



SHIKSHA CLASSES

Sub. : Maths

Answer Paper

Marks : 20

Std. : VIIIth - S.B.

3. Indices and Cube root

Q.1 : A) Select the most appropriate Alternative. 02

1) What is the value of x, if $4^x = 64$?

Ans : b) 3

2) What is the simplification of $(-1)^4 \times (-1)^{-4}$?

Ans : c) 1

: B) Solve the following. 01

1) Find the cube of 0.02.

Ans : The cube of 0.02

$$\begin{aligned} &= (0.02)^3 \\ &= 0.02 \times 0.02 \times 0.02 \\ &= 0.000008. \end{aligned}$$

Q.2 : A) Solve any one of the following. (Activity) 02

1) Using the law of indices, write proper numbers in the following boxes.

Ans : i) $3^5 \times 3^2 = 3^{\boxed{7}}$ ii) $(3^4)^5 = 3^{\boxed{20}}$
iii) $5^{-3} = \frac{1}{5^{\boxed{3}}}$ iv) $5^0 = \boxed{1}$

2) Find cube root of the following : 729.

Ans : $729 = 9 \times 9 \times \boxed{9}$
 $= 9^{\boxed{3}}$

Ans : $\sqrt[3]{729} = \sqrt[3]{9^{\boxed{3}}} = \boxed{9}$

: B) Solve any one of the following. 02

1) Write in the form 'nth root of a' in each of the following numbers :

i) $(512)^{\frac{1}{9}}$ ii) $100^{\frac{1}{19}}$

Ans : i) Ninth root of 512

ii) Nineteenth root of 100.

2) Express the following numbers in index form :

i) Square root of 256

ii) Cube root of 17.

Ans : i) $256^{\frac{1}{2}}$ ii) $17^{\frac{1}{9}}$

Q.3 : A) Solve any one of the following. (Activity) 03

1) Using the law of indices, write proper numbers in the following boxes.

Ans : i) $5^1 = \boxed{5}$ ii) $(5 \times 7)^2 = 5^{\boxed{2}} \times 7^{\boxed{2}}$
iii) $\left(\frac{5}{7}\right)^3 = \frac{5^{\boxed{3}}}{7^{\boxed{3}}}$ iv) $\left(\frac{5}{7}\right)^{-3} = \left(\frac{7}{5}\right)^{\boxed{3}}$

2) Complete the following table :

Ans :

Sr. No.	Number	Power of the root	Root of the power
1.	$(45)^{\frac{4}{5}}$	Fourth power of fifth root of 45	5th root of 4th power of 45
2.	$(81)^{\frac{6}{7}}$	Sixth power of 7th root of 81	7th root of 6th power of 81
3.	$(100)^{\frac{4}{10}}$	Fourth power of 10th root of 100	10th root of 4th power of 100

: **B) Solve any one of the following.** 03

1) Find the cube root of -1331.

Ans : To find the cube root of -1331,
let us factorise 1331 first.
 $1331 = 11 \times 11 \times 11 = 11^3$
 $-1331 = (-11)(-11)(-11)$
 $= (-11)^3$
 $= \sqrt[3]{-1331} = -11.$

2) Find $\sqrt[3]{0.125}$.

Ans : $\sqrt[3]{0.125} = \sqrt[3]{\frac{125}{1000}}$
 $= \frac{\sqrt[3]{125}}{\sqrt[3]{1000}} \dots \left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}$
 $= \frac{\sqrt[3]{5^3}}{\sqrt[3]{10^3}}$
 $= \frac{5}{10} = 0.5 \dots (a^m)^{\frac{1}{m}} = a.$

Q.4 : Solve any one of the following. 04

1) Find m so that

$$\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^{-6} = \left(\frac{2}{9}\right)^{2m-1}$$

Ans : We have

$$\left(\frac{2}{9}\right)^3 \times \left(\frac{2}{9}\right)^{-6} = \left(\frac{2}{9}\right)^{2m-1}$$

$$\therefore \left(\frac{2}{9}\right)^{3-6} = \left(\frac{2}{9}\right)^{2m-1} \quad [\because a^m \times a^n = a^{m+n}]$$

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

On comparing both sides

$$2m - 1 = -3$$

$$\therefore 2m = -2$$

$$\therefore m = \frac{-2}{2}$$

$$\therefore m = -1$$

This is required answer.

$$2) \text{ Simplify : } \left(\frac{1}{4}\right)^{-2} + \left(\frac{1}{2}\right)^{-2} + \left(\frac{1}{3}\right)^{-2}$$

Ans : We have

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

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

$$[\because \left(\frac{a}{b}\right)^{-m} = \left(\frac{b}{a}\right)^m]$$

$$= 4^2 + 2^2 + 3^2$$

$$= 16 + 4 + 9$$

$$= 29.$$

Q.5 : Solve any one of the following. 03

1) The volume of a cubical box is 343 cubic metres. Find the length of a side of the box.

Ans : Let the length of side = a metre

So, volume of cubical box = a^3

$$\therefore a^3 = 343$$

$$\therefore a = \sqrt[3]{343}$$

$$= \sqrt[3]{7 \times 7 \times 7}$$

$$\therefore a = 7 \text{ metre}$$

Hence the length of a side of the box is 7 metre.

$$2) \text{ Evaluate : } \frac{8^{-1} \times 5^3}{2^{-4}}$$

Ans : We have

$$\frac{8^{-1} \times 5^3}{2^{-4}} = \frac{(2^3)^{-1} \times 5^3}{2^{-4}}$$

$$= \frac{2^{-3} \times 5^3}{2^{-4}} \quad \left[\because (a^m)^n = a^{mn} \right]$$

$$= 2^{-3+4} \times 5^3 \quad \left[\because \frac{a^m}{a^n} = a^{m-n} \right]$$

$$= 2^1 \times 5^3$$

$$= 2 \times 5 \times 5 \times 5 = 250.$$

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