EXERCISE # 1

Q.1 (a) Find the value of
(i) 6^2 (ii) 2^4 (iii) 8^3
(iv) 11^3 (v) 7^4
(b) Write the base and exponent of
(i) 3^5 (ii) $(-7)^9$ (iii) 18^2

Q.2 Express the following in exponential form :
(i) $8 \times 8 \times 8 \times 8$ (ii) $b \times b$
(iii) $6 \times 6 \times 9 \times 9 \times 9$ (iv) $x \times x \times x \times y$
(v) $5 \times 5 \times x \times x$
(vi) $x \times x \times x \times x \times y \times y \times z$

Q.3 Identify the smaller number, where-ever possible, in each of the following ?
(i) 5^3 or 3^5 (ii) 6^3 or 3^6
(iii) 4^8 or 8^4 (iv) 1000^3 or 3^{1000}
(v) 3^{10} or 10^3 (vi) 2^6 or 6^2

Q.4 Express each of the following numbers using exponential notations :
(i) 81 (ii) 15625
(iii) 1000000 (iv) 65536
(v) 16807

Q.5 Express each of the following as product of powers of their prime factors :
(i) 324 (ii) 7200 (iii) 810 (iv) 540

Q.6 Simplify :
(i) 3×10^2 (ii) $8^3 \times 2^3$
(iii) $3^3 \times 4$ (iv) 4×5^4
(v) 0×10^3 (vi) $3^2 \times 5^3$
(vii) $3^4 \times 4^2$ (viii) $4^2 \times 10^4$

Q.7 Simplify :
(i) $(-5)^3$ (ii) $(-2) \times (-3)^5$
(iii) $(-2)^2 \times (-4)^2$ (iv) $(-4)^3 \times (-10)^5$

Q.8 Compare the following :
(i) 8.9×10^9; 9.8×10^7
(ii) 5×10^4, 3×10^6
(iii) 16×10^{16}, 3×10^3
(iv) 6×10^{16}, 7×10^{17}

Q.9 Using laws of exponents, simplify and write the answer in exponential form :
(i) $5^3 \times 5^5 \times 5^9$ (ii) $11^{17} \div 11^{15}$
(iii) $9^x \times 9^4$ (iv) $(6^2)^3 \div 6^5$
(v) $3^5 \times 6^5$ (vi) $(4^{14} \div 4^{11}) \times 2^5$

Q.10 Say true or false and justify your answer :
(i) $100 \times 10^{10} = 100^{12}$ (ii) $3^9 \times 4^8 = 12^{17}$
(iii) $5^0 = (2000)^0$ (iv) $5^3 > 3^5$

Q.11 Express each of the following as a product of prime factors only in exponential form :
(i) 289×324 (ii) 216×125
(iii) 2187×49 (iv) 1331×144
(v) 169×343 (vi) $225 \times 3 \times 5$

Q.12 Simplify :
(i) $\frac{15^4 \times 9^4 \times 80}{12^2 \times 27^2}$ (ii) $\frac{4^3 \times x^4 \times 6x^3}{2 \times x^2}$
(iii) $\frac{3 \times 2^2 \times 5^2}{4 \times 15}$ (iv) $(6^0 + 7^0 + 8^0) \div 3$
(v) $\frac{8^0 \times 9^0 \times 10^0}{(720)^0}$ (vi) $(3^5 \times 3^2)^2$
(vii) $\frac{7^6 \times (100)^0}{7^2 \times 7^4}$ (viii) $\frac{8 \times 3^2 \times 12^4}{(4 \times 3)^4 \times (2 \times 3)^2}$
(ix) $\frac{t^6}{xt^3} \times t^2 \times x^2$ (x) $[(9^3)^2 \times 9^6] \div 9^{10}$

Q.13 Write the following numbers in the expanded form :
(i) 398505 (ii) 9087183
(iii) 3708267 (iv) 230423
(v) 86003 (vi) 390868

Q.14 Find the number from each of the following exponential forms :
(i) $9 \times 10^5 + 8 \times 10^4 + 7 \times 10^3 + 6 \times 10^2 + 3 \times 10^1 + 2 \times 10^0$
(ii) $6 \times 10^4 + 7 \times 10^3 + 8 \times 10^2 + 5 \times 10^0$
(iii) $4 \times 10^4 + 8 \times 10^2 + 6 \times 10^0$
(iv) $7 \times 10^6 + 6 \times 10^3 + 3 \times 10^2 + 4 \times 10^1$

Q.15 Express the following numbers in standard form :
(i) 7,00,00,000 (ii) 8,00,00,000
(iii) 47,89,00,000 (iv) 480,767
(v) 48096.9 (vi) 9807.86

