

VIII

EXPONENTS AND POWERS (MCQs)

1) Express 256 as a power of 4
 (a) 4^8 (b) 2^8 (c) 4^4 (d) none of these

ans:-

$$256 = 16^2 = (4^2)^2 = 4^4 \text{ (c)}$$

2) Express 729 as a power of 3
 (a) 3^8 (b) 3^6 (c) 9^3 (d) none of these

ans:-

$$729 = 27^2 = (3^3)^2 = 3^6 \text{ (b)}$$

3) Express 2048 as a power 2
 (a) 2^{16} (b) 2^8 (c) 4^8
 (d) none of these

ans:-

$$2048 = 2^{11} \text{ (d) none of these}$$

$$\begin{array}{r} 2 \overline{) 2048} \\ 2 \overline{) 1024} \\ 2 \overline{) 512} \\ 2 \overline{) 256} \\ 2 \overline{) 128} \\ 2 \overline{) 64} \\ 2 \overline{) 32} \\ 2 \overline{) 16} \\ 2 \overline{) 8} \\ 2 \overline{) 4} \\ 2 \overline{) 2} \\ 1 \end{array}$$

4) Which one is greater?
 (a) 2^3 (b) 3^2 (c) 1^8 (d) 4^2

ans:-

$$\begin{array}{l} 2^3 = 8 \\ 3^2 = 9 \\ 1^8 = 1 \\ 4^2 = 16 \end{array} \quad \left| \quad 4^2 \text{ (d)}$$

5) Express 432 as a product of powers of prime factors
 (a) $2^3 \times 3^3$ (b) $2^4 \times 3^3$ (c) 16×27 (d) none of these

ans:-

$$432 = 2^4 \times 3^3 \text{ (b)}$$

$$\begin{array}{r} 2 \overline{) 432} \\ 2 \overline{) 216} \\ 2 \overline{) 108} \\ 2 \overline{) 54} \\ 3 \overline{) 27} \\ 3 \overline{) 9} \\ 3 \end{array}$$

6) The value of $(-1)^{55}$ is
 (a) -1 (b) 1 (c) 0 (d) none of these

ans:-

$$(-1)^{55} = -1, \text{ since 55 is an odd number. (a)}$$

7) The value of $(-1)^{500}$ is
(a) -1 (b) 1 (c) 0 (d) none of these

ans:-

$$(-1)^{500} = 1, \text{ since the power is an even number (b)}$$

8) The value of 2^8 is (a) 128 (b) 256 (c) 512 (d) none of these

ans:-

$$2^8 = 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 \times 2 = 256 \text{ (b)}$$

9) Simplify and write in exponential form of $2^2 \times 2^5$
(a) 2^3 (b) 2^7 (c) 128 (d) none of these

ans:-

$$2^2 \times 2^5 = 2^{2+5} = 2^7 \text{ (b) } [a^m \times a^n = a^{m+n}]$$

10) Simplify and write in exponential form of

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

(a) $(-4)^{120}$ (b) $(-4)^{80}$ (c) $(-4)^{2000}$ (d) none of these

ans:-

$$(-4)^{100} \times (-4)^{20} = (-4)^{100+20} = (-4)^{120} \text{ (a)}$$
$$[a^m \times a^n = a^{m+n}]$$

11) Simplify and write in exponential form of $5^2 \times 5^7 \times 5^{12}$
(a) 5^3 (b) 5^7 (c) 5^{21} (d) none of these

ans:-

$$5^2 \times 5^7 \times 5^{12} = 5^{2+7+12} = 5^{21} \text{ (c) } [a^m \times a^n = a^{m+n}]$$

12) The value of 2^2

(a) 3 (b) 10 (c) 4 (d) 7

ans:-

$$2^2 = 4 \text{ (c)}$$

13) The exponent in the expression 3^7 is

(a) 1 (b) 7 (c) 0 (d) 3

ans:-

$$7 \text{ (b)}$$

14) The value of 3^0 is

(a) 0 (b) 3 (c) 1 (d) none of these

ans:-

$$3^0 = 1 \text{ (c)}$$

15) Multiplicative inverse of $\frac{1}{7}$ is —

- (a) 49 (b) 5 (c) 7 (d) -14

ans:- 7 (c)

