EXPRESSWALA ACADEMY

Exponents (Level 2)

MCQ Test, Set 08

Time: 30 minutes | Maximum marks: 25

Name: _____ Class: _____ Date: _____

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

1. $\left(\sqrt[3]{7}\right)^{6} =$

A. 343 **B.** $\sqrt{7}$ **C.** 49 **D.** 7^{18}

2. If $a^3 = b^6$ $(a, b > 0)$, then $a =$

A. $b^{\frac{1}{2}}$ **B.** b^{18} **C.** b^3 **D.** b^2

3. $16^5 \times 32^{-3} =$

A. $\frac{1}{32}$ **B.** 32 **C.** 256 **D.** 2^{35}

4. $(1000)^{\frac{2}{3}} \div (8)^{\frac{4}{3}} =$

A. 5 **B.** $\frac{25}{4}$ **C.** 50 **D.** $\frac{4}{25}$

5. $\left(-\frac{1}{64}\right)^{-\frac{1}{3}} =$

A. $-\frac{1}{4}$ **B.** 4 **C.** -4 **D.** -64

6. $\left(\frac{121}{144}\right)^{-\frac{1}{2}} =$

A. $-\frac{12}{11}$ **B.** $\frac{144}{121}$ **C.** $\frac{11}{12}$ **D.** $\frac{12}{11}$

7. $\frac{4^{\frac{4}{3}} \times 25^{\frac{1}{3}}}{10^{\frac{2}{3}}} =$

A. $\frac{1}{4}$ **B.** 4 **C.** 8 **D.** 1

8. $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \cdot \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} =$

A. 1 **B.** $x^{\frac{1}{c}-\frac{1}{a}}$

C. $x^{\frac{1}{a}-\frac{1}{c}}$ **D.** $x^{\frac{1}{a}+\frac{1}{c}}$

9. If $p + q + r = 0$ and $pqr = -2$, then $p^3 + q^3 + r^3 =$

A. 6 **B.** -2 **C.** 0 **D.** -6

10. If $\frac{2^{5x} \times 8^2 \times 4}{2^{2x}} = 2^{14}$, then $x =$

A. 2 **B.** $\frac{6}{7}$ **C.** $\frac{22}{3}$ **D.** 6

11. If $16^x = (2\sqrt{2})^8$, then $x =$

A. 2 **B.** 3 **C.** 1 **D.** 12

12. If $5^{2x-5} \times 2^{x+2} = 160$, then $x =$

A. 5 **B.** -1 **C.** 4 **D.** 3

13. If $3^x = 324$, then $3^{x-4} =$

A. 4 **B.** 81 **C.** 320 **D.** 26244

14. If $\left(\sqrt{\frac{5}{7}}\right)^x = \frac{49}{25}$, then $x =$

A. -2 **B.** 4 **C.** 2 **D.** -4

15. If $2^{x+1} + 2^{x-1} = 40$, then $x =$

A. 4 **B.** 3 **C.** -4 **D.** 5

16. If $\sqrt{2^n} = 512$, then $3^{\frac{n}{9}} =$

A. 9 **B.** 81 **C.** 3 **D.** 27

17. $\frac{1}{1+5^{a-b}} + \frac{1}{1+5^{b-a}} =$

A. 5^{a-b} **B.** 5 **C.** 1 **D.** 0

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

A. x^{2b^3} **B.** 1 **C.** x^{-2b^3} **D.** x^{2a^3}

19. If $3^x = 2$, $2^y = 5$ and $5^z = 27$, then $xyz =$

A. 27 **B.** -3 **C.** 3 **D.** 1

20. If $3^x = 5^y = 225^z$, then $\frac{1}{z} =$

A. $\frac{2}{x+y}$ **B.** $\frac{4}{xy}$

C. $\frac{2}{x} + \frac{2}{y}$ **D.** $\frac{1}{x} + \frac{1}{y}$

21. $\sqrt[5]{100000^{-2}} =$

A. $\frac{1}{100}$ **B.** 100 **C.** -100 **D.** $\frac{1}{10}$

22. $\left(\frac{\sqrt{6}}{5}\right)^2 \div \left(\frac{\sqrt{6}}{5}\right)^4 =$

A. $\frac{25}{36}$ **B.** $\frac{25}{6}$ **C.** $\frac{6}{25}$ **D.** $\frac{36}{25}$

23. If $x = 10^{\frac{1}{3}} + 10^{\frac{2}{3}}$, then $x^3 - 30x =$

A. 11 **B.** 10 **C.** 100 **D.** 110

24. $(32)^{0.4} \times (32)^{0.2} =$

A. 16 **B.** 2 **C.** 8 **D.** 4

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

A. 4 **B.** $\frac{1}{8}$ **C.** 8 **D.** 32

Key sheet

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

Solutions

1. $\left(\sqrt[3]{7}\right)^6 =$

$\left(\sqrt[3]{7}\right)^6 = \left(7^{\frac{1}{3}}\right)^6 = 7^2 = 49$

Ans: (C) 49

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2. If $a^3 = b^6$ $(a, b > 0)$, then $a =$