Q.16 Express the numbers appearing in the following statements in standard form :
(i) The distance of two places A and B is 487,000,000,000 m.
(ii) Diameter of an object is 62,30,000 mm
(iii) Speed of a car is 80000.00 m/hr.
(iv) In sky there are approximately 100,000,000,000,000 stars.
(v) The universe is estimated to be about 12,000,000,000 years old

(vi) The population of world is approximately
3,083,000,000

ANSWER KEY

1. (a) (i) 36 (ii) 16 (iii) 512 (iv) 1331 (v) 2401

(b) (i) Base = 3, Exponent = 5 (ii) Base = (–7), Exponent = 9

(iii) Base = 18, Exponent = 2

2. (i) 8^4 (ii) b^2 (iii) $6^2 \times 9^3 = 2^2 \times 3^8$ (iv) $x^3 \times y$ (v) $5^2 \times x^2 = (5x)^2$ (vi) x^4y^2z

3. (i) 5^3 (ii) 6^3 (iii) 8^4 (iv) 1000^3 (v) 10^3 (vi) 6^2

4. (i) 3^4 (ii) 5^6 (iii) 10^6 (iv) 2^{16} (v) 7^5

5. (i) $2^2 \times 3^4$ (ii) $2^5 \times 3^2 \times 5^2$ (iii) $2 \times 3^4 \times 5$ (iv) $2^2 \times 3^3 \times 5$

6. (i) 300 (ii) 4096 (iii) 108 (iv) 2500 (v) 0 (vi) 1125 (vii) 1296 (viii) 160000

7. (i) –125 (ii) 486 (iii) 64 (iv) 6400000

8. (i) $8.9 \times 10^9 > 9.8 \times 10^7$ (ii) $3 \times 10^6 > 5 \times 10^4$ (iii) $16 \times 10^{16} > 3 \times 10^3$ (iv) $7 \times 10^{17} > 6 \times 10^{16}$

9. (i) 5^{17} (ii) 11^2 (iii) 9^{x+4} (iv) 6 (v) $3^{10} \times 2^5$ (vi) 2^{11}

10. (i) false (ii) false (iii) true (iv) false

11. (i) $(17 \times 2)^2 \times 3^4$ (ii) $6^3 \times 5^3$ (iii) $3^7 \times 7^2$ (iv) $11^3 \times 2^4 \times 3^2$ (v) $13^2 \times 7^3$ (vi) $3^3 \times 5^3$

12. (i) 253125 (ii) $192x^5$ (iii) 5 (iv) 1 (v) 1 (vi) 3^{14} (vii) 1 (viii) 2 (ix) xt^5 (x) 81

13. (i) $3 \times 10^5 + 9 \times 10^4 + 8 \times 10^3 + 5 \times 10^2 + 5 \times 10^0$

(ii) $9 \times 10^6 + 8 \times 10^4 + 7 \times 10^3 + 1 \times 10^2 + 8 \times 10^1 + 3 \times 10^0$

(iii) $3 \times 10^6 + 7 \times 10^5 + 8 \times 10^3 + 2 \times 10^2 + 6 \times 10^1 + 7 \times 10^0$

(iv) $2 \times 10^5 + 3 \times 10^4 + 4 \times 10^2 + 2 \times 10^1 + 3 \times 10^0$

(v) $8 \times 10^4 + 6 \times 10^3 + 3 \times 10^0$

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

14. (i) 987632 (ii) 67805 (iii) 40806 (iv) 7006340

15. (i) 7×10^7 (ii) 8×10^7 (iii) 4.789×10^8 (iv) 4.80767×10^5 (v) 4.80969×10^4 (vi) 9.80786×10^3

16. (i) 4.87×10^{11} m (ii) 6.23×10^6 mm (iii) 8×10^4 m/hr (iv) 1×10^{14} (v) 1.2×10^{10} yrs.

(vi) 3.083×10^9

EXERCISE # 2

Fill in the blanks type Questions :
(Q.1 to Q.15)

Q.1 The value of $(10)^0 + (100)^0$ is equal to ..... .

Q.2 In power notation 25/36, can be expressed as ..... .

Q.3 The value of $(3)^4$ is ..... .

Q.4 The power notation for $10 \times 10 \times 10 \times 10 \times 10$ is ..... .

Q.5 $(-6)^3$ is equal to ..... .

Q.6 The value of $x^0 \div y^0$ is ..... .

Q.7 $5^6 \times 5^x = 5^{----}$

Q.8 $(6^x)^2 = 6^{----}$

Q.9 $(9)^3 \times ..... = 9^8$

Q.10 $..... \div 4^2 = 4^6$

Q.11 The expanded form using exponent for 405972 is ..... .

Q.12 The standard form for 68790 is ..... .

Q.13 In general if 'b' is any non-zero integer, then $(b)^0$ is equal to ..... .

Q.14 5^2 is read as ..... of five.

Q.15 In exponent form (–2) raised to power four can be written as ..... .

