

**1. State which of the following collections are set:**

- (i) collection of odd natural numbers less than 50**
- (ii) collection of four colours of a rainbow**
- (iii) collection of the first three days of a week**
- (iv) collection of all tall students of your class**
- (v) collection of all clever students of your school**
- (vi) collection of all rich people of Bangalore**
- (vii) collection of some multiples of 5 (viii) collection of all prime numbers**
- (ix) collection of all even integers which lie between -5 and 15**
- (x) collection of all good cricket players of India**
- (xi) collection of three youngest students of your class**
- (xii) collection of three healthy students of your class**

**Solution:**

**(i)** It is a set.

If we denote the given set by A, then  $A = \{1, 3, 5, 7, \dots, 47, 49\}$ .

**(ii)** It is not a set since the given collection is not well-defined. People may differ on four colours of a rainbow.

**(iii)** It is a set.

If we denote the given set by A, then  $A = \{\text{Sunday, Monday, Tuesday}\}$ .

**(iv)** It is not a set since the given collection is not well-defined. People may differ on whether a student is tall or not.

**(v)** It is not a set since the given collection is not well-defined. People may differ on whether a student is clever or not.

**(vi)** It is not a set since the given collection is not well-defined. People may differ on whether a person is rich or not.

**(vii)** It is not a set since the given collection is not well-defined. People may differ on which are multiples of 5.

**(viii)** It is a set since the given collection is well defined.

**(ix)** It is a set. If we denote the given set by A, then

$A = \{-4, -2, 0, 2, 4, 6, 8, 10, 12, 14\}$

(x) It is not a set since the given collection is not well-defined. People may differ on whether a cricket player of India is good or not.

(xi) It is a set since the given collection is well-defined. People can choose three youngest students of their classes.

(xii) It is not a set because the given collection is not well-defined. People may differ on whether a student is healthy or not.

**2. Let  $E = \{\text{even integers}\}$ . Insert the appropriate symbol  $\in$  or  $\notin$  in the blanks:**

(i)  $10 \dots E$

(ii)  $-8 \dots E$

(iii)  $13 \dots E$

(iv)  $\{6\} \dots E$

(v)  $a \dots E$  (vi)  $-4, 12, \dots E$

**Solution:**

It is given that  $E = \{\text{even numbers}\}$

$E = \{\dots, -6, -4, -2, 0, 2, 4, 6, 8, \dots\}$

(i)  $10 \in E$

(ii)  $-8 \in E$

(iii)  $13 \notin E$

(iv)  $\{6\} \in E$

(v)  $a \notin E$

(vi)  $-4, 12, \in E$

**3. Let  $V = \{\text{vowels in English alphabet}\}$ . Write which of the following statements are true and which are false :**

(i)  $c \in V$

(ii)  $\{a\} \in V$

(iii)  $a, e, i \in V$

(iv)  $a, b \in V$

(v)  $\{a, u\} \notin V$

(vi)  $\{a, o, u\} \in V$

**Solution:**

Given:

$V = \{\text{Vowels of English alphabet}\}$

(i)  $c \in V$

Hence it is false.

(ii)  $\{a\} \in V$

W Hence it is false.

Hence it is false.

(iii)  $a, e, i \in V$

Hence it is true.

(iv)  $a, b \in V$

Hence it is false.

(v)  $\{a, u\} \in V$

Hence it is true.

(vi)  $\{a, o, u\} \in V$

Hence it is true.

**4. 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'

**Solution:**

(i) The given set can be written as in roster form:  $\{1, 3, 5, 7, 9\}$

(ii) The given set can be written as in roster form:  $\{2, 4, 6, 8, \dots, 98, 100\}$

- (iii) The given set can be written as in roster form: {April, August, October}
- (iv) The given set can be written as in roster form: {1, 4, 9}
- (v) The given set can be written as in roster form: {-14, -7, 0, 7, 14, 21}
- (vi) The given set can be written as in roster form: {1, 2, 3, 4, 6, 9, 12, 18, 36}
- (vii) The given set can be written as in roster form: {2, 3, 5}
- (viii) The given set can be written as in roster form: {0, 5, 10, 15, 20}
- (ix) The given set can be written as in roster form: {C,H,E,N,A,I}
- (x) The given set can be written as in roster form: {U, O, I, E}
- (xi) The given set can be written as in roster form: {M,T,H,C,S}

**5. Write the following sets in tabular form:**

- (i) { $x$  :  $x$  is a natural number and  $x < 7$ }
- (ii) { $x$  :  $x \in \mathbb{W}$  and  $x \leq 5$ }
- (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  $0 \leq x < 80$ }
- (ix) { $y$  :  $y$  is a two digit natural number divisible by 10}

**Solution:**

- (i) The given set can be written as in Tabular form: {1, 2, 3, 4, 5, 6}
- (ii) The given set can be written as in Tabular form: {0, 1, 2, 3, 4, 5}
- (iii) The given set can be written as in Tabular form: {February, April, June, September, November}
- (iv) The given set can be written as in Tabular form: {C, I, R, U, M, F, E, N}
- (v) The given set can be written as in Tabular form: {O, A, I}

(vi) The given set can be written as in Tabular form: {1, 0, 5, 2, 6, 7}

(vii) The given set can be written as in Tabular form: {1, 2, 3, 4, 6, 8, 12, 16, 24, 48}

(viii) The given set can be written as in Tabular form: {0, 11, 22, 33, 44, 55, 66, 77}

(ix) {y: y is a two digit natural number divisible by 10} = {10, 20, 30, 40, 50, 60, 70, 80, 90}

**6. Write the following sets in roster form and also in set builder form:**

**(i) the set of integers which lie between -2 and 3 (both inclusive)**

**(ii) the set of letters in the word 'ULTIMATUM'**

**(iii) {months of a year whose names begin with J}**

**(iv) the set of single digit whole numbers which are perfect squares**

**Solution:**

**(i)** The given set can be written as {-2, -1, 0, 1, 2, 3} (In roster form)

{x : x ∈ I, -2 ≤ x ≤ 3} (In set builder form)

**(ii)** The given set can be written as {U, L, T, I, M, A} (In roster form)

{x : x is a letter in the word 'ULTIMATUM'} (In set builder form)

**(iii)** The given set can be written as {January, June, July} (In roster form)

{x | x is a month of a year whose names begin with J} (In set builder form)

**(iv)** The given set can be written as {0, 1, 4, 9} (In roster form)

{x | x is perfect square one digit number} (In set builder form)