line and a plane?

- (a) Tangent (b) Cosecant
- (c) Secant (d) Sine

Ans. (d) Sine

Q.74. What is the plane equation involved in the formula

$$\sin \theta = \frac{a_1a + b_1b + c_1ca_2 + b_2 + c_2}{\sqrt{a_1^2 + b_1^2 + c_1^2}}$$

- (a) $a_1x - b_1y + c_1z + d_1 = 0$
- (b) $a_1x^2 + b_1y^2 + c_1z^2 + d_1 = 0$
- (c) $ax + by + cz + d = 0$
- (d) $a_1x + b_1y + c_1z + d_1 = 0$ and $ax + by + cz + d = 0$

Ans. (c) $ax + by + cz + d = 0$

Q.75. What is the relation between the plane $ax + by + cz + d = 0$ and a_1, b_1, c_1 the direction ratios of a line, if the plane and line are perpendicular to each other?

- (a) $a_1/b_1 = a_2/c_1 = c_2/b_2$
- (b) $a_1/a_2 = b_1/c_2 = c_1/b_2$
- (c) $a/a_1 = b/b_1 = c/c_1$
- (d) $c_1/a_2 = b_1/b_2 = a_1/c_2$

Ans. (c) $a/a_1 = b/b_1 = c/c_1$

Q.76. The condition $a_1a + b_1b + c_1c = 0$ is for a plane and a line are _____ to each other.

- (a) integral (b) parallel
- (c) perpendicular (d) concentric

Ans. (b) parallel

Q.77. The condition $a/a_1 = b/b_1 = c/c_1$ is for a plane and a line are _____ to each other.

- (a) perpendicular (b) parallel
- (c) differential (d) tangential

Ans. (a) perpendicular

Q.78. The direction ratios of the normal to the plane
 $7x + 4y - 2z + 5 = 0$ are:

- (a) 7, 4, -2
- (b) 7, 4, 5
- (c) 7, 4, 2
- (d) 4, -2, 5

Ans. (a) 7, 4, -2

Q.79. Which of the following represents the set $A = \{11, 13, 15, 17, 19\}$?

- (a) $A = \{x : x \text{ is a natural number greater than } 11\}$
- (b) $A = \{x : x \text{ is an odd number greater than } 11\}$
- (c) $A = \{x : x \text{ is an odd number between } 10 \text{ to } 20\}$
- (d) $A = \{x : x \text{ is a natural number less than } 20\}$

Ans. (b) $A = \{x : x \text{ is an odd number greater than } 11\}$

Q.80. Which of the following represents the statement "The number 10 is a member of the set B"?

- (a) $10 \in B$
- (b) $10 \notin B$
- (c) $B \in 10$
- (d) $B \notin 10$

Ans. (b) $10 \notin B$

Q.81. $d/dx \tan h x =$

- (a) $\sin h x$
- (b) $-\operatorname{cosech} x$
- (c) $\operatorname{sech}^2 x$
- (d) $-\operatorname{sech}^2 x$

Ans. (c) $\operatorname{sech}^2 x$

Q.82. $d/dx (\sin 5x + 6) =$

- (a) $\cos(5x+6)/5$
- (b) $-\cos(5x+6).5$
- (c) $\cos(5x+6).5$
- (d) $\cos(5x+6).6$

Ans. (c) $\cos(5x+6).5$

Q.83. $d/dx (x^3 + x^2 - 2x + 1)$

- (a) $x^3 + 2x - 2$
- (b) $3x^3 + x - 2$
- (c) $3x^2 + 2x - 2$
- (d) $3x^2 + 2x - 1$

Ans. (c) $3x^2 + 2x - 2$

Q.84. $d/dx \sin^3 5x$ is:

- (a) $15 \sin^2 5x \cos 5x$
- (b) $-3 \sin^2 5x \cos 5x$
- (c) $(3 \sin^2 5x \cos 5x)/5$
- (d) $-15 \sin^2 5x \cos 5x$

Ans. (a) $15 \sin^2 5x \cos 5x$

Q.85. $d/dx a^x$ is:

