Basic Mathematics

Subjects : Maths **Previous Year Questions of NDA**

Maths - Section A (MCQ)

1. If $\log_b a = p, \log_d c = 2p$ and $\log_f e = 3p$, then what is $(\text{ ace })^{\frac{1}{p}}$ equal to?

A) bd^2f^3 **B)** bdf **C)** b^3d^2f **D)** $b^2d^2f^2$

2. What is the number of solutions of $\log_4(x-1) = \log_2(x-3)$?

A) Zero **B)** One **C)** Two **D)** Three

3. For $x \geq y > 1$, let $\log_x\left(\frac{x}{y}\right) + \log_y\left(\frac{y}{x}\right) = k$, then the value of k can never be equal to:

A) -1 **B)** $-\frac{1}{2}$ **C)** 0 **D)** 1

4. What is the remainder when 2^{120} is divided by 7?

A) 1 **B)** 3 **C)** 5 **D)** 6

5. If $\log_x a$, a^x and $\log_b x$ are in G.P, then what is x equal to?

A) $\log_a(\log_b a)$ **B)** $\log_b(\log_a a)$

C) $\frac{\log_a(\log_b a)}{2}$ **D)** $\frac{\log_b(\log_a b)}{2}$

6. How many real numbers satisfy the equation $|x-4| + |x-7| = 15$?

A) Only one **B)** Only two **C)** Only three **D)** Infinitely many

7. If $1! + 3! + 5! + 7! + \ldots + 199$! is divided by 24 , what is the remainder?

A) 3 **B)** 6 **C)** 7 **D)** 9

8. If $xy = 4225$ where x, y are natural numbers, then what is the minimum value of $x + y$?

A) 130 **B)** 260 **C)** 2113 **D)** 4226

9. Let $A = \{7, 8, 9, 10, 11, 12, 13, 14, 15, 16\}$ and let $f : A \to N$ be defined by $f(x) =$ the highest prime factor of x. How many elements are there in the range of f ?

A) 4 **B)** 5 **C)** 6 **D)** 7

10. If $n = 100$!, then what is the value of the following?

$\frac{1}{\log_2 n} + \frac{1}{\log_3 n} + \frac{1}{\log_4 n} + \ldots + \frac{1}{\log_{100} n}$

A) 0 **B)** 1 **C)** 2 **D)** 3

11. If $\log_{10} 2 \log_2 10 + \log_{10}(10^x) = 2$, then what is the value of x ?

A) 0 **B)** 1 **C)** $\log_2 10$ **D)** $\log_5 2$

12. If $\log_{10} 2, \log_{10}(2^x - 1), \log_{10}(2^x + 3)$ are in AP, then what is x equal to?

A) 0 **B)** 1 **C)** $\log_2 5$ **D)** $\log_5 2$

13. If $x = \log_c(ab), y = \log_a(bc), z = \log_b(ca)$, then which of the following is correct?

A) $xyz = 1$ **B)** $x + y + z = 1$

C) $(1+x)^{-1} + (1+y)^{-1} + (1+z)^{-1} = 1$ **D)** $(1+x)^{-2} + (1+y)^{-2} + (1+z)^{-2} = 1$

14. The mean weight of 150 students in a certain class is 60 kg . The mean weight of boys is 70 kg and that of girls is 55 kg . What are the number of boys and girls respectively in the class?

A) 75 and 75 **B)** 50 and 100 **C)** 70 and 80 **D)** 100 and 50

15. If $f(x) = \log_{10}(1+x)$, then what is $4f(4) + 5f(1) - \log_{10} 2$ equal to?

A) 0 **B)** 1 **C)** 2 **D)** 4

16. If $x^{\log 7^x} > 7$ where $x > 0$, then which one of the following is correct?

A) $x \in (0, \infty)$ **B)** $x \in \left(\frac{1}{7}, 7\right)$ **C)** $x \in \left(0, \frac{1}{7}\right) \cup (7, \infty)$ **D)** $x \in \left(\frac{1}{7}, \infty\right)$

17. If $\left|x^2 - 3x + 2\right| > x^2 - 3x + 2$, then which one of the following is correct?

A) $x < 1$ or $x > 2$ **B)** $1 \le x \le 2$

C) $1 < x < 2$ **D)** x is any real value except 3 and 4

18. If $n = (2017)!$, then what is $\frac{1}{\log_2 n} + \frac{1}{\log_3 n} + \frac{1}{\log_4 n} + \ldots . + \frac{1}{\log_{2017} n}$ equal to

A) 0 **B)** 1 **C)** $\frac{n}{2}$ **D)** n

19. If $x + \log_{15}(1 + 3^x) = x \log_{15} 5 + \log_{15} 12$, where x is an integer, then what is x equal to?

A) -3 **B)** 2 **C)** I **D)** 3

20. What is the greatest integer among the following by which the number $5^5 + 7^5$ is divisible?

A) 6 **B)** 8 **C)** 11 **D)** 12