

Q1: Choose the correct answer :-

- 1 Which of the following equals  $3 \times 3 \times 3 \times 3 \times 3 \times 3 \times 3$  ?  
 (a)  $3 \times 7$       (b)  $7^3$       (c)  $3^7$       (d)  $3 + 7$
- 2 Which of the following equals  $(-9)^2$  ?  
 (a)  $-81$       (b)  $-18$       (c)  $18$       (d)  $81$
- 3 If  $7^n \times a^m = a \times 7 \times a \times a \times 7$ , what is the value of  $n + m$  ?  
 (a)  $3$       (b)  $2$       (c)  $6$       (d)  $5$
- 4 Which of the following equals  $(-2)^3$  ?  
 (a)  $-6$       (b)  $-8$       (c)  $6$       (d)  $8$
- 5 Which of the following equals  $2^{-4}$  ?  
 (a)  $-16$       (b)  $16$       (c)  $\frac{1}{8}$       (d)  $\frac{1}{16}$
- 6 Which of the following is the multiplicative inverse of the number  $(-1)$  ?  
 (a)  $(-1)^3$       (b)  $(-1)^2$       (c)  $1^3$       (d)  $1^2$
- 7 Which of the following is the additive inverse of the number  $4^{-3}$  ?  
 (a)  $(-4)^3$       (b)  $(-4)^{-3}$       (c)  $4^3$       (d)  $4^{-3}$
- 8  $5a^0 - (5a)^0 = \text{-----}$   
 (a)  $0$       (b)  $4$       (c)  $5$       (d)  $10$
- 9 If  $2^{-5} \times a = 1$ , what is the value of  $a$  ?  
 (a)  $2^5$       (b)  $2^{-5}$       (c)  $5^2$       (d)  $5^{-2}$
- 10 Which of the following is one quarter of the number  $2^{20}$  ?  
 (a)  $2^5$       (b)  $2^{10}$       (c)  $2^{19}$       (d)  $2^{18}$

- 11 Which of the following equals a third of the number  $3^x$  ?
- (a)  $1^x$       (b)  $3^{x+1}$       (c)  $3^{x-1}$       (d)  $(\frac{1}{3})^x$
- 12 Which of the following numbers is written in scientific notation ?
- (a)  $1.5 \times 10^{4.5}$       (b)  $15 \times 10^5$       (c)  $31.5 \times 10^5$       (d)  $3.15 \times 10^5$
- 13 Which of the following expresses the number 8 million in scientific notation?
- (a)  $8 \times 10^7$       (b)  $8 \times 10^6$       (c)  $8 \times 10^{-6}$       (d)  $8 \times 10^8$
- 14 If  $6.3 \times 10^n = 0.00063$  , what is the value of n ?
- (a) -4      (b) -3      (c) 4      (d) 3
- 15 If the number  $y \times 10^{-9}$  is written in scientific notation , what could be the value of y?
- (a) 0.6      (b) 6      (c) 60      (d) 600
- 16 If  $39 \times 10^{-8} = k \times 10^{-7}$  , what is the value of k ?
- (a) 39      (b) 3.9      (c) 0.39      (d) 0.039
- 17 Which of the following is the largest ?
- (a)  $6.3 \times 10^5$       (b)  $9.8 \times 10^4$       (c)  $5.2 \times 10^5$       (d)  $7.3 \times 10^4$
- 18 If the speed of light is equal to 300,000 km/s , what is the speed of light in m/s?
- (a)  $3 \times 10^5$       (b)  $3 \times 10^7$       (c)  $3 \times 10^8$       (d)  $3 \times 10^{10}$
- 19 Which of the following numbers is not in scientific notation ?
- (a)  $1.5 \times 10^5$       (b)  $15 \times 10^5$       (c)  $3.15 \times 10^5$       (d)  $9.85 \times 10^5$

