CHAPTER-10
SETS

QUESTION BANK

AVERAGELEVEL

1. **State whether or not the following elements form a set, if not, give reason:**

(i) The collection of good students in your school.

(ii) The collection of the numbers between 30 and 45.

(iii) The collection of fat-people in your colony.

(iv) The collection of interesting books in your school library.

(v) The collection of books in the library and are of your interest.

(vi) All easy problems in your textbook.

(vii) All three- sided figures.

(viii) The first five counting numbers.

(ix) All the tall boys of your class.

(x) The last three days of the week.

(xi) All triangle that are difficult to draw.

(xii) The first three letters of the English alphabet.

(xiii) All tasty fruits.

(xiv) All clever boys of class 6.

(xv) All good schools in Delhi.

(xvi) All the girls in your class, whose heights are less than your height.

(xvii) All the boys in your class, whose heights are more than your height.

(xviii) All the problems in your Mathematics book, which are difficult for Amit.

2. If set A = {2, 3, 4, 5, 6}, state which of the following statements are true and which are false:

(i) 2 ε A

(ii) 5, 6 ε A

(iii) 3, 4, 7 ε A

(iv) 2, 8 ε A

3. If set B = {4, 6, 8, 10, 12, 14}. State, which of the following statements is correct and which is wrong:

(i) 5 ε B

(ii) 12 ε B

(iii) 14 ε B

(iv) 9 ε B

(v) B is a set of even numbers between 2 and 16.

(vi) 4, 6 and 10 are die members of the set B. Also, write the wrong statements correctly.

4. Let E = {even integers}. Insert the appropriate symbol ϵ or $\notin$ in the blanks:
(i) 10 …. E
(ii) -8 …. E
(iii) 13 … E
(iv) {6} …. E
(v) a …. E

5. Write the following sets in roster form:
(i) the set of first five odd counting numbers
(ii) the set of all even natural numbers less than 101
(iii) {months of year whose names begin with a vowel}
(iv) {one digit natural numbers which are perfect squares}
(v) the set of multiples of 7 which lie between -20 and 25
(vi) {factors of 36}
(vii) {prime factors of 360}
(viii) the set of whole numbers which are multiples of 5
(ix) the set of all letters in the word 'CHENNAI'
(x) The set of all vowels in the word 'MUSSOORIE'
(xi) the set of all consonants in the word 'MATHEMATICS'

6. State, whether true of false:

(i) Sets {4, 9, 6, 2} and {6, 2, 4, 9} are not the same.

(ii) Sets {0, 1, 3, 9, 4} and {4, 0, 1, 3, 9} are the same.

(iii) Sets {5, 4} and {5, 4, 4, 5} are not the same.

(iv) Sets {8, 3} and {3, 3, 8} are the same.

(v) Collection of vowels used in the word 'ALLAHABAD' forms a set.

(vi) If P is the set of letters in the word 'ROOP', then P = (P, O, R)

(vii) If M is the set of letters used in the word 'MUMBAI', then M = {M, U, B, A, I}

7. Write the following sets in tabular form:
(i) {x : is a natural number and x < 7}
(ii) {x : x e W and x ≤ 5}
(iii) {x : x is a month of a year having less than 31 days}
(iv) {x | x is a letter in the word 'CIRCUMFERENCE'}
(v) {x | x is a vowel in the word 'NOTATION'}
(vi) {x : x is a digit in the numeral 110526715}
(vii) {x : x is a factor of 48}
(viii) {x : x is a multiple of 11 and 0 ≤ x < 80}

(ix) {y : y is a two digit natural number divisible by 10}

8. Write the set containing:

(i) the first five counting numbers

(ii) the three types of angles

(iii) the three types of triangles

(iv) the members of your family

(v) the first six consonants of the English Alphabet

(vi) the first four vowels of the English Alphabet

(vii) the names of any three Prime – Ministers of India

9. (a) Write the members (elements) of each set given below:

(i) {3, 8, 5, 15, 12, 7}

(ii) {c, m, n, o, s}

(b) Write the sets whose elements are:

(i) 2, 4, 8, 16, 64 and 128

(ii) 3, 5, 15, 45, 75 and 90

10. (i) Write the set of letters used in the word 'BHOPAL'.

