c

EXERCISE 13.1 PAGE: 252

1. Find the value of:

(i) 2^6

Solution:-

The above value can be written as,

= 2 × 2 × 2 × 2 × 2 × 2

= 64

(ii) 9^3

Solution:-

The above value can be written as,

= 9 × 9 × 9

= 729

(iii) 11^2

Solution:-

The above value can be written as,

= 11 × 11

= 121

(iv) 5^4

Solution:-

The above value can be written as,

= 5 × 5 × 5 × 5

= 625

2. Express the following in exponential form:

(i) 6 × 6 × 6 × 6

Solution:-

The given question can be expressed in the exponential form as 6^4.

(ii) t × t

c

Solution:-
The given question can be expressed in the exponential form as t^2.

(iii) b × b × b × b
Solution:-
The given question can be expressed in the exponential form as b^4.

(iv) 5 × 5× 7 × 7 × 7
Solution:-
The given question can be expressed in the exponential form as $5^2 \times 7^3$.

(v) 2 × 2 × a × a
Solution:-
The given question can be expressed in the exponential form as $2^2 \times a^2$.

(vi) a × a × a × c × c × c × c × d
Solution:-
The given question can be expressed in the exponential form as $a^3 \times c^4 \times d$.

3. Express each of the following numbers using exponential notation:
(i) 512
Solution:-
The factors of 512 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 So
it can be expressed in the exponential form as 2^9.

(ii) 343
Solution:-
The factors of 343 = 7 × 7 × 7
So it can be expressed in the exponential form as 7^3.

(iii) 729
Solution:-
The factors of 729 = 3 × 3 × 3 × 3 × 3 × 3

So it can be expressed in the exponential form as 3^6.

(iv) 3125
Solution:-
The factors of 3125 = 5 × 5 × 5 × 5 × 5
So it can be expressed in the exponential form as 5^5.

4. Identify the greater number, wherever possible, in each of the following? (i) 4^3 or 3^4
Solution:-
The expansion of $4^3 = 4 \times 4 \times 4 = 64$
The expansion of $3^4 = 3 \times 3 \times 3 \times 3 = 81$
Clearly,
$64 < 81$
So, $4^3 < 3^4$
Hence 3^4 is the greater number.

(ii) 5^3 or 3^5
Solution:-
The expansion of $5^3 = 5 \times 5 \times 5 = 125$
The expansion of $3^5 = 3 \times 3 \times 3 \times 3 \times 3 = 243$
Clearly,
$125 < 243$
So, $5^3 < 3^5$
Hence 3^5 is the greater number.

(iii) 2^8 or 8^2
Solution:-
The expansion of $2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256$
The expansion of $8^2 = 8 \times 8 = 64$
Clearly,
$256 > 64$
So, $2^8 > 8^2$
Hence 2^8 is the greater number.

c

(iv) 100^2 or 2^{100}

Solution:-

The expansion of $100^2 = 100 \times 100 = 10000$

The expansion of 2^{100}

$2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1024$

Then,

$2^{100} = 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 \times 1024 =$ Clearly,

$100_2 < 2_{100}$

Hence 2^{100} is the greater number.

(v) 2^{10} or 10^2

Solution:-

The expansion of $2^{10} = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 1024$

The expansion of $10^2 = 10 \times 10 = 100$

Clearly,

$1024 > 100$

So, $2^{10} > 10^2$

Hence 2^8 is the greater number.

5. Express each of the following as product of powers of their prime factors: (i) 648

Solution:-

Factors of $648 = 2 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3$

$= 2^3 \times 3^4$

(ii) 405

Solution:-

Factors of $405 = 3 \times 3 \times 3 \times 3 \times 5$

$= 3^5 \times 3$

(iii) 540

Solution:-

c

Factors of 540 = $2 \times 2 \times 3 \times 3 \times 3 \times 5$
= $2^2 \times 3^3 \times 5$

(iv) 3,600
Solution:-
Factors of 3600 = $2 \times 2 \times 2 \times 2 \times 3 \times 3 \times 5 \times 5$
= $2^4 \times 3^2 \times 5^2$

6. Simplify:
(i) 2×10^3
Solution:-
The above question can be written as,
= $2 \times 10 \times 10 \times 10$
= 2×1000
= 2000