- 20 What is the value of  $\sqrt{(-5)^2}$  ?
- (a) -5      (b) 5      (c) 25      (d) ±5
- 21 Which of the following equals  $\sqrt{16x^2}$  ?
- (a)  $4x^2$       (b)  $4x$       (c)  $4|x|$       (d)  $-4x$
- 22 What is the multiplicative inverse of the number  $\sqrt{\frac{9}{25}}$  ?
- (a)  $-\frac{3}{5}$       (b)  $\frac{3}{5}$       (c)  $-\frac{5}{3}$       (d)  $\frac{5}{3}$
- 23 If a and b are the square roots of the number c , what is a + b equal to ?
- (a) 2 a      (b) 2 b      (c) 0      (d) 1
- 24  $\sqrt{4+\dots\dots\dots} = 4$
- (a) 0      (b) 16      (c) 4      (d) 12
- 25 If  $X = \sqrt{\frac{1}{9}}$ , what is the value of  $X^3$  ?
- (a)  $\frac{1}{9}$       (b)  $\frac{1}{27}$       (c)  $\frac{1}{3}$       (d)  $\frac{1}{81}$
- 26 If  $a = -\frac{1}{2}$  and  $b = -\frac{9}{8}$ , then  $\sqrt{ab} = \dots\dots\dots$
- (a)  $\frac{9}{8}$       (b)  $\frac{3}{4}$       (c)  $\frac{9}{16}$       (d)  $-\frac{3}{4}$
- 27 What is the value of  $\sqrt[3]{0.008}$  in simplest form ?
- (a) 0.0002      (b)  $\frac{1}{2}$       (c)  $\frac{1}{5}$       (d)  $\frac{8}{10}$
- 28 If  $x^3 = -27$ , What is the value of X ?
- (a) 0.0002      (b) ±3      (c) -3      (d) -9
- 29  $\sqrt[3]{64-\dots\dots\dots} = 3$
- (a) 27      (b) 27      (c) 37      (d) 4



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- 30  $|\sqrt[3]{-125}| = \sqrt{\dots\dots\dots}$
- (a) 5                      (b) -5                      (c) 25                      (d) -25
- 31 If  $\sqrt{x} = 27$  What is the value of  $\sqrt[3]{x}$  ?
- (a) 9                      (b) 3                      (c) 81                      (d) 27
- 32 If  $\sqrt[3]{b} = -8$  What is the value of b ?
- (a) -2                      (b) 2                      (c) 64                      (d) -512
- 33 What is the value of  $\sqrt[3]{\sqrt{64}}$  ?
- (a) 4                      (b) 2                      (c) 8                      (d) 64
- 34 What is the inequality that expresses that the temperature  $X$  is less than  $40^\circ$  .
- (a)  $X < 40^\circ$                       (b)  $X > 40^\circ$                       (c)  $X \leq 40^\circ$                       (d)  $X \geq 40^\circ$
- 35 Which of the following inequalities has  $X = -7$  as one of its solutions in Z ?
- (a)  $X < -7$                       (b)  $X > -7$                       (c)  $X > -6$                       (d)  $-X \geq -7$
- 36 What is the inequality that expresses that the twice the number  $X$  is less than 5 .
- (a)  $X - 2 < 5$                       (b)  $X + 2 > 5$                       (c)  $2X < 5$                       (d)  $2X > 5$
- 37 If  $X - 1 > 4$  ,then which of the following can be the value of  $X$  ?
- (a) 3                      (b) 4                      (c) 5                      (d) 7
- 38 If  $A > B$  and  $C < 0$  ,then  $A \times C \dots\dots\dots B \times C$
- (a)  $>$                       (b)  $<$                       (c)  $\geq$                       (d)  $\leq$
- 39  $(2X)(3X) = \dots\dots\dots$
- (a)  $5X$                       (b)  $6X$                       (c)  $5X^2$                       (d)  $6X^2$

- 40  $2(X + 3) = \dots\dots\dots$   
 (a)  $2X^2 + 6X$     (b)  $2X + 6$     (c)  $2X + 3$     (d)  $X + 6$
- 41  $X(X - 1) + X = \dots\dots\dots$   
 (a)  $X(2X - 1)$     (b)  $X^2$     (c)  $2X^2$     (d)  $X^2 - X$
- 42 If the edge length of a cube is  $2b$ , then its volume =  $\dots\dots\dots$   
 (a)  $4b^2$     (b)  $2b^3$     (c)  $4b^3$     (d)  $8b^3$
- 43  $(3a^4b)(5a^2b^2)(2a^3) = \dots\dots\dots$   
 (a)  $60a^{11}b^3$     (b)  $30a^{10}b^2$     (c)  $15a^{10}b^3$     (d)  $30a^9b^3$
- 44 If  $a + 3b = 7$ ,  $c = 3$ , then the value of the expression:  $a + 3(b + c) = \dots\dots\dots$   
 (a) 10    (b) 13    (c) 15    (d) 16

