QUESTIONS

1. What is the value of $(1^\circ \times 2^\circ) \times 5^2$?

(a) 25 (b) 0 (c) –25 (d) 1

2. Which of the following values are equal?

(i) 1^3 (ii) 4^0

(iii) 0^4 (iv) 3^1

(a) (i) and (ii) (b) (ii) and (iii) (c) (i) and (iii) (d) (i) and (iv)

3. What is the sum of the powers of the prime factors in 72×192?

(a) 5 (b) 7 (c) 8 (d) 12

4. Express $(-3)^4 \div n^4$ in the form $\left(\frac{a}{b}\right)^n$.

(a) $\frac{-24}{n^3}$ (b) $\left(-\frac{3}{n}\right)^4$ (c) $\frac{(-2)^4}{n^4}$ (d) $\left(\frac{-3}{n}\right) \times \left(\frac{-3}{n}\right)$

5. Express $\underline{a \times a \times a} \times \underline{c \times c \times c \times c} \times b \times b$ in exponential form.

(a) $a^3c^3b^3$ (b) a^3c^3b (c) $a^3c^3b^2$ (d) $a^3c^4b^2$

6. Which of the following statements is correct?

(a) $(2^3)^2$ and $(3^2)^4$ are not the same

(b) $(2^3)^2$ and $(3^4)^2$ are the same

(c) $(6^{49})^2 = 6^{492}$

(d) $(8^7)^3 = 8^{10}$

7. What is the value of $2^4 \times 5^3$

(a) 2453 (b) 2000 (c) 11200 (d) 10000000

8. What is the result of $\frac{2^1 \times 3^2 \times 3^3}{1^2 \times 4^2}$?

(a) $\frac{243}{8}$ (b) 42 (c) $\frac{46}{16}$ (d) 48

9. Express ———— as a product of prime factors in a exponential form.

(a) $\frac{2^6 \times 3^4}{27}$ (b) $\frac{2^5 \times 3^3}{5}$ (c) $\frac{2^5 \times 3^3}{5^3}$ (d) $\frac{2^6 \times 3^2}{5^2}$

10. The value $\frac{\left(-\frac{1}{2}\right)^5}{\left(-\frac{1}{2}\right)} \div \frac{\left(-\frac{1}{8}\right)}{\left(-\frac{1}{4}\right)}$ is

(a) 1 (b) 2 (c) 3 (d) –1

11. The value of $\left(\frac{8}{125}\right)^{\frac{-4}{3}}$

(a) $\frac{625}{16}$ (b) $\frac{125}{16}$ (c) $\frac{16}{25}$ (d) $\frac{-625}{16}$

12. Cube of $\left(-\frac{1}{9}\right)$ is.....

(a) $\left(\frac{-1}{729}\right)$ (b) $\frac{1}{963}$ (c) $\frac{1}{850}$ (d) $\left(\frac{1}{729}\right)$

13. If $3^x = 300$, then the value of 3^{x-2} is

(a) $\frac{200}{11}$ (b) $\frac{1}{963}$ (c) $\frac{100}{3}$ (d) $\frac{300}{2}$

14. Find the numerical value of $(4096)^{\frac{-1}{4}}$.

(a) 16 (b) 8 (c) 4 (d) 1

15. Simplify and leave the answer in the exponent form $\left(\frac{3}{5}\right)^{-30} \times \left(\frac{5}{3}\right)^{-30}$.

(a) $\frac{3}{5}$ (b) 1^1 (c) $\left(\frac{3}{5}\right)^{-60}$ (d) $\left(\frac{5}{3}\right)^{-60}$

16. Find the numerical value of $16^{0.75}$

(a) 8 (b) 32 (c) 2^{-3} (d) 4^{-3}

17. Express $6^2 \times 7^{-4} \times (8^{-2}) \times 6^3 \times (7^2)^2 \times 8^4$ in the simplest exponential form.

(a) $6^5 7^2$ (b) 6^5 (c) $6^{-5} 7^2$ (d) $6^{-5} 7^{-2}$

18. Solve $81^{2x} = (729)^2$

(a) $x = \frac{3}{4}$ (b) $x = \frac{2}{3}$ (c) $x = \frac{5}{6}$ (d) $x = \frac{3}{2}$

19. The value of x so that $\left(\frac{2}{7}\right)^4 \cdot \left(\frac{2}{7}\right)^3 = \left(\frac{2}{7}\right)^{4x-1}$ is

(a) 1 (b) 2 (c) 3 (d) 4

20. The speed of light is 300, 000, 000 ms^{-1}. Express it in standard form.

(a) $3.0 \times 10^8\ ms^{-1}$ (b) $3.0 \times 10^{10}\ ms^{-1}$

(c) $3.0 \times 10^6\ ms^{-1}$ (d) $3.0 \times 10^{12}\ ms^{-1}$

ANSWER - KEY				
1. A	**2.** A	**3.** D	**4.** B	**5.** D
6. A	**7.** B	**8.** A	**9.** B	**10.** D
11. A	**12.** A	**13.** C	**14.** D	**15.** B
16. A	**17.** B	**18.** D	**19.** B	**20.** A