(ii) $7^2 \times 2^2$
Solution:-
The above question can be written as,
= $7 \times 7 \times 2 \times 2$
= 49×4
= 196

(iii) $2^3 \times 5$
Solution:-
The above question can be written as,
= $2 \times 2 \times 2 \times 5$
= 8×5
= 40

(iv) 3×4^4
Solution:-
The above question can be written as,

c

$= 3 \times 4 \times 4 \times 4 \times 4$
$= 3 \times 256$
$= 768$

(v) 0×10^2

Solution:-

The above question can be written as,

$= 0 \times 10 \times 10$
$= 0 \times 100$
$= 0$

(vi) $5^2 \times 3^3$

Solution:-

The above question can be written as,

$= 5 \times 5 \times 3 \times 3 \times 3$
$= 25 \times 27$
$= 675$

(vii) $2^4 \times 3^2$

Solution:-

The above question can be written as,

$= 2 \times 2 \times 2 \times 2 \times 3 \times 3$
$= 16 \times 9$
$= 144$

(viii) $3^2 \times 10^4$

Solution:-

The above question can be written as,

$= 3 \times 3 \times 10 \times 10 \times 10 \times 10$
$= 9 \times 10000$
$= 90000$

c

7. Simplify: (i)
$(-4)^3$
Solution:-
The expansion of -4^3
$= -4 \times -4 \times -4$
$= -64$

(ii) $(-3) \times (-2)^3$
Solution:-
The expansion of $(-3) \times (-2)^3$
$= -3 \times -2 \times -2 \times -2$
$= -3 \times -8$
$= 24$

(iii) $(-3)^2 \times (-5)^2$
Solution:-
The expansion of $(-3)^2 \times (-5)^2$
$= -3 \times -3 \times -5 \times -5$
$= 9 \times 25$
$= 225$

(iv) $(-2)^3 \times (-10)^3$
Solution:-
The expansion of $(-2)^3 \times (-10)^3$
$= -2 \times -2 \times -2 \times -10 \times -10 \times -10$
$= -8 \times -1000$
$= 8000$

8. Compare the following numbers:
(i) 2.7×10^{12} ; 1.5×10^8
Solution:- By observing
the question
Comparing the exponents of base 10,

c

Clearly,

$2.7 \times 10^{12} > 1.5 \times 10^{8}$

(ii) 4×10^{14} ; 3×10^{17}

Solution:- By observing
the question
Comparing the exponents of base 10,
Clearly,

$4 \times 10^{14} < 3 \times 10^{17}$

EXERCISE 13.2 PAGE: 260

1. Using laws of exponents, simplify and write the answer in exponential form:

(i) $3^2 \times 3^4 \times 3^8$

Solution:-

By the rule of multiplying the powers with same base = $a^m \times a^n = a^{m+n}$ Then,

c

$= (3)^{2+4+8}$

$= 3^{14}$

(ii) $6^{15} \div 6^{10}$

Solution:-

By the rule of dividing the powers with same base = $a^m \div a^n = a^{m-n}$

Then,

$= (6)^{15-10}$

$= 6^5$

(iii) $a^3 \times a^2$

Solution:-

By the rule of multiplying the powers with same base = $a^m \times a^n = a^{m+n}$

Then,

$= (a)^{3+2}$

$= a^5$

(iv) $7^x \times 7^2$

Solution:-

By the rule of multiplying the powers with same base = $a^m \times a^n = a^{m+n}$

Then,

$= (7)^{x+2}$

(v) $(5^2)^3 \div 5^3$

Solution:-

By the rule of taking power of as power = $(a^m)^n = a^{mn}$

$(5^2)^3$ can be written as = $(5)^{2\times 3}$

$= 5^6$

Now, $5^6 \div 5^3$

By the rule of dividing the powers with same base = $a^m \div a^n = a^{m-n}$

Then,

$= (5)^{6-3}$

c

$= 5^3$

(vi) $2^5 \times 5^5$

Solution:-

By the rule of multiplying the powers with same exponents = $a^m \times b^m = ab^m$ Then,

$= (2 \times 5)^5$

$= 10^5$

(vii) $a^4 \times b^4$

Solution:-

By the rule of multiplying the powers with same exponents = $a^m \times b^m = ab^m$ Then,