Q2: Complete the following :-

- 1 Half of the number  $2^{10}$  is  $\overset{9}{2}$  -----
- 2 Double the number  $2^{10}$  is  $\overset{11}{2}$  -----
- 3  $2^{10} \times 2^{-10} = 3$   $\overset{6}{\square}$
- 4 If  $X = y$ , then  $(-3)^{X-y} = \overset{1}{1}$  -----
- 5 The multiplicative inverse of the number  $5^{-1}$  is  $\overset{5}{5}$  -----
- 6 If  $(\frac{3}{4})^7 = X \times (\frac{3}{4})^5$ , then  $X = \overset{2}{(\frac{3}{4})^2}$  -----
- 7  $\sqrt{\frac{16}{9}} \times \frac{3}{4} = \overset{1}{1}$  -----
- 8 The multiplicative inverse of the number  $\sqrt{\frac{4}{25}}$  in its simplest form is  $\overset{2}{\frac{5}{2}}$  -----



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9 The additive inverse of the number  $\sqrt{36x^4}$  is  $-6x^2$

10  $\sqrt{3+46} = 7$

11  $\sqrt{3 \times 27} = 9$

12  $\sqrt[3]{8} + \sqrt[3]{-8} = 0$

13 If a cube has volume of 125 cubic c, then its edge length = 5 cm

14  $\sqrt{x^{12}} = \sqrt[3]{x^{18}}$

15  $\sqrt[3]{64+61} = 5$

16  $\sqrt[3]{-27x^6} = -3x^2$

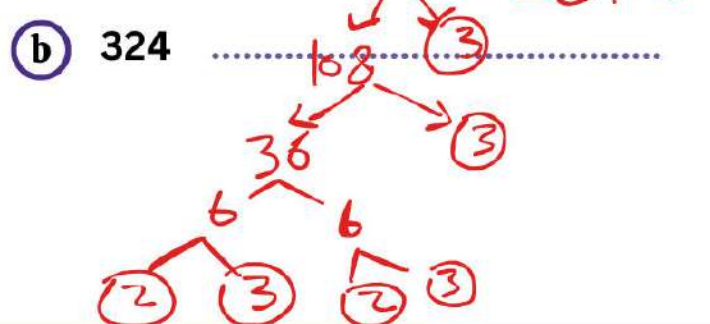
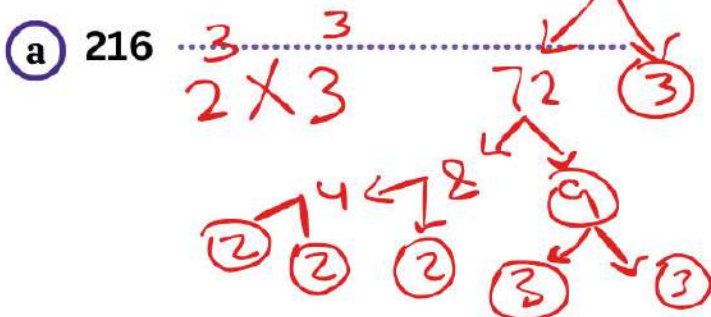
Q3: Answer the following :-

1 Write each of the following using exponents :-

a  $(-3) \times (-3) \times (-3) \times (-3)$   
 $(-3)^4 = 3^4$

b  $7 \times 5 \times 7 \times 7 \times 7$   
 $7^3 \times 5^2$

2 Write each of the following in exponential form such that the base is a prime number :-



- 3 If  $x = -3$ , and  $y = 4$ , then find the numerical value of each of the following :-  $x^2 + y^2$

$$(-3)^2 + (4)^2 = 9 + 16 = 25$$

- 4 Find the missing exponent in each of the following :-

a  $a^{\boxed{2}} \times a^7 = a^9$

b  $q^{-3} \times q^{\boxed{3}} = 1$

- 5 Write each of the following in scientific notation :-

a 192 000 000

$$1.92 \times 10^8$$

b - 0.000721

$$-7.21 \times 10^{-4}$$

c  $571 \times 10^{-9}$

$$5.71 \times 10^{-7}$$

- 6 Arrange each of the following :-

a  $73 \times 10^{11}$ ,  $6.9 \times 10^{12}$ ,  $0.537 \times 10^{13}$  Ascendingly

