

Exponents (Level 2)

MCQ Test, Set 05

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. If $x^{\frac{1}{3}} = 4$, then $x =$

A. 12

B. $4^{\frac{1}{3}}$

C. 64

D. $\frac{4}{3}$

2. $\sqrt[3]{76} \div \sqrt{7^2} =$

A. 1

B. 7

C. 343

D. 49

3. $36^3 \times 6^{-5} =$

A. 6

B. 6^{11} C. $\frac{1}{1296}$ D. $\frac{1}{6}$

4. $(343)^{\frac{2}{3}} \div (16)^{\frac{1}{4}} =$

A. $\frac{49}{2}$

B. 47

C. $\frac{7}{2}$ D. $\frac{2}{49}$

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

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

6. $(\sqrt[4]{16})^{-3} =$

A. 8

B. $-\frac{1}{8}$ C. $\frac{1}{2}$ D. $\frac{1}{8}$

7. $\frac{8^{\frac{1}{4}} \times 10^{\frac{1}{4}}}{5^{\frac{1}{4}}} =$

A. 1

B. 2

C. 4

D. $\frac{1}{2}$

8. $\left(\frac{x^a}{x^b}\right)^c \cdot \left(\frac{x^b}{x^c}\right)^a =$

A. x^{ab-bc}

B. 1

C. x^{ab+bc} D. x^{bc-ab}

9. If $a = -6$, $b = 2$ and $c = 4$, then $a^3 + b^3 + c^3 =$

A. 144

B. -48

C. -144

D. 0

10. If $5^{4x} \div 5^x = \sqrt[5]{5^{30}}$, then $x =$

A. 6

B. 2

C. 10

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

11. If $27^x = (3\sqrt{3})^8$, then $x =$

A. 12

B. $\frac{8}{3}$

C. 4

D. $\frac{4}{3}$

12. If $7^{2x-5} \times 3^{x-1} = 63$, then $x =$

A. $\frac{7}{2}$

B. 4

C. 3

D. 2

13. If $4^x = 6$, then $4^{x+1} =$

A. $\frac{3}{2}$

B. 24

C. 7

D. 6

14. If $\left(\sqrt{\frac{4}{5}}\right)^{x+1} = \frac{125}{64}$, then $x =$

A. 5

B. -4

C. -5

D. -7

15. If $2^{x+3} - 2^{x+1} = 48$, then $x =$

A. 2

B. 4

C. -3

D. 3

16. If $27^{x+1} = 9^{x+3}$, then $5^{x-1} =$

A. 25

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

C. 125

D. 5

17. $\frac{1}{1+x^{2a-b}} + \frac{1}{1+x^{b-2a}} =$

A. 0

B. 2

C. x^{2a-b}

D. 1

18. $(x^{p-q})^{p^2+pq+q^2} =$

A. $x^{p^2-q^2}$

B. $x^{p^3-q^3}$

C. $x^{(p-q)^3}$

D. $x^{p^3+q^3}$

19. If $4^x = 5$ and $5^y = 64$, then $xy =$

A. 64

B. -3

C. 3

D. 1

20. If $2^x = 5^y = 100^z$, then $z =$

A. $\frac{2xy}{x+y}$

B. $\frac{xy}{2(x+y)}$

C. $\frac{xy}{x+y}$

D. $\frac{x+y}{2xy}$

21. $\sqrt[3]{0.064} =$

A. 0.4

B. 4

C. 0.004

D. 0.04

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

A. $\frac{16}{49}$

B. $\frac{49}{16}$

C. $\frac{2401}{16}$

D. $\frac{16}{2401}$

23. If $x = 5^{\frac{1}{3}} + 5^{-\frac{1}{3}}$, then $x^3 - 3x =$

A. $\frac{24}{5}$

B. $\frac{26}{5}$

C. 5

D. 6

24. $(36)^{0.35} \times (36)^{0.15} =$

A. 18

B. $\frac{1}{6}$

C. 36

D. 6

25. $\left\{(6^{-2})^{-2}\right\}^{\frac{1}{4}} =$

A. 36

B. 1

C. 6

D. $\frac{1}{6}$

Key sheet

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

Solutions

1. If $x^{\frac{1}{3}} = 4$, then $x =$