$= (a \times b)^4$

$= ab^4$

(viii) $(3^4)^3$

Solution:-

By the rule of taking power of as power = $(a^m)^n = a^{mn}$

$(3^4)^3$ can be written as = $(3)^{4 \times 3}$

$= 3^{12}$

(ix) $(2^{20} \div 2^{15}) \times 2^3$

Solution:-

By the rule of dividing the powers with same base = $a^m \div a^n = a^{m-n}$

$(2^{20} \div 2^{15})$ can be simplified as,

$= (2)^{20-15}$

$= 2^5$

Then,

By the rule of multiplying the powers with same base = $a^m \times a^n = a^{m+n}$

$2^5 \times 2^3$ can be simplified as,

$= (2)^{5+3}$

$= 2^8$

c

(x) $8^t \div 8^2$

Solution:-

By the rule of dividing the powers with same base = $a^m \div a^n = a^{m-n}$ Then,

$= (8)^{t-2}$

2. Simplify and express each of the following in exponential form:

(i) $(2^3 \times 3^4 \times 4)/(3 \times 32)$

Solution:-

Factors of 32 = $2 \times 2 \times 2 \times 2 \times 2$

$= 2^5$

Factors of 4 = 2×2

$= 2^2$

Then,

$= (2^3 \times 3^4 \times 2^2)/(3 \times 2^5)$

$= (2^{3+2} \times 3^4) / (3 \times 2^5)$ … [∵$a^m \times a^n = a^{m+n}$]

$= (2^5 \times 3^4) / (3 \times 2^5)$

$= 2^{5-5} \times 3^{4-1}$ … [∵$a^m \div a^n = a^{m-n}$]

$= 2^0 \times 3^3$

$= 1 \times 3^3$

$= 3^3$

(ii) $((5^2)^3 \times 5^4) \div 5^7$

Solution:-

$(5^2)^3$ can be written as $= (5)^{2 \times 3}$ … [∵$(a^m)^n = a^{mn}$]

$= 5^6$

Then,

$= (5^6 \times 5^4) \div 5^7$

$= (5^{6+4}) \div 5^7$ … [∵$a^m \times a^n = a^{m+n}$]

$= 5^{10} \div 5^7$

$= 5^{10-7}$ … [∵$a^m \div a^n = a^{m-n}$]

$= 5^3$

c

(iii) $25^4 \div 5^3$

Solution:-

$(25)^4$ can be written as = $(5 \times 5)^4$

= $(5^2)^4$

$(5^2)^4$ can be written as = $(5)^{2 \times 4}$ ... [∵$(a^m)^n = a^{mn}$]

= 5^8

Then,

= $5^8 \div 5^3$

= 5^{8-3} ... [∵$a^m \div a^n = a^{m-n}$]

= 5^5

(iv) $(3 \times 7^2 \times 11^8)/(21 \times 11^3)$

Solution:- Factors of 21 = 7 × 3

Then,

= $(3 \times 7^2 \times 11^8)/(7 \times 3 \times 11^3)$

= $3^{1-1} \times 7^{2-1} \times 11^{8-3}$

= $3^0 \times 7 \times 11^5$

= $1 \times 7 \times 11^5$

= 7×11^5

(v) $3^7/(3^4 \times 3^3)$

Solution:-

= $3^7/(3^{4+3})$ ... [∵$a^m \times a^n = a^{m+n}$]

= $3^7/3^7$

= 3^{7-7} ... [∵$a^m \div a^n = a^{m-n}$]

= 3^0

= 1

(vi) $2^0 + 3^0 + 4^0$

Solution:-

c

= 1 + 1 + 1
= 3

(vii) $2^0 \times 3^0 \times 4^0$
Solution:-
= 1 × 1 × 1
= 1

(viii) $(3^0 + 2^0) \times 5^0$
Solution:-
= (1 + 1) × 1
= (2) × 1
= 2

(ix) $(2^8 \times a^5)/ (4^3 \times a^3)$
Solution:-
$(4)^3$ can be written as = $(2 \times 2)^3$
= $(2^2)^3$
$(5^2)^4$ can be written as = $(2)^{2 \times 3}$ ... [$\because (a^m)^n = a^{mn}$]
= 2^6
Then,
= $(2^8 \times a^5)/ (2^6 \times a^3)$
= $2^{8-6} \times a^{5-3}$ ... [$\because a^m \div a^n = a^{m-n}$]
= $2^2 \times a^2$
= $2a^2$ ... [$\because (a^m)^n = a^{mn}$]