$$0.537 \times 10^3, 6.9 \times 10^{12}, 73 \times 10^{11}$$

b 4 300 000,  $3.4 \times 10^6$ ,  $0.37 \times 10^7$  Descendingly

$$4.3 \times 10^6, 0.37 \times 10^7, 3.4 \times 10^6$$

7 Write the result of each of the following in scientific notation :-

a  $(2.1 \times 10^4) + (4.1 \times 10^5)$

$$2.1 \times 10^4 + 41 \times 10^4 = (2.1 + 41) \times 10^4 = 43.1 \times 10^4$$

b  $(3.21 \times 10^{13}) - (8.1 \times 10^{12})$

$$32.1 \times 10^{12} - 8.1 \times 10^{12} = 24 \times 10^{12} = 2.4 \times 10^{13}$$

8 Write the result of each of the following in scientific notation :-

a  $(2.5 \times 10^6) \times (6 \times 10^{12})$

$$(2.5 \times 6) \times (10^6 \times 10^{12}) = 15 \times 10^{18} = 1.5 \times 10^{19}$$

b  $(5 \times 10^4) \div (2.5 \times 10^{-3})$

$$\frac{5}{2.5} \times \frac{10^4}{10^{-3}} = 2 \times 10^7$$

9 Write each of the following in standard form :-

a  $-1.2 \times 10^{-4}$

$$-0.00012$$

b  $5.34 \times 10^6$

$$5,340,000$$

10 Write the following in the simplest form :-

a  $\left(\frac{3}{2}\right)^2 + \sqrt[3]{\frac{125}{64}} + \sqrt{\frac{25}{4}}$

$$\frac{9}{4} + \frac{5}{4} + \frac{5}{2} = \frac{24}{4} = 6$$

b  $\sqrt{\frac{49}{4}} \times \left(\frac{2}{7}\right)^0 \times \left(-\frac{2}{7}\right)^2$

$$\frac{7}{2} \times 1 \times \frac{4}{49} = \frac{2}{7}$$

11 Find each of the following in its simplest form :-

a  $(-\frac{2}{5})^2 \times (-\frac{5}{2})^3 \times (\frac{1}{5})^0$

$\frac{4}{25} \times \frac{-125}{8} \times 1 = -\frac{5}{2}$

b  $(-1)^{50} + (-1)^{99}$

$1 + (-1) = 0$

12 Find the value of each of the following :-

a  $\frac{(-4)^2 \times 4^8}{(-4) \times (-4)^6}$

$\frac{(-4)^2 \times (-4)^8}{(-4) \times (-4)^6} = (-4)^{10-7} = (-4)^3 = -64$

b  $\frac{(-3)^6}{(-3)^3} + \frac{(-4)^5}{(-4)^3}$

$(-3)^3 + (-4)^2 = -27 + 16 = -11$

13 Find the value of each of the following :-

a  $-\sqrt{\frac{64}{25}}$

$-\frac{8}{5}$

b  $\sqrt{36 + 64}$

10

c  $\sqrt{4} - \sqrt[3]{-8}$

$2 - (-2) = 4$

14 A cube has a volume of 3,375 cubic cm . Find its total surface area and its lateral area .

edge length =  $\sqrt[3]{3,375} = 15 \text{ cm}$

T.A =  $6s^2 = 6 \times 15^2 = 1,350 \text{ cm}^2$

L.A =  $4s^2 = 900 \text{ cm}^2$

- 15 The total surface area of a cube is 294 sq cm . Find the length of its edge .

$$T.A = 6s^2$$

$$s = \sqrt{\frac{T.A}{6}} = \sqrt{\frac{294}{6}} = 7 \text{ cm}$$

- 16 Find the solution set of each of the following equations in Z :-

a  $6x^2 - 2 = 4x^2 + 6$

$$2x^2 = 8 \quad x^2 = 4$$

$$x = \pm\sqrt{4} = \pm 2$$

b  $3x^3 - 4 = 2x^3 + 4$

$$x^3 = 8$$

$$x = \sqrt[3]{8} = 2$$

- 17 Find the S.S for the each of the following in N :-

a  $2x - 3 < 7$

$$2x < 10 \quad x < 5$$

$$S.S = \{4, 3, 2, 1, 0\}$$

b  $2\frac{1}{2}x + 4 \geq -2$

$$2\frac{1}{2}x \geq -6 \quad \frac{2}{5}x \geq -6 \quad x \geq -\frac{12}{5}$$

$$S.S = \{0, 1, 2, 3, \dots\}$$

- 18 Express each of the following with an inequality :-

- a The maximum speed of your car is 80 km/h.

