

Exponents (Level 2)**MCQ Test, Set 07**

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

- There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
- Each correct answer carries 1 mark. There is no negative marking.
- The key sheet and worked solutions are at the end of this test.

1. $\sqrt[3]{2} \times \sqrt[3]{4} =$

- A.** $\sqrt[3]{6}$ **B.** 2 **C.** $2^{\frac{1}{3}}$ **D.** 8

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

- A.** $\frac{1}{8}$ **B.** 8 **C.** -8 **D.** $-\frac{1}{8}$

3. $27^3 \times 81^{-2} =$

- A.** 3 **B.** 27 **C.** $\frac{1}{3}$ **D.** 3^{17}

4. $(256)^{\frac{3}{8}} \times (9)^{\frac{1}{2}} =$

- A.** 24 **B.** 11 **C.** $\frac{1}{24}$ **D.** 6

5. $\left(\frac{64}{27}\right)^{-\frac{2}{3}} =$

- A.** $\frac{3}{4}$ **B.** $\frac{9}{16}$ **C.** $\frac{16}{9}$ **D.** $-\frac{9}{16}$

6. $\left(\frac{1}{243}\right)^{-\frac{3}{5}} =$

- A.** 27 **B.** -27 **C.** $\frac{1}{27}$ **D.** 3

7. $\frac{6 \times 9^{\frac{1}{2}}}{8^{-\frac{1}{3}}} =$

- A.** 9 **B.** 4 **C.** 36 **D.** 72

8. $\left(\frac{10^4}{10^1}\right)^5 \times \left(\frac{10^1}{10^3}\right)^4 =$

- A.** 10^{-7} **B.** 10^{23} **C.** 1 **D.** 10^7

9. If $a = 7$, $b = -3$ and $c = -4$, then $a^3 + b^3 + c^3 =$

- A.** 84 **B.** 0 **C.** 252 **D.** -252

10. If $4^x = (2\sqrt[3]{2})^6$, then $x =$

- A.** $\frac{3}{2}$ **B.** 8 **C.** 3 **D.** 4

11. If $7^{5x} \div 7^{2x} = \sqrt{7^{18}}$, then $x =$

- A.** 6 **B.** $\frac{9}{7}$ **C.** 3 **D.** 9

12. If $3^{2x-2} \times 2^{x+1} = 72$, then $x =$

A. 3

B. 2

C. 1

D. $\frac{5}{2}$

13. If $2^x = 5$, then $2^{x+3} =$

A. $\frac{5}{8}$

B. 8

C. 15

D. 40

14. If $9^{3x} = \frac{1}{243}$, then $x =$

A. $-\frac{5}{6}$

B. $-\frac{6}{5}$

C. $-\frac{5}{3}$

D. $\frac{5}{6}$

15. If $5^{x+1} + 5^x = 750$, then $x =$

A. 4

B. 2

C. -3

D. 3

16. If $4^{2x-1} = 8^{x+1}$, then $2^{x-3} =$

A. $\frac{1}{4}$

B. 8

C. 2

D. 4

17. $\frac{1}{1+x^{m+n-p}} + \frac{1}{1+x^{p-m-n}} =$

A. 1

B. x^{m+n-p}

C. 2

D. 0

18. $\left(x^{a^2-ab+b^2}\right)^{a+b} \cdot \left(x^{a^2+ab+b^2}\right)^{a-b} =$

A. 1

B. x^{2a^3}

C. x^{2b^3}

D. x^{a^3}

19. If $10^x = 7$ and $7^y = 0.001$, then $xy =$

A. -3

B. 1

C. 0.001

D. 3

20. If $5^x = 2^y = 50^z$, then $\frac{1}{z} - \frac{2}{x} =$

A. $\frac{1}{y}$

B. $\frac{2}{y}$

C. y

D. 0

21. $(0.00032)^{\frac{1}{5}} =$

A. 2

B. 0.2

C. 0.002

D. 0.02

22. $\left(\frac{5}{\sqrt{3}}\right)^5 \div \left(\frac{5}{\sqrt{3}}\right)^7 =$

A. $\frac{25}{9}$

B. $\frac{9}{25}$

C. $\frac{3}{25}$

D. $\frac{25}{3}$

23. If $x = 4$, then $(x^{\frac{1}{2}} + x^{-\frac{1}{2}})(x + x^{-1} - 1) =$

A. $\frac{17}{4}$

B. $\frac{65}{8}$

C. 8

D. $\frac{63}{8}$

24. $(100)^{0.3} \times (100)^{0.2} =$

A. 50

B. $\frac{1}{10}$

C. 100

D. 10

25. $\left\{125^{\frac{2}{3}} \div 5^4\right\}^{-\frac{1}{2}} =$

A. $\frac{1}{5}$

B. $\frac{1}{25}$

C. 5

D. 25

Key sheet

1. B	2. C	3. A	4. A	5. B
6. A	7. C	8. D	9. C	10. D
11. C	12. B	13. D	14. A	15. D
16. D	17. A	18. B	19. A	20. A
21. B	22. C	23. B	24. D	25. C

Solutions

1. $\sqrt[3]{2} \times \sqrt[3]{4} =$
 $\sqrt[3]{2} \times \sqrt[3]{4} = 2^{\frac{1}{3}} \times (2^2)^{\frac{1}{3}}$
 $= 2^{\frac{1}{3} + \frac{2}{3}} = 2^1 = 2$

Ans: (B) 2

2. $(-\frac{1}{2})^{-3} =$
 $(-\frac{1}{2})^{-3} = (-2)^3$
 $= -8$ (3 is odd)

Ans: (C) -8

3. $27^3 \times 81^{-2} =$
 $= (3^3)^3 \times (3^4)^{-2}$
 $= 3^9 \times 3^{-8}$
 $= 3^{9-8} = 3^1$
 $= 3$

Ans: (A) 3

4. $(256)^{\frac{3}{8}} \times (9)^{\frac{1}{2}} =$
 $(2^8)^{\frac{3}{8}} \times (3^2)^{\frac{1}{2}}$
 $= 2^3 \times 3$
 $= 8 \times 3 = 24$

Ans: (A) 24

5. $(\frac{64}{27})^{-\frac{2}{3}} =$
 $(\frac{64}{27})^{-\frac{2}{3}} = \left[\left(\frac{4}{3}\right)^3\right]^{-\frac{2}{3}}$
 $= \left(\frac{4}{3}\right)^{-2} = \left(\frac{3}{4}\right)^2$
 $= \frac{9}{16}$

Ans: (B) $\frac{9}{16}$

6. $(\frac{1}{243})^{-\frac{3}{5}} =$
 $(\frac{1}{243})^{-\frac{3}{5}} = \left[\left(\frac{1}{3}\right)^5\right]^{-\frac{3}{5}}$
 $= \left(\frac{1}{3}\right)^{-3} = (3)^3$
 $= 27$

Ans: (A) 27

$$\begin{aligned}
 7. \frac{6 \times 9^{\frac{1}{2}}}{8^{-\frac{1}{3}}} &= \\
 &= \frac{(2 \times 3) \times (3^2)^{\frac{1}{2}}}{(2^3)^{-\frac{1}{3}}} \\
 &= 2^{1+1} \times 3^{1+1} \\
 &= 2^2 \times 3^2 \\
 &= 36
 \end{aligned}$$

Ans: (C) 36

$$\begin{aligned}
 8. \left(\frac{10^4}{10^1}\right)^5 \times \left(\frac{10^1}{10^3}\right)^4 &= \\
 \text{Powers: } (4-1)(5) + (1-3)(4) &= 15-8=7 \\
 \text{Value} &= 10^7
 \end{aligned}$$

Ans: (D) 10^7

$$\begin{aligned}
 9. \text{ If } a = 7, b = -3 \text{ and } c = -4, \text{ then } a^3 + b^3 + c^3 &= \\
 a + b + c &= 7 - 3 - 4 = 0 \\
 \text{So } a^3 + b^3 + c^3 &= 3abc = 3 \times 7 \times (-3) \times (-4) = 252
 \end{aligned}$$

Ans: (C) 252

$$\begin{aligned}
 10. \text{ If } 4^x &= (2\sqrt[3]{2})^6, \text{ then } x = \\
 2\sqrt[3]{2} &= 2^1 \times 2^{\frac{1}{3}} = 2^{\frac{4}{3}} \\
 (2^2)^x &= \left(2^{\frac{4}{3}}\right)^6 \\
 \Rightarrow 2^{2x} &= 2^8 \\
 \Rightarrow 2x &= 8 \Rightarrow x = 4
 \end{aligned}$$

Ans: (D) 4

$$\begin{aligned}
 11. \text{ If } 7^{5x} \div 7^{2x} &= \sqrt{7^{18}}, \text{ then } x = \\
 \frac{7^{5x}}{7^{2x}} &= 7^{\frac{18}{2}} \\
 \Rightarrow 7^{5x-2x} &= 7^9 \\
 \Rightarrow 3x &= 9 \Rightarrow x = 3
 \end{aligned}$$

Ans: (C) 3

$$\begin{aligned}
 12. \text{ If } 3^{2x-2} \times 2^{x+1} &= 72, \text{ then } x = \\
 72 &= 3^2 \times 2^3 \\
 \Rightarrow 3^{2x-2} \times 2^{x+1} &= 3^2 \times 2^3 \\
 \Rightarrow 2x-2 &= 2 \text{ and } x+1 = 3 \\
 \Rightarrow x &= 2 \text{ and } x = 2 \\
 \therefore x &= 2
 \end{aligned}$$

Ans: (B) 2

$$\begin{aligned}
 13. \text{ If } 2^x &= 5, \text{ then } 2^{x+3} = \\
 2^{x+3} &= 2^x \times 2^3 \\
 &= 5 \times 8 = 40
 \end{aligned}$$

Ans: (D) 40

14. If $9^{3x} = \frac{1}{243}$, then $x =$

$$\begin{aligned}(3^2)^{3x} &= \frac{1}{3^5} \\ \Rightarrow 3^{6x} &= 3^{-5} \\ \Rightarrow 6x &= -5 \\ \Rightarrow x &= -\frac{5}{6}\end{aligned}$$

Ans: (A) $-\frac{5}{6}$

15. If $5^{x+1} + 5^x = 750$, then $x =$

$$\begin{aligned}5 \times 5^x + 5^x &= 750 \\ \Rightarrow 5^x (5 + 1) &= 750 \\ \Rightarrow 5^x \times 6 &= 750 \\ \Rightarrow 5^x &= 750 \times \frac{1}{6} = 125 = 5^3 \\ \Rightarrow x &= 3\end{aligned}$$

Ans: (D) 3

16. If $4^{2x-1} = 8^{x+1}$, then $2^{x-3} =$

$$\begin{aligned}(2^2)^{2x-1} &= (2^3)^{x+1} \Rightarrow 2^{4x-2} = 2^{3x+3} \\ \Rightarrow 4x - 2 &= 3x + 3 \Rightarrow x = 5 \\ 2^{5-3} &= 2^2 = 4\end{aligned}$$

Ans: (D) 4

17. $\frac{1}{1+x^{m+n-p}} + \frac{1}{1+x^{p-m-n}} =$
 $= \frac{x^p}{x^p+x^{m+n}} + \frac{x^{m+n}}{x^{m+n}+x^p} = 1$

Ans: (A) 1

18. $\left(x^{a^2-ab+b^2}\right)^{a+b} \cdot \left(x^{a^2+ab+b^2}\right)^{a-b} =$
 $= x^{a^3+b^3} \cdot x^{a^3-b^3}$
 $= x^{a^3+b^3+a^3-b^3} = x^{2a^3}$

Ans: (B) x^{2a^3}

19. If $10^x = 7$ and $7^y = 0.001$, then $xy =$

$$\begin{aligned}0.001 &= 7^y = (10^x)^y = 10^{xy} \\ 10^{xy} &= 0.001 = 10^{-3} \\ \Rightarrow xy &= -3\end{aligned}$$

Ans: (A) -3

20. If $5^x = 2^y = 50^z$, then $\frac{1}{z} - \frac{2}{x} =$

Let each = k : $5 = k^{\frac{1}{x}}$, $2 = k^{\frac{1}{y}}$, $50 = k^{\frac{1}{z}}$
 $50 = 5^2 \times 2$, so $\frac{1}{z} = \frac{2}{x} + \frac{1}{y}$, so $\frac{1}{z} - \frac{2}{x} = \frac{1}{y}$

Ans: (A) $\frac{1}{y}$

21. $(0.00032)^{\frac{1}{5}} =$

$$0.00032 = \frac{32}{100000} = \left(\frac{2}{10}\right)^5 = (0.2)^5$$

$$(0.00032)^{\frac{1}{5}} = [(0.2)^5]^{\frac{1}{5}} = 0.2$$

Ans: (B) 0.2

22. $\left(\frac{5}{\sqrt{3}}\right)^5 \div \left(\frac{5}{\sqrt{3}}\right)^7 =$

$$\frac{a^m}{a^n} = \frac{1}{a^{n-m}}$$

$$\left(\frac{5}{\sqrt{3}}\right)^5 \div \left(\frac{5}{\sqrt{3}}\right)^7 = \frac{1}{\left(\frac{5}{\sqrt{3}}\right)^2}$$

$$= \frac{3}{25}$$

Ans: (C) $\frac{3}{25}$

23. If $x = 4$, then $(x^{\frac{1}{2}} + x^{-\frac{1}{2}})(x + x^{-1} - 1) =$

$$(a + b)(a^2 + b^2 - ab) = a^3 + b^3 \text{ with } a = x^{\frac{1}{2}}, b = x^{-\frac{1}{2}}$$

$$ab = x^{\frac{1}{2}} \cdot x^{-\frac{1}{2}} = x^0 = 1$$

$$\text{So the value} = (x^{\frac{1}{2}})^3 + (x^{-\frac{1}{2}})^3 = x^{\frac{3}{2}} + x^{-\frac{3}{2}}$$

$$= 4^{\frac{3}{2}} + 4^{-\frac{3}{2}} = \frac{65}{8}$$

Ans: (B) $\frac{65}{8}$

24. $(100)^{0.3} \times (100)^{0.2} =$

$$= (100)^{0.3+0.2} = (100)^{0.5}$$

$$0.5 = \frac{1}{2}$$

$$= (10^2)^{\frac{1}{2}} = 10$$

Ans: (D) 10

25. $\left\{125^{\frac{2}{3}} \div 5^4\right\}^{-\frac{1}{2}} =$

$$= \left\{\frac{(5^3)^{\frac{2}{3}}}{5^4}\right\}^{-\frac{1}{2}}$$

$$= \left\{\frac{5^2}{5^4}\right\}^{-\frac{1}{2}} = \{5^{-2}\}^{-\frac{1}{2}}$$

$$= 5^1 = 5$$

Ans: (C) 5