(ii) Write the set of vowels used in the word 'BENGAL'

(iii) Write the set of consonants used in the word 'HONG KONG'

11. Write each of the following sets in the Roster Form:

(i) The set of five numbers each of which is divisible by 3

(ii)The set of integers between -4 and 4

(iii) {x: x is a letter in the word 'SCHOOL'}

(iv) {x: x is an odd natural number between 10 and 20}

(v) {Vowels used in the word 'AMERICA'}

12. Write each given set in the Roster Form:

(i) All prime numbers between one and twenty

(ii) The squares of first four natural numbers

(iii) Even numbers between 1 and 9

(iv) First eight letters of the English alphabet

(v) The letters of the word 'BASKET
(vi) Set of odd whole numbers between 15 and 27.
(vii) A = Set of letters in the word "CHITAMBARAM"
(viii) B = {All even numbers from 15 to 26}

(ix) P = {x : x is a vowel used in the word 'ARITHMETIC'}
(x) S = {Squares of first eight whole numbers}
(xi) Set of all integers between 7 and 94; which are divisible by 6.
(xii) C = {All composite numbers between 2 and 20}
(xiii) D = Set of Prime numbers from 2 to 23.
(xiv) E = Set of natural numbers below 30 which are divisible by 2 or 5.
(xv) F = Set of factors of 24.
(xvi) G = Set of names of three closed figures in Geometry.
(xvii) H = {x : x ∈ W and x < 10}
(xviii) J = {x: x ∈ N and 2x − 3 ≤ 17}
(xix) K = {x : x is an integer and − 3 < x < 5}

13. Write each given set in the Set-Builder Form:

(i) {2, 4, 6, 8, 10}

(ii) {2, 3, 5, 7, 11}

(iii) {January, June, July}

(iv) {a, e, i, o, u}

(v) {Tuesday, Thursday}

14. Write each of the following sets in Roster (tabular) Form and also in Set-Builder Form

(i) Set of all natural numbers that can divide 24 completely

(ii) Set of odd numbers between 20 and 35

(iii) Set of letters used in the word 'CALCUTTA'

(iv) Set of names of the first five months of a year

(v) Set of all two digit numbers that are perfect square as well

15. Write, in Roster Form, the set of:

(i) the first four odd natural numbers each divisible by 5

(ii) the counting numbers between 15 and 35, each of which is divisible by 6

(iii) the names of the last three days of a week

(iv) the names of the last four months of a year

16. State, whether the given set is infinite or finite:

(i) {3, 5, 7, ...}

(ii) {1, 2, 3, 4}

(iii) {.........., -3, -2, -1, 0, 1, 2}

(iv) {20, 30, 40, 50, ..., 200}

(v) {7, 14, 21, ..., 2401}

17. Which of the following sets is empty?

(i) Set of counting numbers between 5 and 6

(ii) Set of odd numbers between 7 and 19.

(iii) Set of odd numbers between 7 and 9

(iv) Set of even numbers which are not divisible by 2

(v) {0}

18. State, which pair of sets, given below, are equal sets or equivalent sets:

(i) {3, 5, 7} and {5, 3, 7}

(ii) {8, 6, 10, 12} and {3, 2, 4, 6}

(iii) {7, 7, 2, 1, 2} and {1, 2, 7}

(iv) {2, 4, 6, 8, 10} and {a, b, d, e, m}

(v) {5, 5, 2, 4} and {5, 4, 2, 2}

19. State whether true or false:

(i) Set {4, 5, 8} is same as the set {5, 4, 8} and the set {8, 4, 5}
(ii) Sets {a, b, m, n} and {a, a, m, b, n, n) are same.