$$x \leq 80$$

- b You must purchase at least 200 L.E to get the discount.

$$x \geq 200$$

19 Find the S.S for the each of the following in Z :-

a)  $3(x+2) \geq -2(x+1)$

$3x + 6 \geq -2x - 2$  S.S =  $\{-1, 0, 1, 2, \dots\}$   
 $5x \geq -8$   $x \geq -\frac{8}{5}$

b)  $2x - 3 < 7$

$2x < 10$   
 $x < 5$  S.S =  $\{4, 3, 2, 1, 0, -1, \dots\}$

20 Find the S.S for the each of the following in Q :-

a)  $x - 2 \leq 3x + 7$

$-9 \leq 2x$  S.S =  $\{x : x \in \mathbb{Q}, x \geq -\frac{9}{2}\}$   
 $x \geq -\frac{9}{2}$

b)  $2 - 3(x - 5) \geq x + 7$

$2 - 3x + 15 \geq x + 7$   
 $-4x \geq -10$  S.S =  $\{x : x \in \mathbb{Q}, x \leq \frac{5}{2}\}$   
 $x \leq \frac{5}{2}$

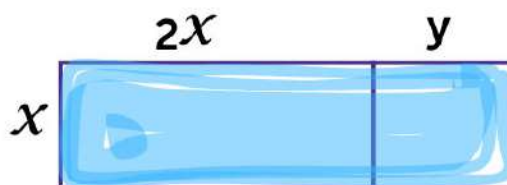
21 The sides length of a tringle are 6 cm, 8 cm and  $(2x - 4)$  cm, What are the possible integer values of  $x$ ?

$(8-6) < 2x-4 < (8+6)$  The values are  
 $2 < 2x-4 < 14$  4, 5, 6, 7, 8  
 $6 < 2x < 18$   
 $3 < x < 9$

22 Simplify to the simplest form :  $2a(3a - 1) + 3a(a + 2)$ , then find the value when  $a = 2$

$= 6a^2 - 2a + 3a^2 + 6a = 9a^2 + 4a$   
 at  $a = 2$  the value =  $9 \times 4 + 4 \times 2 = 44$

- 23 Find the expression that represents the area of the following in the simplest form :



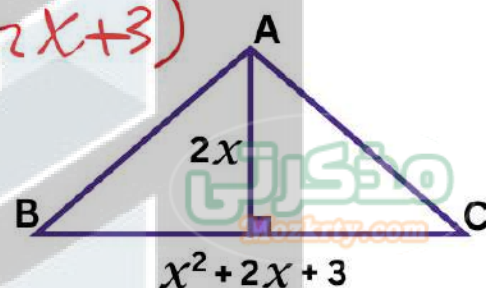
$$A = x \times (2x + y) = 2x^2 + xy$$

- 24 Find the area of the opposite triangle ABC in terms of  $x$  then calculate the value of its area when  $x = 3$

$$A = \frac{1}{2} \times B \times H = \frac{1}{2} \times 2x \times (x^2 + 2x + 3)$$

$$= x^3 + 2x^2 + 3x$$

$$9 + x = 3 \quad A = 27 + 18 + 9 = 54$$



- 25 Simplify each of the following :-

(a)  $2x(x^2 - 2x - 3) - x^2(3x - 5)$

$$\cancel{2x^3} - \cancel{4x^2} - 6x - \cancel{3x^3} + 5x^2 = -x^3 + x^2 - 6x$$

(b)  $3a(4a - 1) + 2a(a + 3) - 5a(2a - 1)$

$$12a^2 - 3a + 2a^2 + 6a - 10a^2 + 5a = 4a^2 + 8a$$

(c)  $8x^2(2x^3 - 3x^2 - x + 4)$

$$16x^5 - 24x^4 - 8x^3 + 32x^2$$