SOLUTIONS

1. $\left(1^0 \times 2^0\right) \times 5^2 = (1 \times 1) \times 25 = 25$

2. $1^3 = 1 \times 1 \times 1 = 1;\ 4^0 = 1$ (Since any number to the power zero is one)

3. $72 = 2^3 \times 3^2$ (Prime factors are 1, 2, 3); Prime factors are prime numbers

$192 = 2^6 \times 3^1$ (Prime factors are 1, 2, 3)

$\therefore$ The required sum is $3 + 2 + 6 + 1 = 12$

4. $a^m \div b^m = \left(\frac{a}{b}\right)^m \Rightarrow (-3)^4 \div n^4$

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

5. a three times $\Rightarrow a^2$; c four times $\Rightarrow c^4$; b two times $\Rightarrow b^2$ $\therefore$ $a^3c^4b^2$

6. $\left(2^3\right)^2 = 2^6$ and $\left(3^2\right)^4 = 3^8$ now $2^6 \neq 3^8$

$\therefore$ not same and hence correct statement.

7. Expand $2^4 \times 5^3$, $2^4 \times 5^3 =$

$\times 2 \times 2 \times 2 \times 2 \times 5 \times 5 \times 5 \equiv 16 \times 125 = 2000$

8. $\frac{2^1 \times 3^2 \times 3^3}{1^2 \times 4^2}$

$= \frac{2 \times 3^5}{1 \times 16_8} = \frac{243}{8}$

9. $\frac{729 \times 64}{270} = \frac{3^6 \times 2^6}{3^3 \times 2 \times 5} = \frac{3^3 \times 2^5}{5}$

10. $\frac{\left(\frac{-1}{2}\right)^5}{\left(\frac{-1}{2}\right)^4} = \left(\frac{-1}{2}\right)^{5-4} = \left(-\frac{1}{2}\right)^1 = \frac{-1}{2}; \frac{-\frac{1}{8}}{-1/4} = \frac{-1}{8} \times \frac{-4}{1} = \frac{1}{2} \therefore \left(\frac{-1}{2}\right) \div \frac{1}{2} = -1$

11. $\left(\frac{8}{125}\right)^{-4/3} = \left(\frac{2^3}{5^3}\right)^{-4/3} = \left[\frac{2}{5}\right]^{(-4/3)\times 3}$

$= \left(\frac{2}{5}\right)^{-4} = \left(\frac{5}{2}\right)^4 = \frac{5^4}{2^4} = \frac{625}{16}$

12. $\left(-\frac{1}{9}\right)^3 = \frac{-1^3}{9^3} = \frac{-1}{729}$

13. $3^x = 300 \Rightarrow \frac{3^x}{9} = \frac{300}{9} \Rightarrow 3^{x-2} = \frac{300}{9}$

$\Rightarrow \quad 3^{x-2} = \dfrac{100}{3}$

14. $(4096)^{\frac{-1}{4}} = \left(2^{12}\right)^{-1/4} = 2^{\left(12\times\frac{-1}{4}\right)} = 2^{-3} = \dfrac{1}{8}$

Mathematical ingenuity: It is worthwhile to remember a few powers of 2 and 3 : e.g.,

$2^2 = 4; \ldots\ldots\ldots 2^6 = 6^4 \ldots\ldots; \ldots 2^{10} = 1024$

Similarly $3^2 = 9; 3^3 = 27 \ldots; \ldots\ldots 3^5 = 243, 3^6 = 729$ etc.

15. $\left(\dfrac{3}{5}\right)^{-30} \times \left(\dfrac{5}{3}\right)^{-30} = \left(\dfrac{5}{3}\right)^{30} \times \left(\dfrac{5}{3}\right)^{-30}$

$= \left(\dfrac{5}{3}\right)^{30-30} = \left(\dfrac{5}{3}\right)^{0} = 1 = 1^1$

16. $16^{\frac{3}{4}} = \left(2^4\right)^{3/4} = 2^{4\times\frac{3}{4}}$

$= 2^3 = 8$

17. $6^2 \times \dfrac{1}{\cancel{7^4}} \times \dfrac{1}{\cancel{8^4}} \times 6^3 \times \cancel{7^4} \times \cancel{8^4}$

$= 6^2 \times 6^3 = 6^{2+3} = 6^5$

18. $\left(9^2\right)^{2x} = \left(9^3\right)^2 \Rightarrow 9^{4x} = 9^6 \Rightarrow 4x = 6 \Rightarrow x = \dfrac{3}{2}$

19. Not available

20. Not available