(iii) Set of letters in the word 'suchismita' is {s, u, c, h, i, m, t, a}
(iv) Set of letters in the word 'MAHMOOD' is {M, A, H, O, D}.

MODERATE LEVEL

19. State, which of the following are finite or infinite sets:

(i) Set of integers

(ii) {Multiple of 5}

(iii) {Fractions between 1 and 2}

(iv) {Number of people in India}

(v) Set of trees in the world

20. State, whether or not the following sets are empty:

(i) {Prime numbers divisible by 2}

(ii) {Negative natural numbers}

(iii) {Women with height 5 metre}

(iv) {Integers less than 5}

(v) {Prime numbers between 17 and 23}

21. State, if the given pairs of sets are equal sets or equivalent sets:

(i) {Natural numbers less than five} and {Letters of the word 'BOAT'}

(ii) {2, 4, 6, 8, 10} and {even natural numbers less than 12}

(iii) {1, 3, 5, 7, …..} and set of odd natural numbers

(iv) {Letters of the word MEMBER} and {Letters of the word 'REMEMBER'}

(v) {Negative natural numbers} and {50ᵗʰ day of a month}

22. State, whether the following are finite or infinite sets:

(i) {2, 4, 6, 8, …… 800}

(ii) {……, -5, -4, -3, -2}

(iii) {x: x is an integer between -60 and 60}

(iv) {No. of electrical appliances working in your house}

(v) {x: x is a whole number greater than 20}

23. For each statement, given below, write True or False:

(i) {…., -8, -4, 0, 4, 8}is a finite set

(ii) {-32, -28, -24, -20, ………, 0, 4, 8, 16} is an infinite set

(iii) {x: x is a natural number less than 1} is the empty set

(iv) {Whole numbers between 15 and 16} = {Natural numbers between 5 and 6}

(v) {Odd numbers divisible by 2} is the empty set

HIGHER LEVEL

24. State, giving reasons, which of the following pairs of sets disjoint sets and which are overlapping sets:

(i) A = {Girls with ages below 15 years} and B = {Girls with ages above 15 years}

(ii) C = {Boys with ages above 20 years} and D = {Boys with ages above 27 years}

(iii) A = {Natural numbers between 35 and 60} and B = {Natural numbers between 50 and 80}

(iv) P = {Students of class IX studying in I.C.S.E. Board} and Q = {Students of class IX}

(v) A = {Natural numbers multiples of 3 and less than 30} and B= {Natural numbers divisible by 4 and between 20 and 45}

25. Write the cardinal number of each of the following sets:

(i) A = {0, 1, 2, 4}

(ii) B = {-3, -1, 1, 3, 5, 7}

(iii) C = {}

(iv) D = {3, 2, 2, 1, 3, 1, 2}

(v) E = {Natural numbers between 15 and 20}

26. Given

(i) A = {Natural numbers less than 10}

B = {Letters of the word 'PUPPET'}

C = {Squares of first four whole numbers}

D = {Odd numbers divisible by 2}

Find:

(i) n (A)

(ii) n (B)

(iii) n (C)

(iv) n (D)

27. State true or false for each of the following. Correct the wrong statement

(i) If A = {0}, then n (A) = 0

(ii) n (φ) = 1

(iii) If T = {a, l, a, h, b, d, h}, then n (T) = 5

(iv) If B = {1, 5, 51, 15, 5, 1}, then n (B) = 6

28. Let set A = {6, 8, 10, 12} and set B = {3, 9, 15, 18}.
Insert the symbol '∈' or '∉' to make each of the following true :
(i) 6 …. A
(ii) 10 …. B
(iii) 18 …. B
(iv) (6 + 3) …. B
(v) (15 − 9) …. B
(vi) 12 …. A
(vii) (6 + 8) …. A
(viii) 6 and 8 …. A