(x) $(a^5/a^3) \times a^8$
Solution:-
= $(a^{5-3}) \times a^8$ ... [$\because a^m \div a^n = a^{m-n}$]
= $a^2 \times a^8$
= a^{2+8} ... [$\because a^m \times a^n = a^{m+n}$]
= a^{10}

c

(xi) $(4^5 \times a^8b^3)/(4^5 \times a^5b^2)$

Solution:-

$= 4^{5-5} \times (a^{8-5} \times b^{3-2})$ … [$\because a^m \div a^n = a^{m-n}$]

$= 4^0 \times (a^3b)$

$= 1 \times a^3b$

$= a^3b$

(xii) $(2^3 \times 2)^2$

Solution:-

$= (2^{3+1})^2$ … [$\because a^m \times a^n = a^{m+n}$]

$= (2^4)^2$

$(2^4)^2$ can be written as $= (2)^{4 \times 2}$ … [$\because (a^m)^n = a^{mn}$]

$= 2^8$

3. Say true or false and justify your answer:

(i) $10 \times 10^{11} = 100^{11}$

Solution:-

Let us consider Left Hand Side (LHS) $= 10 \times 10^{11}$

$= 10^{1+11}$ … [$\because a^m \times a^n = a^{m+n}$]

$= 10^{12}$

Now, consider Right Hand Side (RHS) $= 100^{11}$

$= (10 \times 10)^{11}$

$= (10^{1+1})^{11}$

$= (10^2)^{11}$

$= (10)^{2 \times 11}$ … [$\because (a^m)^n = a^{mn}$]

$= 10^{22}$

By comparing LHS and RHS, LHS

$\neq$ RHS

Hence, the given statement is false.

(ii) $2^3 > 5^2$

Solution:-

c

Let us consider LHS = 2^3

Expansion of $2^3 = 2 \times 2 \times 2$

$= 8$

Now, consider RHS = 5^2

Expansion of $5^2 = 5 \times 5$

$= 25$

By comparing LHS and RHS,

LHS < RHS

$23 < 5^2$

Hence, the given statement is false.

(iii) $2^3 \times 3^2 = 6^5$

Solution:-

Let us consider LHS = $2^3 \times 3^2$

Expansion of $2^3 \times 3^2 = 2 \times 2 \times 2 \times 3 \times 3$

$= 72$

Now, consider RHS = 6^5

Expansion of $6^5 = 6 \times 6 \times 6 \times 6 \times 6$

$= 7776$

By comparing LHS and RHS,

LHS < RHS

$23 < 5^2$

Hence, the given statement is false.

(iv) $3^0 = (1000)^0$

Solution:-

Let us consider LHS = 3^0

$= 1$

Now, consider RHS = 1000^0

$= 1$

By comparing LHS and RHS,

LHS = RHS

$3^0 = 1000^0$

c

Hence, the given statement is true.

4. Express each of the following as a product of prime factors only in exponential form:

(i) 108 × 192

Solution:-

The factors of 108 = 2 × 2 × 3 × 3 × 3

$= 2^2 \times 3^3$

The factors of 192 = 2 × 2 × 2 × 2 × 2 × 2 × 3

$= 2^6 \times 3$

Then,

$= (2^2 \times 3^3) \times (2^6 \times 3)$

$= 2^{2+6} \times 3^{3+3}$ … $[\because a^m \times a^n = a^{m+n}]$

$= 2^8 \times 3^6$

(ii) 270

Solution:-

The factors of 270 = 2 × 3 × 3 × 3 × 5

$= 2 \times 3^3 \times 5$

(iii) 729 × 64

The factors of 729 = 3 × 3 × 3 × 3 × 3 × 3

$= 3^6$

The factors of 64 = 2 × 2 × 2 × 2 × 2 × 2

$= 2^6$

Then,

$= (3^6 \times 2^6)$

$= 3^6 \times 2^6$

(iv) 768

Solution:-

The factors of 768 = 2 × 2 × 2 × 2 × 2 × 2 × 2 × 2 × 3

$= 2^8 \times 3$

c

5. Simplify:
(i) $((2^5)^2 \times 7^3)/(8^3 \times 7)$
Solution:-
8^3 can be written as = $(2 \times 2 \times 2)^3$
= $(2^3)^3$
We have,
= $((2^5)^2 \times 7^3)/((2^3)^3 \times 7)$
= $(2^{5 \times 2} \times 7^3)/((2^{3 \times 3} \times 7)$ … [∵$(a^m)^n = a^{mn}$]
= $(2^{10} \times 7^3)/(2^9 \times 7)$
= $(2_{10-9} \times 7_{3-1})$ … [∵$a_m \div a_n = a_{m-n}$]
= 2×7^2
= $2 \times 7 \times 7$
= 98