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

$a = b^{\frac{6}{3}} = b^2$

Ans: (D) b^2

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3. $16^5 \times 32^{-3} =$

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

$= 2^{20} \times 2^{-15}$

$= 2^{20-15} = 2^5$

$= 32$

Ans: (B) 32

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4. $(1000)^{\frac{2}{3}} \div (8)^{\frac{4}{3}} =$

$(10^3)^{\frac{2}{3}} \div (2^3)^{\frac{4}{3}}$

$= 10^2 \div 2^4$

$= 100 \div 16 = \frac{25}{4}$

Ans: (B) $\frac{25}{4}$

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5. $\left(-\frac{1}{64}\right)^{-\frac{1}{3}} =$

$\left(-\frac{1}{64}\right)^{-\frac{1}{3}} = \left[\left(-\frac{1}{4}\right)^3\right]^{-\frac{1}{3}}$

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

$= -4$

Ans: (C) -4

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6. $\left(\frac{121}{144}\right)^{-\frac{1}{2}} =$

$\left(\frac{121}{144}\right)^{-\frac{1}{2}} = \left[\left(\frac{11}{12}\right)^2\right]^{-\frac{1}{2}}$

$= \left(\frac{11}{12}\right)^{-1} = \left(\frac{12}{11}\right)^1$

$= \frac{12}{11}$

Ans: (D) $\frac{12}{11}$

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7. $\frac{4^{\frac{4}{3}} \times 25^{\frac{1}{3}}}{10^{\frac{2}{3}}} =$

$= \frac{(2^2)^{\frac{4}{3}} \times (5^2)^{\frac{1}{3}}}{(2\times5)^{\frac{2}{3}}}$

$= 2^{\frac{8}{3}-\frac{2}{3}} \times 5^{\frac{2}{3}-\frac{2}{3}}$

$= 2^2 \times 5^0$

$= 4$

Ans: (B) 4

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8. $\left(\frac{x^a}{x^b}\right)^{\frac{1}{ab}} \cdot \left(\frac{x^b}{x^c}\right)^{\frac{1}{bc}} =$

$= x^{\frac{a-b}{ab}} \cdot x^{\frac{b-c}{bc}} = x^{\frac{1}{b}-\frac{1}{a}} \cdot x^{\frac{1}{c}-\frac{1}{b}}$

$= x^{\frac{1}{c}-\frac{1}{a}}$

Ans: (B) $x^{\frac{1}{c}-\frac{1}{a}}$

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9. If $p+q+r=0$ and $pqr=-2$, then $p^3+q^3+r^3 =$

$p+q+r=0 \Rightarrow p^3+q^3+r^3 = 3pqr$

$= 3 \times (-2) = -6$

Ans: (D) -6

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10. If $\frac{2^{5x} \times 8^2 \times 4}{2^{2x}} = 2^{14}$, then $x =$

$\frac{2^{5x}}{2^{2x}} \times (2^3)^2 \times 2^2 = 2^{14}$

$\Rightarrow 2^{3x} \times 2^6 \times 2^2 = 2^{14}$

$\Rightarrow 2^{3x+8} = 2^{14}$

$\Rightarrow 3x+8 = 14 \Rightarrow 3x = 6 \Rightarrow x = 2$

Ans: (A) 2

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11. If $16^x = (2\sqrt{2})^8$, then $x =$

$2\sqrt{2} = 2^1 \times 2^{\frac{1}{2}} = 2^{\frac{3}{2}}$

$(2^4)^x = \left(2^{\frac{3}{2}}\right)^8$

$\Rightarrow 2^{4x} = 2^{12}$

$\Rightarrow 4x = 12 \Rightarrow x = 3$

Ans: (B) 3

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12. If $5^{2x-5} \times 2^{x+2} = 160$, then $x =$

