Exercise 13.3

Question 1.
Write the following numbers in the expanded forms:
(a) 279404

Solution:-
Expanding the given term: 279404
Therefore = [2 × 100000] + [7 × 10000] + [9 × 1000] + [4 × 100] + [0 × 10] + [4 × 1]
Expressing the obtained values using powers of 10 in the exponent form,
Now, we get = $[2 \times 10^5] + [7 \times 10^4] + [9 \times 10^3] + [4 \times 10^2] + [0 \times 10^1] + [4 \times 10^0]$

[b] 3006194

Solution:-
Expanding the given term: 3006194
Therefore = [3 × 1000000] + [0 × 100000] + [0 × 10000] + [6 × 1000] + [1 × 100] + [9 × 10] + 4
Expressing the obtained values using powers of 10 in the exponent form,
Now, we get = $[3 \times 10^6] + [0 \times 10^5] + [0 \times 10^4] + [6 \times 10^3] + [1 \times 10^2] + [9 \times 10^1] + [4 \times 10^0]$

[c] 2806196

Solution:-
Expanding the given term: 2806196
Therefore = [2 × 1000000] + [8 × 100000] + [0 × 10000] + [6 × 1000] + [1 × 100] + [9 × 10] + 6
Expressing the obtained values using powers of 10 in the exponent form,
Now, we get = $[2 \times 10^6] + [8 \times 10^5] + [0 \times 10^4] + [6 \times 10^3] + [1 \times 10^2] + [9 \times 10^1] + [6 \times 10^0]$

[d] 120719

Solution:-
Expanding the given term: 120719
Therefore = [1 × 100000] + [2 × 10000] + [0 × 1000] + [7 × 100] + [1 × 10] + [9 × 1]
Expressing the obtained values using powers of 10 in the exponent form,
Now, we get = $[1 \times 10^5] + [2 \times 10^4] + [0 \times 10^3] + [7 \times 10^2] + [1 \times 10^1] + [9 \times 10^0]$

[e] 20068

Solution:-
Expanding the given term: 20068

Therefore = [2 × 10000] + [0 × 1000] + [0 × 100] + [6 × 10] + [8 × 1]
Expressing the obtained values using powers of 10 in the exponent form,
Now, we get = [2 × 10^4] + [0 × 10^3] + [0 × 10^2] + [6 × 10^1] + [8 × 10^0]

Question 2.
Find the number from each of the following expanded forms:
[a] [8 ×10]^4 + [6 × 10]^3 + [0 × 10]^2 + [4 × 10]^1 + [5 × 10]^0

Solution:-
Expanding the values from question,
= [8 × 10000] + [6 × 1000] + [0 × 100] + [4 × 10] + [5 × 1]
Therefore = 80000 + 6000 + 0 + 40 + 5
= 86045

[b] [4 ×10]^5 + [5 × 10]^3 + [3 × 10]^2 + [2 × 10]^0

Solution:-
Expanding the values from question,
Therefore = [4 × 100000] + [0 × 10000] + [5 × 1000] + [3 × 100] + [0 × 10] + [2 × 1]
= 400000 + 0 + 5000 + 300 + 0 + 2
= 405302

[c] [3 ×10]^4 + [7 × 10]^2 + [5 × 10]^0

Solution:-
Expanding the values from question,
Therefore = [3 × 10000] + [0 × 1000] + [7 × 100] + [0 × 10] + [5 × 1]
= 30000 + 0 + 700 + 0 + 5
= 30705

[d] [9 ×10]^5 + [2 × 10]^2 + [3 × 10]^1

Solution:-
Expanding the values from question,
Therefore = [9 × 100000] + [0 × 10000] + [0 × 1000] + [2 × 100] + [3 × 10] + [0 × 1]
= 900000 + 0 + 0 + 200 + 30 + 0
= 900230

Question 3.
Express the following numbers in standard form:
[i] 5,00,00,000

Solution:-

Converting to the standard form i.e. 5×10^7

[ii] 70,00,000

Solution:-
Converting to the standard form i.e. 7×10^6

[iii] 3,18,65,00,000

Solution:-
Converting to the standard form i.e. 3.1865×10^9

[iv] 3,90,878

Solution:-
Converting to the standard form i.e. 3.90878×10^5

[v] 39087.8

Solution:-
Converting to the standard form i.e. 3.90878×10^4

[vi] 3908.78

Solution:-
Converting to the standard form i.e. 3.90878×10^3

Question 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:-
Converting the given values to the standard form i.e. 3.84×10^8 m.

[b] Speed of light in vacuum is 300,000,000 m/s.

Solution:-
Converting the given values to the standard form i.e. 3×10^8 m/s.

[c] Diameter of the Earth is 1,27,56,000 m.

Solution:-
Converting the given values to the standard form i.e. 1.2756×10^7 m.

[d] Diameter of the Sun is 1,400,000,000 m.

Solution:-
Converting the given values to the standard form i.e. 1.4×10^9 m.

[e] In a galaxy there are on an average 100,000,000,000 stars.

Solution:-
Converting the given values to the standard form i.e. 1×10^{11} stars.

[f] The universe is estimated to be about 12,000,000,000 years old.

Solution:-
Converting the given values to the standard form i.e. 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:-
Converting the given values to the standard form i.e. 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:-
Converting the given values to the standard form i.e. 6.023×10^{22} molecules.

[i] The earth has 1,353,000,000 cubic km of sea water.

Solution:-
Converting the given values to the standard form i.e. 1.353×10^9 cubic km.

[j] The population of India was about 1,027,000,000 in March, 2001.

Solution:-
Converting the given values to the standard form i.e. 1.027×10^9.