$$a^m = b^n \Rightarrow a = b^{\frac{n}{m}}$$

$$x = 4^{\frac{1}{\frac{1}{3}}} = 4^3 = 64$$

Ans: (C) 64

2. $\sqrt[3]{7^6} \div \sqrt{7^2} =$

$$\sqrt[3]{7^6} = 7^2$$

$$\sqrt{7^2} = 7^1$$

$$7^2 \div 7 = 7$$

Ans: (B) 7

3. $36^3 \times 6^{-5} =$

$$= (6^2)^3 \times 6^{-5}$$

$$= 6^6 \times 6^{-5}$$

$$= 6^{6-5} = 6^1$$

$$= 6$$

Ans: (A) 6

4. $(343)^{\frac{2}{3}} \div (16)^{\frac{1}{4}} =$

$$(7^3)^{\frac{2}{3}} \div (2^4)^{\frac{1}{4}}$$

$$= 7^2 \div 2$$

$$= 49 \div 2 = \frac{49}{2}$$

Ans: (A) $\frac{49}{2}$

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

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

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

$$= \frac{16}{9}$$

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

6. $(\sqrt[4]{16})^{-3} =$

$$\sqrt[4]{16} = 2$$

$$(\sqrt[4]{16})^{-3} = 2^{-3}$$

$$= \frac{1}{8}$$

Ans: (D) $\frac{1}{8}$

$$\begin{aligned}
 7. \frac{8^{\frac{1}{4}} \times 10^{\frac{1}{4}}}{5^{\frac{1}{4}}} &= \\
 &= \frac{(2^3)^{\frac{1}{4}} \times (2 \times 5)^{\frac{1}{4}}}{5^{\frac{1}{4}}} \\
 &= 2^{\frac{3}{4} + \frac{1}{4}} \times 5^{\frac{1}{4} - \frac{1}{4}} \\
 &= 2^1 \times 5^0 \\
 &= 2
 \end{aligned}$$

Ans: (B) 2

$$\begin{aligned}
 8. \left(\frac{x^a}{x^b}\right)^c \cdot \left(\frac{x^b}{x^c}\right)^a &= \\
 &= x^{(a-b)c} \cdot x^{(b-c)a} = x^{ac-bc} \cdot x^{ab-ac} \\
 &= x^{ac-bc+ab-ac} = x^{ab-bc}
 \end{aligned}$$

Ans: (A) x^{ab-bc}

$$\begin{aligned}
 9. \text{ If } a = -6, b = 2 \text{ and } c = 4, \text{ then } a^3 + b^3 + c^3 &= \\
 a + b + c &= -6 + 2 + 4 = 0 \\
 \text{So } a^3 + b^3 + c^3 &= 3abc = 3 \times (-6) \times 2 \times 4 = -144
 \end{aligned}$$

Ans: (C) -144

$$\begin{aligned}
 10. \text{ If } 5^{4x} \div 5^x &= \sqrt[5]{5^{30}}, \text{ then } x = \\
 \frac{5^{4x}}{5^x} &= 5^{\frac{30}{5}} \\
 \Rightarrow 5^{4x-x} &= 5^6 \\
 \Rightarrow 3x &= 6 \Rightarrow x = 2
 \end{aligned}$$

Ans: (B) 2

$$\begin{aligned}
 11. \text{ If } 27^x &= (3\sqrt{3})^8, \text{ then } x = \\
 3\sqrt{3} &= 3^1 \times 3^{\frac{1}{2}} = 3^{\frac{3}{2}} \\
 (3^3)^x &= \left(3^{\frac{3}{2}}\right)^8 \\
 \Rightarrow 3^{3x} &= 3^{12} \\
 \Rightarrow 3x &= 12 \Rightarrow x = 4
 \end{aligned}$$

Ans: (C) 4

$$\begin{aligned}
 12. \text{ If } 7^{2x-5} \times 3^{x-1} &= 63, \text{ then } x = \\
 63 &= 7^1 \times 3^2 \\
 \Rightarrow 7^{2x-5} \times 3^{x-1} &= 7^1 \times 3^2 \\
 \Rightarrow 2x - 5 &= 1 \text{ and } x - 1 = 2 \\
 \Rightarrow x &= 3 \text{ and } x = 3 \\
 \therefore x &= 3
 \end{aligned}$$

Ans: (C) 3

$$\begin{aligned}
 13. \text{ If } 4^x &= 6, \text{ then } 4^{x+1} = \\
 4^{x+1} &= 4^x \times 4^1 \\
 &= 6 \times 4 = 24
 \end{aligned}$$