(ii) $(25 \times 5^2 \times t^8)/(10^3 \times t^4)$
Solution:-
25 can be written as = 5×5
= 5^2
10^3 can be written as = 10^3
= $(5 \times 2)^3$
= $5^3 \times 2^3$
We have,
= $(5^2 \times 5^2 \times t^8)/(5^3 \times 2^3 \times t^4)$
= $(5^{2+2} \times t^8)/(5^3 \times 2^3 \times t^4)$ … [∵$a^m \times a^n = a^{m+n}$]
= $(5^4 \times t^8)/(5^3 \times 2^3 \times t^4)$
= $(5_{4-3} \times t_{8-4})/2_3$ … [∵$a_m \div a_n = a_{m-n}$]
= $(5 \times t^4)/(2 \times 2 \times 2)$
= $(5t^4)/8$

(iii) $(3^5 \times 10^5 \times 25)/(5^7 \times 6^5)$
Solution:-
10^5 can be written as = $(5 \times 2)^5$

c

$= 5^5 \times 2^5$

25 can be written as $= 5 \times 5$

$= 5^2$

6^5 can be written as $= (2 \times 3)^5$

$= 2^5 \times 3^5$

Then we have,

$= (3^5 \times 5^5 \times 2^5 \times 5^2) / (5^7 \times 2^5 \times 3^5)$

$= (3^5 \times 5^{5+2} \times 2^5) / (5^7 \times 2^5 \times 3^5)$ … $[\because a^m \times a^n = a^{m+n}]$

$= (3^5 \times 5^7 \times 2^5) / (5^7 \times 2^5 \times 3^5)$

$= (3_{5-5} \times 5_{7-7} \times 2_{5-5})$

$= (3^0 \times 5^0 \times 2^0)$ … $[\because a^m \div a^n = a^{m-n}]$

$= 1 \times 1 \times 1$

$= 1$

EXERCISE 13.3 PAGE: 263

c

1. Write the following numbers in the expanded forms:

279404

Solution:-

The expanded form of the number 279404 is,

$= (2 \times 100000) + (7 \times 10000) + (9 \times 1000) + (4 \times 100) + (0 \times 10) + (4 \times 1)$

Now we can express it using powers of 10 in the exponent form,

$= (2 \times 10^5) + (7 \times 10^4) + (9 \times 10^3) + (4 \times 10^2) + (0 \times 10^1) + (4 \times 10^0)$

3006194

Solution:-

The expanded form of the number 3006194 is,

$= (3 \times 1000000) + (0 \times 100000) + (0 \times 10000) + (6 \times 1000) + (1 \times 100) + (9 \times 10) + 4$

Now we can express it using powers of 10 in the exponent form,

$= (3 \times 10^6) + (0 \times 10^5) + (0 \times 10^4) + (6 \times 10^3) + (1 \times 10^2) + (9 \times 10^1) + (4 \times 10^0)$

2806196

Solution:-

The expanded form of the number 2806196 is,

$= (2 \times 1000000) + (8 \times 100000) + (0 \times 10000) + (6 \times 1000) + (1 \times 100) + (9 \times 10) + 6$

Now we can express it using powers of 10 in the exponent form,

$= (2 \times 10^6) + (8 \times 10^5) + (0 \times 10^4) + (6 \times 10^3) + (1 \times 10^2) + (9 \times 10^1) + (6 \times 10^0)$

120719

Solution:-

The expanded form of the number 120719 is,

$= (1 \times 100000) + (2 \times 10000) + (0 \times 1000) + (7 \times 100) + (1 \times 10) + (9 \times 1)$

Now we can express it using powers of 10 in the exponent form,

$= (1 \times 10^5) + (2 \times 10^4) + (0 \times 10^3) + (7 \times 10^2) + (1 \times 10^1) + (9 \times 10^0)$