16) Fill in the blank : $a^m \div a^n = a^{\underline{\quad}}$

where m and n are natural numbers

- (a) mn (b) $m+n$ (c) $m-n$ (d) $m \div n$

ans:-

$$a^m \div a^n = a^{\underline{m-n}}$$

17) Express $(2a)^4$ in exponential form

- (a) $4a^3$ (b) $16a^4$ (c) $2a^4$ (d) $8a^4$

ans:-

$$(2a)^4 = 2^4 a^4 = 16a^4 \text{ (b)}$$

18) The value of $\frac{1}{3^2} = \underline{\quad}$ (a) $\frac{1}{9}$ (b) 1 (c) -6 (d) $\frac{1}{3}$

ans:- $\frac{1}{3^2} = \frac{1}{9}$ (a)

19) Find the value of 11^2 (a) 22 (b) 9 (c) 121 (d) 13

ans:- $11^2 = 121$ (c)

20) In simplified form $(3^0 + 4^0 + 5^0)^0$ is equal to

- (a) 12 (b) 3 (c) 12 (d) 1

ans:- $(3^0 + 4^0 + 5^0)^0 = (1+1+1)^0 = 3^0 = 1$ (d)

21) Find the value of $(\frac{2}{3})^2$ is (a) $\frac{4}{9}$ (b) $\frac{9}{4}$ (c) $-\frac{2}{9}$ (d) 0

ans:- $(\frac{2}{3})^2 = \frac{2^2}{3^2} = \frac{4}{9}$ (a)

22) In standard form $52,00,00,000 = \underline{\quad}$

- (a) 5.2×10^7 (b) 5.2×10^8
(c) 52×10^8 (d) $52 \times 100,00,000$

ans:- 5.2×10^8 (b)

23) Usual form of the expression 10^4 is given by
(a) 1000,00 (b) 10000 (c) 10×10^4 (d) 10,000

Ans:- $10^4 = 10000$ (d)

24) 1 micron is equal to
(a) $\frac{1}{1000000}$ m (b) 10^6 m (c) 10^5 m (d) 10^7 m

Ans:- 1 micron = 1×10^{-6} m
 $= \frac{1}{1000000}$ m

25) The approximate distance of moon from the earth is 384,467,000 m and in exponential form this distance can be written as
(a) 3.84467×10^8 m (b) 384467×10^{-8} m (c) 384467×10^{-9} m
(d) 3.84467×10^{13} m

Ans:- $384,467,000 = 3.84467 \times 10^8$ m (a)

26) 7×10^{-5} m is the standard form of which of the following

(a) 0.0007 m (b) 0.000007 m (c) 0.0000007 m
(d) 0.00007 m

Ans:- $\frac{7}{100000} = 0.00007$ m (d)

27) The standard form of 4050000 is given by
(a) 4.05×10^6 (b) 40.5×10^9 (c) 405×10^6 (d) 4.05×10^{-6}

Ans:- $4050000 = 4.05 \times 10^6$ (a)

28) Which one of the following is the value of 1^{15}
(a) 0 (b) 15 (c) 1 (d) none of these

Ans:- $1^{15} = 1$ (c)

29) Fill in the blank: $(-1)^{\text{even number}} =$
(a) $2 \times (-1)$ (b) 1 (c) 0 (d) $(-1)^3$

Ans:- 1 (b)

30) Fill in the blank: $(-1)^{\text{odd number}} =$
(a) 1 (b) -1 (c) 2 (d) 0

ans:- -1 (b)

31) value of $(3^0 + 2^0) \times 5^0$ is
(a) 1 (b) 25 (c) 2 (d) 0

ans:- $(1+1) \times 1 = 2 \times 1 = 2$ (c)

32) The value of 7^2 is _____
(a) 7 (b) 49 (c) 2 (d) 14

ans:- $7^2 = 49$ (b)

33) The Base in the expression 8^{10} is _____
(a) 10 (b) 2 (c) 8 (d) 800

ans:- 8 (c)

34) The value of 100^0 is _____
(a) 0 (b) 100 (c) 1 (d) none of these

ans:- 1 (c)

35) Find the number from the following expanded form:
 $9 \times 10^5 + 2 \times 10^2 + 3 \times 10^1$

(a) 900203 (b) 912351 (c) 905302 (d) 900230

ans:- 9 0 0 2 3 0 (d)

36) Value of $(2^3)^2$ is given by

(a) 64 (b) 32 (c) 12 (d) None of these

ans:- $(2^3)^2 = 2^{3 \times 2} = 2^6 = 64$ (a)

37) The value of $\frac{1}{5^2} =$ _____ (a) -5 (b) 25 (c) -15 (d) $\frac{1}{25}$

ans:- $\frac{1}{5^2} = \frac{1}{5 \times 5} = \frac{1}{25}$ (d)

38) In exponential form 140,000,000,000 kg is given by
(a) 1.4×10^{10} kg (b) 1.4×10^9 kg (c) 14×10^8 kg (d) 1.4×10^{11} kg

ans:- 1.4×10^{11} kg (d)

39) The expression $(5^2 + 7^2 + 3^2)^0$ is equal to
(a) 15^6 (b) -6 (c) 1 (d) 83

ans:- $(25 + 49 + 9)^0 = (83)^0 = 1$ (c)

40) The value of $(\frac{1}{6})^2$ is —

(a) $\frac{1}{12}$ (b) $\frac{2}{3}$ (c) $\frac{1}{36}$ (d) 2

ans:- $\frac{1}{6 \times 6} = \frac{1}{36}$ (c)

41) In standard form 56700000 is written as

(a) 5.67×10^7 (b) 567×10^7 (c) 5.67×10^5
(d) 567×100000

ans:- 5.67×10^7 (a)

42) Usual form of the expression 9×10^{-5} = —

(a) 0.00009 (b) 0.000009 (c) 90×10^{-4} (d) 0.09×10^{-3}

ans:- $9 \times 10^{-5} = \frac{9}{100000} = 0.00009$ (a)

43) The number $86,800,000,000,000,000,000,000,000$ kg is equal to —

(a) 8.68×10^{25} kg (b) 868×10^{23} kg (c) 86.8×10^{-25} kg (d) 868×10^{-23} m

ans:- 8.68×10^{25} kg (a)

44) Charge of an electron is $0.000,000,000,000,000,000,16$ Coulomb and in exponential form it can be written as

(a) 16×10^{18} C (b) 1.6×10^{-21} C (c) 1.6×10^{-19} C (d) 16×10^{-21} C

ans:- 1.6×10^{-19} C (c)

45) 13×10^{-7} km is the standard form of which of the following

(a) 0.00000013 km (b) 0.0000013 km (c) 0.00000000013 km
(d) 0.00000000013 km

ans:- 0.0000013 km (b)

46) The standard form of 9,030,000,000 is given by —
(a) 9.03×10^9 (b) 90.3×10^7 (c) 903×10^6 (d) 9.03×10^{-9}

ans: 9.03×10^9 (a)

47) Which one of the following is the value of 3^5
(a) 3 (b) 15 (c) 2 (d) 243

ans: $3^5 = 243$ (d)

48) Find the value of $5^0 \times 7^0 \times 3^0$
(a) 1 (b) $\frac{1}{24}$ (c) 6 (d) $\frac{1}{5} \times 7 \times 3$

ans: $5^0 \times 7^0 \times 3^0 = 1 \times 1 \times 1 = 1$ (a)

49) 64 in exponential form is
(a) 2^6 (b) 16^2 (c) $\frac{1}{8^2}$ (d) 2^4

ans: $64 = 2^6$ (a)

50) The value of $2^0 \times 3^0 \times 4^0$ is
(a) 1 (b) 0 (c) 24 (d) None of these

ans: $2^0 \times 3^0 \times 4^0 = 1 \times 1 \times 1 = 1$ (a)

51) 1024 in exponential form is —
(a) 2^6 (b) 16^2 (c) $\frac{1}{8^2}$ (d) none of these

ans: $1024 = 2^{10}$ (d) none of these

52) The value of $\frac{2^2}{3^2}$ in the exponential form is

(a) $\left(\frac{2}{3}\right)^4$ (b) $\left(\frac{2}{3}\right)^2$ (c) $\left(\frac{2}{3}\right)^0$ (d) none of these

ans: $\frac{2^2}{3^2} = \left(\frac{2}{3}\right)^2$ (b)

53) The value of $(6^{-1} - 8^{-1})^{-1}$ is (a) $-\frac{1}{2}$ (b) -2 (c) $\frac{1}{24}$ (d) 24

ans: $\left(\frac{1}{6} - \frac{1}{8}\right)^{-1} = \left(\frac{8-6}{48}\right)^{-1} = \left(\frac{2}{48}\right)^{-1} = \left(\frac{1}{24}\right)^{-1} = 24$ (d)

54) The value of $(5^{-1} \times 3^{-1})^{-1}$ is (a) $-\frac{1}{15}$ (b) $\frac{1}{15}$ (c) 15 (d) -15

ans:- $(\frac{1}{5} \times \frac{1}{3})^{-1} = (\frac{1}{15})^{-1} = 15$ (c)

55) The value of $(2^{-1} - 4^{-1})^2$ is (a) $\frac{1}{16}$ (b) $\frac{1}{16}$ (c) 4 (d) -4

ans:- $(\frac{1}{2} - \frac{1}{4})^2 = (\frac{2-1}{4})^2 = (\frac{1}{4})^2 = \frac{1}{16}$ (b)

56) The value of $(\frac{1}{2})^{-2} + (\frac{1}{3})^{-2} + (\frac{1}{4})^{-2}$ is

(a) $\frac{61}{144}$ (b) $\frac{144}{61}$ (c) 29 (d) none of these

ans:- $2^2 + 3^2 + 4^2 = 4 + 9 + 16 = 29$ (c)

57) The value of $[6^{-1} + (\frac{3}{2})^{-1}]^{-1}$ is

(a) $\frac{2}{3}$ (b) $\frac{5}{6}$ (c) $\frac{6}{5}$ (d) none of these

ans:- $(\frac{1}{6} + \frac{2}{3})^{-1} = (\frac{1+4}{6})^{-1} = (\frac{5}{6})^{-1} = \frac{6}{5}$ (c)

58) The value of $(-\frac{1}{2})^{-6}$ is

(a) -64 (b) $-\frac{1}{64}$ (c) $\frac{1}{64}$ (d) 64

ans:- $(-\frac{1}{2})^{-6} = (-2)^6 = 64$ (d)

59) The value of $[(\frac{3}{4})^{-1} - (\frac{1}{4})^{-1}]^{-1}$ is

(a) $\frac{3}{8}$ (b) $-\frac{3}{8}$ (c) $-\frac{8}{3}$ (d) $\frac{8}{3}$

ans:- $[\frac{4}{3} - \frac{4}{1}]^{-1} = (\frac{4-12}{3})^{-1} = (-\frac{8}{3})^{-1} = -\frac{3}{8}$ (b)

60) The value of $[(\frac{1}{2})^{-2}]^{-2}$ is

(a) $-\frac{1}{16}$ (b) $\frac{1}{16}$ (c) 16 (d) -16

ans:- $\left(-\frac{1}{2}\right)^{2x-2x-1} = \left(-\frac{1}{2}\right)^4 = \frac{1}{16}$ (b)

61) The value of $\left(\frac{5}{6}\right)^0$ is (a) 0 (b) $\frac{5}{6}$ (c) $\frac{6}{5}$ (d) none of these

ans:- $\left(\frac{5}{6}\right)^0 = 1$ (d) none of these

62) The value of $\left(\frac{2}{3}\right)^{-5}$ is (a) $\frac{32}{243}$ (b) $\frac{-243}{32}$ (c) $\frac{243}{32}$ (d) $\frac{-32}{243}$

ans:- $\left(\frac{2}{3}\right)^{-5} = \left(\frac{3}{2}\right)^5 = \frac{3^5}{2^5} = \frac{243}{32}$ (c)

63) By what number should $\frac{1}{5}$ be multiplied to get $\frac{1}{4}$?
 (a) $\frac{4}{5}$ (b) $-\frac{4}{5}$ (c) $\frac{5}{4}$ (d) none of these

ans:- $-\frac{5}{4} \times x = 1$
 $x = 1 \times \frac{4}{-5} = -\frac{4}{5}$ (b)

64) If $\left(\frac{5}{3}\right)^{-5} \times \left(\frac{5}{3}\right)^{11} = \left(\frac{5}{3}\right)^{8x}$, then the value of x is

(a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) $\frac{3}{4}$

ans:- $\left(\frac{5}{3}\right)^{-5+11} = \left(\frac{5}{3}\right)^{8x}$

$\therefore -5+11 = 8x$

$8x = 6$

$x = \frac{6}{8} = \frac{3}{4}$ (d)

65) The value of $\left(-\frac{1}{2}\right)^3$ is (a) $-\frac{3}{2}$ (b) $-\frac{1}{6}$ (c) $-\frac{1}{8}$ (d) none of these

ans:- $\left(-\frac{1}{2}\right)^3 = -\frac{1}{2} \times -\frac{1}{2} \times -\frac{1}{2} = -\frac{1}{8}$ (c)

66) The value of $\left(-\frac{2}{3}\right)^2$ is (a) $\frac{4}{3}$ (b) $-\frac{4}{9}$ (c) $-\frac{2}{9}$ (d) $\frac{4}{9}$

ans:- $\left(-\frac{2}{3}\right)^2 = -\frac{2}{3} \times -\frac{2}{3} = \frac{4}{9}$ (d)

67) The value of $\left[\left(\frac{4}{-3}\right)^{-3}\right]^2$ is (a) $\frac{3}{4}$ (b) $\frac{1024}{243}$ (c) $\frac{729}{4096}$ (d) $-\frac{3}{4}$

ans:- $\left(-\frac{4}{3}\right)^{-6} = \left(-\frac{3}{4}\right)^6 = \frac{3^6}{4^6} = \frac{729}{4096}$ (c)

68) The value of $(-\frac{1}{5})^3 \div (-\frac{1}{5})^8$ is

(a) $(-\frac{1}{5})^5$ (b) $(-5)^5$ (c) $(\frac{1}{5})^5$ (d) $(-\frac{1}{5})^{11}$

ans: $(-\frac{1}{5})^{3-8} = (-\frac{1}{5})^{-5} = (-5)^5$ (b)

69) The value of $[(\frac{1}{3})^{-3} - (\frac{1}{2})^{-3}] \div (\frac{1}{4})^{-3}$ is

(a) $\frac{19}{64}$ (b) $\frac{27}{16}$ (c) $\frac{64}{19}$ (d) none of these

ans: $(3^3 - 2^3) \div 4^3 = \frac{27-8}{64} = \frac{19}{64}$ (a)

70) The value of $[(\frac{1}{3})^2]^4$ is (a) $(\frac{1}{3})^6$ (b) $(\frac{1}{3})^{24}$ (c) $(\frac{1}{3})^{16}$ (d) $(\frac{1}{3})^8$

ans: $(\frac{1}{3})^{2 \times 4} = (\frac{1}{3})^8$ (d)

71) The value of $(-\frac{3}{2})^{-1}$ is (a) $\frac{2}{3}$ (b) $-\frac{2}{3}$ (c) $\frac{3}{2}$ (d) none of these

ans: $(-\frac{3}{2})^{-1} = -\frac{2}{3}$ (b)

72) The value of $(3^2 - 2^2) \times (\frac{2}{3})^{-3}$ is

(a) $\frac{45}{8}$ (b) $\frac{135}{8}$ (c) $\frac{8}{135}$ (d) $\frac{8}{45}$

ans: $(9-4) \times (\frac{3}{2})^3 = 5 \times \frac{3^3}{2^3} = \frac{5 \times 27}{8} = \frac{135}{8}$ (b)

73) If $(\frac{4}{9})^4 \times (\frac{4}{9})^{-7} = (\frac{4}{9})^{2x-1}$, then the value of x is

(a) -1 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) none of these

ans: $(\frac{4}{9})^{4-7} = (\frac{4}{9})^{2x-1}$

$\therefore -3 = 2x - 1$

$-3 + 1 = 2x$

$2x = -2 \Rightarrow x = -1$ (a)

74) If $5^{2x+1} \div 25 = 125$, then the value of x is
(a) 2 (b) $\frac{1}{2}$ (c) $-\frac{1}{2}$ (d) -2

ans:- $\frac{5^{2x+1}}{25} = 125$

$$\Rightarrow 5^{2x+1} = 125 \times 25$$

$$\Rightarrow 5^{2x+1} = 5^3 \times 5^2$$

$$\Rightarrow 5^{2x+1} = 5^5$$

$$\therefore 2x+1 = 5$$

$$2x = 4$$

$$x = 2 \text{ (a)}$$

75) The value of $(3^{-1} + 4^{-1})^{-1} \div 5^{-1}$ is

(a) $\frac{7}{10}$ (b) $\frac{7}{15}$ (c) $\frac{7}{5}$ (d) $\frac{60}{7}$

ans:- $\left(\frac{1}{3} + \frac{1}{4}\right)^{-1} \div \frac{1}{5} = \left(\frac{4+3}{12}\right)^{-1} \div \frac{1}{5}$

$$= \frac{12}{7} \times 5 = \frac{60}{7} \text{ (d)}$$

76) If $(2^{3x-1} + 10) \div 7 = 6$, then the value of x is
(a) 2 (b) 0 (c) 1 (d) -2

ans:- $\frac{2^{3x-1} + 10}{7} = 6$

$$\Rightarrow 2^{3x-1} + 10 = 42$$

$$\Rightarrow 2^{3x-1} = 42 - 10$$

$$\Rightarrow 2^{3x-1} = 32$$

$$\Rightarrow 2^{3x-1} = 2^5$$

$$\therefore 3x-1 = 5$$

$$3x = 5+1$$

$$3x = 6$$

$$x = 2 \text{ (a)}$$

77) If $\left(\frac{7}{12}\right)^{-4} \times \left(\frac{7}{12}\right)^{3x} = \left(\frac{7}{12}\right)^5$, then the value of x is

(a) -1 (b) 1 (c) 2 (d) 3

ans:- $\left(\frac{7}{12}\right)^{-4+3x} = \left(\frac{7}{12}\right)^5$

$$\therefore -4+3x = 5$$

$$3x = 5+4=9$$

$$x = \frac{9}{3} = 3 \quad (d)$$

78) The value of $\left(-\frac{2}{5}\right)^7 \div \left(-\frac{2}{5}\right)^5$ is

(a) $\left(-\frac{2}{5}\right)^{12}$ (b) $\frac{25}{4}$ (c) $-\frac{4}{25}$ (d) $\frac{4}{25}$

ans:- $\left(-\frac{2}{5}\right)^{7-5} = \left(-\frac{2}{5}\right)^2 = \frac{4}{25} \quad (d)$

79) The value of $\left(\frac{1}{2}\right)^{-2} + \left(\frac{2}{3}\right)^{-2} + \left(\frac{3}{4}\right)^{-2}$ is

(a) $\frac{289}{36}$ (b) $\frac{313}{72}$ (c) $\frac{27}{4}$ (d) $\frac{241}{36}$

ans:- $2^2 + \left(\frac{3}{2}\right)^2 + \left(\frac{4}{3}\right)^2$

$$= 4^{\frac{36}{9}} + \frac{9^{\frac{9}{3}}}{4^{\frac{9}{3}}} + \frac{16^{\frac{4}{4}}}{9^{\frac{4}{4}}} = \frac{144+81+64}{36} = \frac{289}{36} \quad (a)$$