29. Express each of the following sets in set- builder notation (form):
(i) {3, 6, 9, 12, 15}
(ii) {2, 3, 5, 7, 11, 13 …. }
(iii) {1, 4, 9, 16, 25, 36}
(iv) {0, 2, 4, 6, 8, 10, 12, …. }
(v) {Monday, Tuesday, Wednesday}
(vi) {23, 25, 27, 29, … }

(vii) {1/3, ¼, 1/5, 1/6, 1/7, 1/8}

(viii) {42, 49, 56, 63, 70, 77}

30. Given: A = {x : x is a multiple of 2 and is less than 25}
B = {x : x is a square of a natural number and is less than 25}
C = {x : x is a multiple of 3 and is less than 25}
D = {x: x is a prime number less than 25}
Write the sets A, B, C and D in roster form.

31. Which of the following represent the null set?
φ, {0}, 0, { }, {φ}.

. State true or false :
(i) All examples of the empty set are equal.

(ii) All examples of the empty set are equivalent.
(iii) If two sets have the same cardinal number, they are equal sets.
(iv) If n (A) = n (B) then A and B are equivalent sets.
(v) If B = {x : x + 4 = 4}, then B is the empty set.
(vi) The set of all points in a line is a finite set.
(vii) The set of letters in your Mathematics book is an infinite set.
(viii) If M = {1, 2, 4, 6} and N = {x : x is a factor of 12} ; then M = N.
(ix) The set of whole numbers greater than 50 is an infinite set.
(x) If A and B are two different infinite sets, then n (A) = n (B).

32. Write the cardinal number of each of the following sets:
(i) A = Set of days in a leap year.
(ii) B = Set of numbers on a clock-face.
(iii) C = {x : x ∈ N and x ≤ 7}
(iv) D = Set of letters in the word "PANIPAT".
(v) E = Set of prime numbers between 5 and 15.
(vi) F = {x : x ∈ Z and − 2 < x ≤ 5}
(vii) G = {x : x is a perfect square number, x ∈ N and x ≤ 30}.

33. For each set, given below, state whether it is finite set, infinite set or the null set :
(i) {natural numbers more than 100}
(ii) A = {x : x is an integer between 1 and 2}
(iii) B = {x : x ∈ W ; x is less than 100}.
(iv) Set of mountains in the world.
(v) {multiples of 8}.
(vi) {even numbers not divisible by 2}.
(vii) {squares of natural numbers}.
(viii) {coins used in India}
(ix) C = {x | x is a prime number between 7 and 10}.
(x) Planets of the Solar system.

.

34. State, which of the following pairs of sets are disjoint :
(i) {0, 1, 2, 6, 8} and {odd numbers less than 10}.
(ii) {birds} and {trees}
(iii) {x : x is a fan of cricket} and {x : x is a fan of football}.
(iv) A = {natural numbers less than 10} and B = {x : x is a multiple of 5}.
(v) {people living in Calcutta} and {people living in West Bengal}.

35. State whether the given pairs of sets are equal or equivalent.
(i) A = {first four natural numbers} and B = {first four whole numbers}.
(ii) A = Set of letters of the word "FOLLOW" and B = Set of letters of the word "WOLF".
(iii) E = {even natural numbers less than 10} and O = {odd natural numbers less than 9}
(iv) A = {days of the week starting with letter S} and B = {days of the week starting with letter T}.
(v) M = {multiples of 2 and 3 between 10 and 20} and N = {multiples of 2 and 5 between 10 and 20}.
(vi) P = {prime numbers which divide 70 exactly} and Q = {prime numbers which divide 105 exactly}
(vii) A = {0², 1², 2², 3², 4²} and B = {16, 9,4, 1, 0}.
(viii) E = {8, 1O, 12, 14, 16} and F = {even natural numbers between 6 and 18}.

36. Examine which of the following sets are the empty sets :
(i) The set of triangles having three equal sides.
(ii) The set of lions in your class.
(iii) {x: x + 3 = 2 and x ∈ N}
(iv) P = {x : 3x = 0}

xxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxxx