IX Number Systems (Exponents of Real Numbers) MCQs

1) The value of $[2-3(2-3)^3]^3$ is
(a) 5 (b) 125 (c) 1/5 (d) −125

Solution:-

$(2-3(-1)^3)^3 = (2+3)^3 = 5^3 = 125$ (b)

2) The value of $x-y^{x-y}$ when $x=2, y=-2$ is
(a) 18 (b) −18 (c) 14 (d) −14

Solution:-

$$2-(-2)^{2-(-2)} = 2-(-2)^{2+2}$$
$$= 2-(-2)^4$$
$$= 2-16$$
$$= -14 \text{ (d)}$$

3) The product of the square root of x with the cube root of x is
(a) Cube root of the square root of x (b) Sixth root of the fifth power of x (c) fifth root of the sixth power of x (d) sixth root of x.

Solution:-

$$\sqrt{x} \times \sqrt[3]{x} = x^{\frac{1}{2}} \times x^{\frac{1}{3}} = x^{\frac{1\times3}{2\times3}+\frac{1\times2}{3\times2}}$$
$$= x^{\frac{3+2}{6}} = x^{\frac{5}{6}}$$
$$= \sqrt[6]{x^5}$$

i.e., sixth root of the fifth power of x (b)

4) The seventh root of x divided by the eighth root of x
(a) x (b) $\sqrt{x}$ (c) $\sqrt[56]{x}$ (d) $\frac{1}{\sqrt[56]{x}}$

Solution:- $\frac{\sqrt[7]{x}}{\sqrt[8]{x}} = \frac{x^{\frac{1}{7}}}{x^{\frac{1}{8}}} = x^{\frac{1\times8}{7\times8}-\frac{1\times7}{8\times7}} = x^{\frac{8-7}{56}}$

$= x^{\frac{1}{56}} = \sqrt[56]{x}$ (c)

5) The Square root of 64 divided by the cube root of 64 is
(a) 64 (b) 2 (c) 1/2 (d) $64^{2/3}$

Solution:-

$$\frac{\sqrt{64}}{\sqrt[3]{64}} = \frac{8}{4} = 2 \text{ (b)}$$

6) Which of the following is (are) not equal to $\left(\left(\frac{5}{6}\right)^{\frac{1}{5}}\right)^{-\frac{1}{6}}$?

(a) $\left(\frac{5}{6}\right)^{\frac{1}{5}-\frac{1}{6}}$ (b) $\frac{1}{\left(\left(\frac{5}{6}\right)^{\frac{1}{5}}\right)^{\frac{1}{6}}}$ (c) $\left(\frac{6}{5}\right)^{\frac{1}{30}}$ (d) $\left(\frac{5}{6}\right)^{-\frac{1}{30}}$

Solution:-

$$\left(\frac{5}{6}\right)^{\frac{1}{5}\times-\frac{1}{6}} = \left(\frac{5}{6}\right)^{-\frac{1}{30}} \neq \left(\frac{5}{6}\right)^{\frac{1}{5}-\frac{1}{6}} \text{ (a)}$$

7) When simplified $(x^{-1}+y^{-1})^{-1}$ is equal to

(a) xy (b) $x+y$ (c) $\frac{xy}{x+y}$ (d) $\frac{x+y}{xy}$

Solution:-

$$(x^{-1}+y^{-1})^{-1} = \left(\frac{1^{\times y}}{x_{\times y}} + \frac{1^{\times x}}{y_{\times x}}\right)^{-1} = \left(\frac{y+x}{xy}\right)^{-1} = \frac{xy}{x+y} \text{ (c)}$$

8) If $8^{x+1} = 64$, what is the value of 3^{2x+1}?

(a) 1 (b) 3 (c) 9 (d) 27

Solution:-

$$8^{x+1} = 64$$

$$\Rightarrow (2^3)^{x+1} = 64$$

$$\Rightarrow 2^{3x+3} = 64$$

$$\Rightarrow 2^{3x} \cdot 2^3 = 64$$

$$\Rightarrow 2^{3x} = \frac{64}{2^3} = \frac{64}{8} = 8$$

$$\Rightarrow 2^{3x} = 2^3$$

$$\therefore 3x = 3$$

$$x = 1 //$$

$$\therefore 3^{2x+1} = 3^{2+1} = 3^3 = 27$$

9) If $(2^3)^2 = 4^x$, then $3^x =$

(a) 3 (b) 6 (c) 9 (d) 27

Solution:-

$$(2^3)^2 = 4^x$$

$$\Rightarrow 2^6 = 2^{2x}$$

$$\therefore 6 = 2x$$

$$x = 3$$

$$\therefore 3^x = 3^3 = 27 \text{ (d)}$$

10) If $x^{-2} = 64$, then $x^{\frac{1}{3}} + x^0 =$

(a) 2 (b) 3 (c) 3/2 (d) 2/3

Solution:-

$$x^{-2} = 64$$

$$\Rightarrow \frac{1}{x^2} = 64$$

$$\Rightarrow \frac{1}{64} = x^2$$

$$\therefore x = \sqrt{\frac{1}{64}} = \frac{1}{8} = 2^{-3}$$

$$x^{\frac{1}{3}} + x^0 = 2^{-3\times\frac{1}{3}} + 1 = 2^{-1} + 1 = \frac{1}{2} + 1 = \frac{3}{2} \text{ (c)}$$

11) When simplified $\left(-\frac{1}{27}\right)^{-\frac{2}{3}}$ is

(a) 9 (b) −9 (c) $\frac{1}{9}$ (d) $-\frac{1}{9}$

Solution:-

$$(-27)^{\frac{2}{3}} = (-3)^{3\times\frac{2}{3}} = (-3)^2 = 9 \text{ (a)}$$

12) Which one of the following is not equal to $\left(\sqrt[3]{8}\right)^{-\frac{1}{2}}$?

(a) $\left(\sqrt[3]{2}\right)^{-\frac{1}{2}}$ (b) $8^{-\frac{1}{6}}$ (c) $\left(\frac{1}{\sqrt[3]{8}}\right)^{\frac{1}{2}}$ (d) $\frac{1}{\sqrt{2}}$

Solution:-

$$(8)^{-\frac{1}{2}\times\frac{1}{3}} = 8^{-\frac{1}{6}}$$

$$\left(\sqrt[3]{8}\right)^{-\frac{1}{2}} = \frac{1}{\left(\sqrt[3]{8}\right)^{\frac{1}{2}}}$$

$$\left(\sqrt[3]{8}\right)^{-\frac{1}{2}} = 8^{\frac{1}{3}\times-\frac{1}{2}} = 2^{3\times\frac{1}{3}\times-\frac{1}{2}} = 2^{-\frac{1}{2}} = \frac{1}{2^{\frac{1}{2}}} = \frac{1}{\sqrt{2}}$$

$$\neq \left(\sqrt[3]{2}\right)^{-\frac{1}{2}} \text{ (a)}$$

13) Which one of the following is not equal to $\left(\frac{100}{9}\right)^{-\frac{3}{2}}$?

(a) $\left(\frac{9}{100}\right)^{\frac{3}{2}}$ (b) $\frac{1}{\left(\frac{100}{9}\right)^{\frac{3}{2}}}$ (c) $\frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}$ (d) $\sqrt{\frac{100}{9}\times\frac{100}{9}\times\frac{100}{9}}$

Solution:-

$$\left(\frac{100}{9}\right)^{-\frac{3}{2}} = \left(\frac{9}{100}\right)^{\frac{3}{2}} = \sqrt{\frac{9}{100}\times\frac{9}{100}\times\frac{9}{100}} = \frac{3}{10}\times\frac{3}{10}\times\frac{3}{10}$$

$$\left(\frac{100}{9}\right)^{-\frac{3}{2}} = \frac{1}{\left(\frac{100}{9}\right)^{\frac{3}{2}}}$$

$$\neq \sqrt{\frac{100}{9}\times\frac{100}{9}\times\frac{100}{9}} \quad \text{(d)}$$

14) If a, b, c are positive real numbers, then

$\sqrt{a^{-1}b}\times\sqrt{b^{-1}c}\times\sqrt{c^{-1}a}$ is equal to

(a) 1 (b) abc (c) $\sqrt{abc}$ (d) $\frac{1}{abc}$

Solution:-

$$\sqrt{\frac{b}{a}}\times\sqrt{\frac{c}{b}}\times\sqrt{\frac{a}{c}} = \sqrt{\frac{b}{a}\times\frac{c}{b}\times\frac{a}{c}} = \sqrt{1} = 1 \quad \text{(a)}$$

15) If $\left(\frac{2}{3}\right)^{x}\times\left(\frac{3}{2}\right)^{2x} = \frac{81}{16}$, then x =

(a) 2 (b) 3 (c) 4 (d) 1

Solution:-

$$\left(\frac{3}{2}\right)^{-x}\times\left(\frac{3}{2}\right)^{2x} = \frac{3^4}{2^4}$$

$$\Rightarrow \left(\frac{3}{2}\right)^{-x+2x} = \left(\frac{3}{2}\right)^{4}$$

$$\therefore x = 4 \quad \text{(c)}$$

16) The value of $\left[8^{-\frac{4}{3}} \div 2^{-2}\right]^{\frac{1}{2}}$ is

(a) 1/2 (b) 2 (c) 1/4 (d) 4

Solution:-

$$\left[2^{3\times-\frac{4}{3}} \div \frac{1}{2^2}\right]^{\frac{1}{2}} = \left(2^{-4}\times 2^{2}\right)^{\frac{1}{2}}$$

$$= \left(\frac{2^2}{2^4}\right)^{\frac{1}{2}} = \frac{1}{2^{2\times\frac{1}{2}}} = \frac{1}{2} \quad \text{(a)}$$

17) If a, b, c are positive real numbers, then $\sqrt[5]{3125 a^{10} b^{5} c^{10}}$ is equal to

(a) $5a^2bc^2$ (b) $25ab^2c$ (c) $5a^3bc^3$ (d) $125\,a^2bc^2$

Solution:-

$$5^{5^1 \times \frac{1}{5_1}} \times a^{\frac{10^2}{5_1}} \times b^{\frac{5^1}{5_1}} \times c^{\frac{10^2}{5_1}}$$

$$= 5 \times a^2 \times b \times c^2$$

$$= 5a^2bc^2 \text{ (a)}$$

18) If a, m, n are positive integers, then $\left(\sqrt[m]{\sqrt[n]{a}}\right)^{mn}$ is equal to

(a) a^{mn} (b) a (c) $a^{m/n}$ (d) 1

Solution:-

$$a^{\cancel{mn}^1 \times \frac{1}{n_1} \times \frac{1}{m_1}} = a \text{ (b)}$$

19) If $x = 2$ and $y = 4$, then $\left(\frac{x}{y}\right)^{x-y} + \left(\frac{y}{x}\right)^{y-x} =$

(a) 4 (b) 8 (c) 12 (d) 2

Solution:-

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

$$= \left(\frac{1}{2}\right)^{-2} + (2)^2 = 2^2 + 2^2 = 4 + 4 = 8 \text{ (b)}$$

20) The value of m for which $\left\{\left[\left(\frac{1}{7^2}\right)^{-2}\right]^{-\frac{1}{3}}\right\}^{\frac{1}{4}} = 7^m$ is

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

Solution:-

$$\frac{1}{7^{\cancel{2}x\cancel{-2}^{-1} \times -\frac{1}{3} \times \frac{1}{\cancel{4}_1}}} = 7^m$$

$$\Rightarrow \frac{1}{7^{\frac{1}{3}}} = 7^m$$

$$\Rightarrow 7^{-\frac{1}{3}} = 7^m$$

$$\therefore m = -\frac{1}{3} \text{ (a)}$$

21) The value of $\left\{(23+2^2)^{\frac{2}{3}} + (140-19)^{\frac{1}{2}}\right\}^2$ is

(a) 196 (b) 289 (c) 324 (d) 400

Solution:-

$$\left((23+4)^{\frac{2}{3}} + (121)^{\frac{1}{2}}\right)^2$$

$$= \left((27)^{\frac{2}{3}} + 11^{2\times\frac{1}{2}}\right)^2$$

$$= \left(3^{3\times\frac{2}{3}} + 11^{2\times\frac{1}{2}}\right)^2$$

$$= (3^2+11)^2 = (9+11)^2 = 20^2 = \underline{\underline{400}}$$ (d)