CLASS VIII: CHAPTER - 12
EXPONENTS AND POWERS

1. Express:
(i) 729 as a power of 3
(ii) 128 as a power of 2
(iii) 343 as a power of 7
(iv) 256 as a power 2.

2. Which one is greater 2^3 or 3^2?

3. Which one is greater 8^2 or 2^8?

4. Express the following numbers as a product of powers of prime factors:
(i) 72 (ii) 432 (iii) 1000 (iv) 16000

5. Express each of the following numbers using exponential notation:
(i) 512 (ii) 343 (iii) 729 (iv) 3125

6. Simplify:
(i) $(-4)^3$ (ii) $(-3) \times (-2)^3$ (iii) $(-3)^2 \times (-5)^2$ (iv) $(-2)^3 \times (-10)^3$

7. Compare the following numbers:
(i) 2.7×10^{12} ; 1.5×10^8 (ii) 4×10^{14} ; 3×10^{17}

8. Simplify and write in exponential form:

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

(ii) $p^3 \times p^2$

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

(iv) $a^3 \times a^2 \times a^7$

(v) $5^3 \times 5^7 \times 5^{12}$

(vi) $(-4)^{100} \times (-4)^{20}$

9. Simplify and write in exponential form:

(i) $2^9 \div 2^3$

(ii) $10^8 \div 10^4$

(iii) $9^{11} \div 9^7$

(iv) $20^{15} \div 20^{13}$

(v) $7^{13} \div 7^{10}$

10. Express the following terms in the exponential form:
(i) $(2 \times 3)^5$ (ii) $(2a)^4$ (iii) $(-4m)^3$

11. Simplify and write the answer in exponential form:

$(i) 6^{2^4}$

$(ii) \left(2^2\right)^{100}$

$(iii) \left(7^{50}\right)^2$

$(iv) \left(5^3\right)^7$

12. Expand: $(i) \left(\frac{3}{5}\right)^4$ $(ii) \left(\frac{4}{7}\right)^5$

13. Write exponential form for 8 × 8 × 8 × 8 taking base as 2.

14. Simplify and write the answer in the exponential form.

$(i) \left(\frac{3^7}{3^2}\right) \times 3^5$ $(ii) 2^3 \times 2^2 \times 2^5$ $(iii) (6^2 \times 6^4) \div 6^3$

$(iv) \left[\left(2^2\right)^3 \times 3^6\right] \times 5^6$ $(v) 8^2 \div 2^3$

15. Simplify:

$(i) \frac{12^4 \times 9^3 \times 4}{6^3 \times 8^2 \times 27}$ $(ii)\ 2^3 \times a^3 \times 5a^4$ $(iii) \frac{2 \times 3^4 \times 2^5}{9 \times 4^2}$

16. Express each of the following as a product of prime factors only in exponential form:
(i) 108 × 192 (ii) 270 (iii) 729 × 64 (iv) 768

17. Simplify:

$(i) \frac{\left(2^5\right)^2 \times 7^3}{8^3 \times 7}$ $(ii) \frac{25 \times 5^2 \times t^8}{10^3 \times t^4}$ $(iii) \frac{3^5 \times 10^5 \times 25}{5^7 \times 6^5}$

18. Simplify and write the answer in the exponential form:

$(i) \left(2^5 \div 2^8\right)^5 \times 2^{-5}$

$(ii) (-4)^{-3} \times (5)^{-3} \times (-5)^{-3}$

$(iii) \frac{1}{8} \times (3)^{-3}$

$(iv) (-3)^4 \times \left(\frac{5}{3}\right)^4$

19. Simplify:

$(i) \left\{\left(\frac{1}{3}\right)^{-2} - \left(\frac{1}{2}\right)^{-3}\right\} \div \left(\frac{1}{4}\right)^{-2}$

$(ii) \left(\frac{5}{8}\right)^{-7} \times \left(\frac{8}{5}\right)^{-5}$

20. Simplify:

$(i)\dfrac{25\times t^{-4}}{5^{-3}\times 10\times t^{-8}}(t\neq 0)$

$(ii)\dfrac{3^{-5}\times 10^{-5}\times 125}{5^{-7}\times 6^{-5}}$

21. Find m so that $(-3)^{m+1}\times(-3)^5=(-3)^7$

22. Find the value of m for which $5^m \div 5^{-3}=5^5$.

23. Write the following numbers in standard form.
(i) 0.000000564 (ii) 0.0000021 (iii) 21600000

(iv) 15240000 (v) 6020000000000000

24. Express the following numbers in standard form.
(i) 0.00000000000000000000035

(ii) 4050000000000

(iii) 51000000000000000000

(iv) 0.000000000000000000000000000625

(v) 0.000000000000001257

25. Express the following numbers in usual form.
(i) 3.52×10^5 (ii) 7.54×10^{-4} (iii) 3×10^{-5} (iv) 5.25×10^{-7} (v) 8.525×10^9

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

(i) 1 micron is equal to $\dfrac{1}{1000000}$ m.

(ii) Charge of an electron is 0.000,000,000,000,000,000,16 coulomb.

(iii) Size of a bacteria is 0.0000005 m

(iv) Size of a plant cell is 0.00001275 m

(v) Thickness of a thick paper is 0.07 mm

(vi) Mass of Uranus = 86,800,000,000,000,000,000,000,000 kg

(vii) Mass of the Earth = 5,976,000,000,000,000,000,000,000 kg

(viii) Distance of Sun from the centre of our Galaxy = 300,000,000,000,000,000,000 m

(ix) Sun is located 300,000,000,000,000,000,000 m from the centre of our Milky Way Galaxy.

(x) The distance between Sun and Saturn is 1,433,500,000,000 m

27. Express the following numbers in standard form.
(i) 0.000035 (ii) 4050000

28. In a stack there are 5 books each of thickness 20mm and 5 paper sheets each of thickness 0.016 mm. What is the total thickness of the stack.

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