$160 = 5^1 \times 2^5$

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

$\Rightarrow 2x-5 = 1$ and $x+2 = 5$

$\Rightarrow x = 3$ and $x = 3$

$\therefore x = 3$

Ans: (D) 3

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13. If $3^x = 324$, then $3^{x-4} =$

$3^{x-4} = \frac{3^x}{3^4}$

$= \frac{324}{81} = 4$

Ans: (A) 4

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14. If $\left(\sqrt{\frac{5}{7}}\right)^x = \frac{49}{25}$, then $x =$

$\left[\left(\frac{5}{7}\right)^{\frac{1}{2}}\right]^x = \left(\frac{7}{5}\right)^2$

$\Rightarrow \left(\frac{5}{7}\right)^{\frac{x}{2}} = \left(\frac{5}{7}\right)^{-2}$

$\Rightarrow \frac{x}{2} = -2$

$\Rightarrow x = -4$

$\Rightarrow x = -4$

Ans: (D) -4

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15. If $2^{x+1} + 2^{x-1} = 40$, then $x =$

$2 \times 2^x + \frac{2^x}{2} = 40$

$\Rightarrow 2^x \left(2 + \frac{1}{2}\right) = 40$

$\Rightarrow 2^x \times \frac{5}{2} = 40$

$\Rightarrow 2^x = 40 \times \frac{2}{5} = 16 = 2^4$

$\Rightarrow x = 4$

Ans: (A) 4

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16. If $\sqrt{2^n} = 512$, then $3^{\frac{n}{9}} =$

$2^{\frac{n}{2}} = 512 = 2^9 \Rightarrow \frac{n}{2} = 9 \Rightarrow n = 18$

$3^{\frac{18}{9}} = 3^2 = 9$

Ans: (A) 9

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17. $\frac{1}{1+5^{a-b}} + \frac{1}{1+5^{b-a}} =$

$= \frac{5^b}{5^b+5^a} + \frac{5^a}{5^a+5^b} = 1$

Ans: (C) 1

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

$= x^{a^3+b^3} \div x^{a^3-b^3}$

$= x^{a^3+b^3-a^3+b^3} = x^{2b^3}$

Ans: (A) x^{2b^3}

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19. If $3^x = 2$, $2^y = 5$ and $5^z = 27$, then $xyz =$

$5 = 2^y = (3^x)^y = 3^{xy}$

$27 = 5^z = (3^{xy})^z = 3^{xyz}$

$3^{xyz} = 27 = 3^3$

$\Rightarrow xyz = 3$

Ans: (C) 3

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20. If $3^x = 5^y = 225^z$, then $\frac{1}{z} =$

Let each $= k$: $3 = k^{\frac{1}{x}}$, $5 = k^{\frac{1}{y}}$, $225 = k^{\frac{1}{z}}$

$225 = 3^2 \times 5^2$, so $\frac{1}{z} = \frac{2}{x} + \frac{2}{y}$

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

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21. $\sqrt[5]{100000^{-2}} =$

$\sqrt[n]{a^m} = a^{\frac{m}{n}}$

$\sqrt[5]{100000^{-2}} = 100000^{-\frac{2}{5}} = (10^5)^{-\frac{2}{5}}$

$= 10^{-2} = \frac{1}{10^2} = \frac{1}{100}$

Ans: (A) $\frac{1}{100}$

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22. $\left(\frac{\sqrt{6}}{5}\right)^2 \div \left(\frac{\sqrt{6}}{5}\right)^4 =$

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

$\left(\frac{\sqrt{6}}{5}\right)^2 \div \left(\frac{\sqrt{6}}{5}\right)^4 = \frac{1}{\left(\frac{\sqrt{6}}{5}\right)^2}$

$= \frac{25}{6}$

Ans: (B) $\frac{25}{6}$

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23. If $x = 10^{\frac{1}{3}} + 10^{\frac{2}{3}}$, then $x^3 - 30x =$

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

$x^3 = 10 + 10^2 + 3 \cdot 10^{\frac{1}{3}} \cdot 10^{\frac{2}{3}} \cdot x = 110 + 30x$

$x^3 - 30x = 110$

Ans: (D) 110

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24. $(32)^{0.4} \times (32)^{0.2} =$

$= (32)^{0.4+0.2} = (32)^{0.6}$

$0.6 = \frac{3}{5}$

$= (2^5)^{\frac{3}{5}} = 8$

Ans: (C) 8

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

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

$= 2^3$

$= 8$

Ans: (C) 8