- (a) $x^3 \log a$
- (b) $x^4 \log a$
- (c) $a^x \log a$
- (d) $a^x \log a$

Ans. (d) $a^x \log a$

Q.86. $d/dx (1-x^2)$ is:

- (a) $1-x^2$
- (b) $1-2x$
- (c) $2x$
- (d) $-2x$

Ans. (d) $-2x$

Q.87. $d/dx(x^3 + 2x^2)$ is:

- (a) $3x^2 - 4x$ (b) $3x^2 + 4x$
(c) $3x^2 + 2x^2$ (d) $3x^4 + 4x$

Ans. (b) $3x^2 + 4x$

Q.88. $d/dx(e^{2x} \cos 2x)$ is:

- (a) $2e^{2x}[\cos 2x - \sin 2x]$ (b) $2e^{2x}[\cos 2x + \sin 2x]$
(c) $2e^{2x}[\sin 2x - \cos 2x]$ (d) $e^{2x}[\cos 2x - \sin 2x]$

Ans. (a) $2e^{2x}[\cos 2x - \sin 2x]$

Q.89. If $y = \tan x$, then $dy/dx =$

- (a) $\tan^2 x$ (b) $\cos x$
(c) $\log|\sec x|$ (d) $\sin x - x \cos x$

Ans. (a) $\tan^2 x$

Q.90. If $f(x) = x + \sin x$, then $f'(x) =$

- (a) $1 - \cos x$ (b) $\sec x \tan x$
(c) $1 + \cos x$ (d) $\sec^2 x$

Ans. (c) $1 + \cos x$

Q.91. $\{x: x \text{ is an integer neither positive nor negative}\}$ is _____

- (a) Empty set
(b) Non-empty set
(c) Finite set
(d) Non-empty and Finite set

Ans. (d) Non-empty and Finite set

Q.92. $\{x: x \text{ is a real number between 1 and 2}\}$ is an _____

- (a) Infinite set (b) Finite set
(c) Empty set (d) None of the mentioned

Ans. (a) Infinite set

Q.93. Express $\{x: x = n/(n+1), n \text{ is a natural number less than } 7\}$ in roster form.

- (a) $\{1/2, 2/3, 4/5, 6/7\}$
(b) $\{1/2, 2/3, 3/4, 4/5, 5/6, 6/7, 7/8\}$
(c) $\{1/2, 2/3, 3/4, 4/5, 5/6, 6/7\}$
(d) Infinite set

Ans. (c) $\{1/2, 2/3, 3/4, 4/5, 5/6, 6/7\}$

Q.94. Number of power set of $\{a, b\}$, where a and b are distinct elements.

- (a) 3 (b) 4
(c) 2 (d) 5

Ans. (b) 4

Q.95. Which of the following is subset of set {1, 2, 3, 4}?

- (a) {1, 2}
- (b) {1, 2, 3}
- (c) {1}
- (d) All of the mentioned

Ans. (d) All of the mentioned

Q.96. $A = \{\emptyset, \{\emptyset\}, 2, \{2, \emptyset\}, 3\}$, which of the following is true?

- (a) $\{\{\emptyset, \{\emptyset\}\}\} \in A$
- (b) $\{2\} \in A$
- (c) $\emptyset \subset A$
- (d) $3 \subset A$

Ans. (c) $\emptyset \subset A$

Q.97. Subset of the set $A = \{\}$ is?

- (a) Q
- (b) {}
- (c) \emptyset
- (d) All of the mentioned

Ans. (d) All of the mentioned

Q.98. $\{x : x \in N \text{ and } x \text{ is prime}\}$ then it is _____

- (a) Infinite set
- (b) Finite set
- (c) Empty set
- (d) Not a set

Ans. (a) Infinite set

Q.99. Convert set $\{x : x \text{ is a positive prime number which divides } 72\}$ in roster form.

- (a) {2, 3, 5}
- (b) {2, 3, 6}
- (c) {2, 3}
- (d) $\{\emptyset\}$

Ans. (c) {2, 3}

Q.100. How many binary relations are there on a set S with 9 distinct elements?

- (a) 290
- (b) 2100
- (c) 281
- (d) 260

Ans. (c) 281

□□