20068

Solution:-

The expanded form of the number 20068 is,

$= (2 \times 10000) + (0 \times 1000) + (0 \times 100) + (6 \times 10) + (8 \times 1)$

c

Now we can express it using powers of 10 in the exponent form,

$= (2 \times 10^4) + (0 \times 10^3) + (0 \times 10^2) + (6 \times 10^1) + (8 \times 10^0)$

2. Find the number from each of the following expanded forms:

(a) $(8 \times 10)^4 + (6 \times 10)^3 + (0 \times 10)^2 + (4 \times 10)^1 + (5 \times 10)^0$

Solution:-

The expanded form is,

$= (8 \times 10000) + (6 \times 1000) + (0 \times 100) + (4 \times 10) + (5 \times 1)$

$= 80000 + 6000 + 0 + 40 + 5$

$= 86045$

(b) $(4 \times 10)^5 + (5 \times 10)^3 + (3 \times 10)^2 + (2 \times 10)^0$

Solution:-

The expanded form is,

$= (4 \times 100000) + (0 \times 10000) + (5 \times 1000) + (3 \times 100) + (0 \times 10) + (2 \times 1)$

$= 400000 + 0 + 5000 + 300 + 0 + 2$

$= 405302$

(c) $(3 \times 10)^4 + (7 \times 10)^2 + (5 \times 10)^0$

Solution:-

The expanded form is,

$= (3 \times 10000) + (0 \times 1000) + (7 \times 100) + (0 \times 10) + (5 \times 1)$

$= 30000 + 0 + 700 + 0 + 5$

$= 30705$

(d) $(9 \times 10)^5 + (2 \times 10)^2 + (3 \times 10)^1$

Solution:-

The expanded form is,

$= (9 \times 100000) + (0 \times 10000) + (0 \times 1000) + (2 \times 100) + (3 \times 10) + (0 \times 1)$

$= 900000 + 0 + 0 + 200 + 30 + 0$

$= 900230$

3. Express the following numbers in standard form:

(i) 5,00,00,000

Solution:-

The standard form of the given number is 5×10^7

(ii) 70,00,000

Solution:-

The standard form of the given number is 7×10^6

(iii) 3,18,65,00,000

Solution:-

The standard form of the given number is 3.1865×10^9

(iv) 3,90,878

Solution:-

The standard form of the given number is 3.90878×10^5

(v) 39087.8

Solution:-

The standard form of the given number is 3.90878×10^4

(vi) 3908.78

Solution:-

The standard form of the given number is 3.90878×10^3

4. Express the number appearing in the following statements in standard form.

(a) The distance between Earth and Moon is 384,000,000 m.

Solution:-

The standard form of the number appearing in the given statement is 3.84×10^8m.

(b) Speed of light in vacuum is 300,000,000 m/s.

Solution:-

The standard form of the number appearing in the given statement is 3×10^8m/s.

(c) Diameter of the Earth is 1,27,56,000 m.

Solution:-

c

The standard form of the number appearing in the given statement is 1.2756×10^7m.

(d) Diameter of the Sun is 1,400,000,000 m.
Solution:-
The standard form of the number appearing in the given statement is 1.4×10^9m.

(e) In a galaxy there are on an average 100,000,000,000 stars.
Solution:-
The standard form of the number appearing in the given statement is 1×10^{11} stars. **(f) The universe is estimated to be about 12,000,000,000 years old. Solution:-**
The standard form of the number appearing in the given statement is 1.2×10^{10} years old.

(g)The distance of the Sun from the centre of the Milky Way Galaxy is estimated to be 300,000,000,000,000,000,000 m.
Solution:-
The standard form of the number appearing in the given statement is 3×10^{20}m.

(h) 60,230,000,000,000,000,000,000 molecules are contained in a drop of water weighing 1.8 gm. Solution:-
The standard form of the number appearing in the given statement is 6.023×10^{22} molecules.

(i) The earth has 1,353,000,000 cubic km of sea water.
Solution:-
The standard form of the number appearing in the given statement is 1.353×10^9 cubic km.

(j) The population of India was about 1,027,000,000 in March, 2001.
Solution:-
The standard form of the number appearing in the given statement is 1.027×10^9.

c