Ans: (B) 24

14. If $\left(\sqrt{\frac{4}{5}}\right)^{x+1} = \frac{125}{64}$, then $x =$

$$\left[\left(\frac{4}{5}\right)^{\frac{1}{2}}\right]^{x+1} = \left(\frac{5}{4}\right)^3$$

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

$$\Rightarrow \frac{x+1}{2} = -3$$

$$\Rightarrow x + 1 = -6$$

$$\Rightarrow x = -7$$

Ans: (D) -7

15. If $2^{x+3} - 2^{x+1} = 48$, then $x =$

$$8 \times 2^x - 2 \times 2^x = 48$$

$$\Rightarrow 2^x (8 - 2) = 48$$

$$\Rightarrow 2^x \times 6 = 48$$

$$\Rightarrow 2^x = 48 \times \frac{1}{6} = 8 = 2^3$$

$$\Rightarrow x = 3$$

Ans: (D) 3

16. If $27^{x+1} = 9^{x+3}$, then $5^{x-1} =$

$$(3^3)^{x+1} = (3^2)^{x+3} \Rightarrow 3^{3x+3} = 3^{2x+6}$$

$$\Rightarrow 3x + 3 = 2x + 6 \Rightarrow x = 3$$

$$5^{3-1} = 5^2 = 25$$

Ans: (A) 25

17. $\frac{1}{1+x^{2a-b}} + \frac{1}{1+x^{b-2a}} =$
 $= \frac{x^b}{x^b+x^{2a}} + \frac{x^{2a}}{x^{2a}+x^b} = 1$

Ans: (D) 1

18. $(x^{p-q})^{p^2+pq+q^2} =$
 $= x^{(p-q)(p^2+pq+q^2)}$
 $= x^{p^3+p^2q+pq^2-p^2q-pq^2-q^3} = x^{p^3-q^3}$

Ans: (B) $x^{p^3-q^3}$

19. If $4^x = 5$ and $5^y = 64$, then $xy =$

$$64 = 5^y = (4^x)^y = 4^{xy}$$

$$4^{xy} = 64 = 4^3$$

$$\Rightarrow xy = 3$$

Ans: (C) 3

20. If $2^x = 5^y = 100^z$, then $z =$

Let each = k : $2 = k^{\frac{1}{x}}$, $5 = k^{\frac{1}{y}}$, $100 = k^{\frac{1}{z}}$

$$100 = 2^2 \times 5^2, \text{ so } \frac{1}{z} = \frac{2}{x} + \frac{2}{y} = \frac{2(x+y)}{xy}, z = \frac{xy}{2(x+y)}$$

Ans: (B) $\frac{xy}{2(x+y)}$

21. $\sqrt[3]{0.064} =$

$$0.064 = \frac{64}{1000} = \left(\frac{4}{10}\right)^3 = (0.4)^3$$

$$\sqrt[3]{0.064} = (0.064)^{\frac{1}{3}} = [(0.4)^3]^{\frac{1}{3}} = 0.4$$

Ans: (A) 0.4

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

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

$$\left(\frac{\sqrt{7}}{2}\right)^3 \div \left(\frac{\sqrt{7}}{2}\right)^7 = \frac{1}{\left(\frac{\sqrt{7}}{2}\right)^4}$$

$$= \frac{16}{49}$$

Ans: (A) $\frac{16}{49}$

23. If $x = 5^{\frac{1}{3}} + 5^{-\frac{1}{3}}$, then $x^3 - 3x =$

$$(a+b)^3 = a^3 + b^3 + 3ab(a+b)$$

$$x^3 = 5 + \frac{1}{5} + 3 \cdot 5^{\frac{1}{3}} \cdot 5^{-\frac{1}{3}} \cdot x = \frac{26}{5} + 3x$$

$$x^3 - 3x = \frac{26}{5}$$

Ans: (B) $\frac{26}{5}$

24. $(36)^{0.35} \times (36)^{0.15} =$

$$= (36)^{0.35+0.15} = (36)^{0.5}$$

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

$$= (6^2)^{\frac{1}{2}} = 6$$

Ans: (D) 6

25. $\left\{(6^{-2})^{-2}\right\}^{\frac{1}{4}} =$

$$= 6^{(-2) \times (-2) \times \frac{1}{4}}$$

$$= 6^1$$

$$= 6$$

Ans: (C) 6