True/False type Question (Q.16 to Q.25)

Q.16 We can not find the exponential value of $(a)^m$ unless we know that numerical numbers, the literal numbers a and m are.

Q.17 Third power of a number is called the square of the number.

Q.18 5^2 is read as "two square".

Q.19 x^3y^2 and $-y^2x^3$ are not like terms.

Q.20 7^2 is greater than 2^7.

Q.21 The product of powers of prime factors for the number 343 is 3^7.

Q.22 The value of $(a)^m \times (a)^{-n}$ is $(a)^{m+n}$.

Q.23 The value of $a^m \div (a)^{-n}$ is $(a)^{m+n}$.

Q.24 The value of $(a^{-m})^n$ is $(a)^{-m+n}$.

Q.25 The value of $\left(\frac{1}{9}\right)^0$ is 1.

Q.26 Match column A with column B

Column A	Column B
(i) $x^a \times x^b$	(a) x^{a-b}
(ii) $x^a \div x^b$	(b) x^{ab}
(iii) $(x^a)^b$	(c) 1
(iv) $(x)^0$	(d) x^{a+b}
(v) $(x^0)^m$	
(vi) $(x^b)^a$	
(vii) $\left(\frac{x^a}{x^a}\right)$	

Q.27 Find the square of first ten natural numbers.

Q.28 Find the cube of first ten natural numbers.

Q.29 To what power (–3) should be raised to get –27 ?

Q.30 To what power (–2) should be raised to get 16 ?

Q.31 Convert the following into power notation :

(i) $\frac{1}{27}$ (ii) $\frac{-1}{64}$

(iii) $\frac{1}{81}$ (iv) $\frac{49}{81}$

Q.32 Find the value of the following :

(i) $\left(\frac{1}{7}\right)^4$ (ii) $\left(\frac{2}{8}\right)^3$

(iii) $\left(\frac{7}{9}\right)^5$ (iv) $\left(\frac{-6}{8}\right)^3$

Q.33 Simplify :

(i) $\frac{11^3 \times 5^2}{121 \times 5}$ (ii) $\frac{81 \times 7^3 \times 100}{10^2 \times 3^4 \times 7}$

(iii) $\frac{a^2 \times a^3 \times b^3 \times b^4}{a^5 \times b^2}$ (iv) $\frac{2^7 \times 4^3 \times 5^4}{4 \times 4 \times 10^3}$

Q.34 Write the following numbers in the standard form :

(i) 4830000 (ii) 946×10^7

(iii) 525×10^7

Q.35 Write the following numbers in the usual form :

(i) 4.85×10^7 (ii) 7.49×10^5

(iii) 3.5×10^6

Q.36 Express the following numbers in the form $K \times 10^n$, where K is a number such that $1 < K < 10$ and n is an integer :

(i) 30560000 (ii) 847300000

ANSWER KEY

1. 2 **2.** $\left(\frac{5}{6}\right)^2$ **3.** 81 **4.** $(10)^5$ **5.** (–216) **6.** 1 **7.** 6 + x

8. 6^{2x} **9.** 9^5 **10.** 4^8 **11.** $4 \times 10^5 + 5 \times 10^3 + 9 \times 10^2 + 7 \times 10^1 + 2 \times 10^0$

12. 6.8×10^4 **13.** 1 **14.** square **15.** $(-2)^4$ **16.** T **17.** F **18.** F

19. T **20.** F **21.** F **22.** F **23.** T **24.** F **25.** T

26. (i) d (ii) a (iii) b (iv) c (v) c (vi) b (vii) c

27. $1^2 = 1$; $2^2 = 4$; $3^2 = 9$; $4^2 = 16$; $5^2 = 25$; 6^2 36; $7^2 = 49$; $8^2 = 64$; $9^2 = 81$; $10^2 = 100$

28. $1^3 = 1$; $2^3 = 8$; $3^3 = 27$; $4^3 = 64$; $5^3 = 125$; $6^3 = 216$; $7^3 = 343$; $8^3 = 512$; $9^3 = 729$; $10^3 = 1000$

29. $(-3)^3 = -27$ **30.** $(-2)^4 = 16$

31. (i) $\left(\frac{1}{3}\right)^3$ (ii) $-\left(\frac{1}{2}\right)^6$ or $\left(\frac{-1}{4}\right)^3$ (iii) $\left(\frac{1}{3}\right)^4$ (iv) $\left(\frac{7}{9}\right)^2$

32. (i) $\frac{1}{2401}$ (ii) $\frac{8}{512}$ (iii) $\frac{16807}{59049}$ (iv) $\frac{-216}{512}$

33. (i) 55 (ii) 49 (iii) b^5 (iv) 320

34. (i) 4.83×10^6 (ii) 9.46×10^9 (iii) 5.25×10^9

35. (i) 48500000 (ii) 749000 (iii) 3500000

36. (i) 3.056×10^7 (ii) 8.473×10^8