MOCK TEST 1

Topic: Fundamental of Mathematics, Sets and Logarithm

1. If $\frac{(2+1)(2^2+1)(2^4+1)(2^8+1)}{(2^8-1)} = 4^n + 1$, then n is

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

2. If $(x+y)^2 = 2(x^2+y^2)$ and $(x-y+\lambda)^2 = 4$, $\lambda > 0$, then λ is equal to:

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

3. If $\frac{a+3d}{a+9d} = \frac{a+d}{a+5d} = k$, then k is equal to ($a, d > 0$)

   (a) 1/2 (c) 6
   (b) 2 (d) 1/4

4. If $(x-a)$ is a factor of $x^3 - a^2x + x + 2$, then a is equal to

   (a) 0 (c) -2
   (b) 2 (d) 1

5. The polynomial $P(x) = kx^3 + 3x^2 - 3$ and $Q(x) = 2x^3 - 5x + k$, when divided by $(x-4)$ leave the same remainder. The value of k is

   (a) 2 (c) 0
   (b) 1 (d) -1

6. If $x + \frac{1}{x} = 2$, then $x^2 + \frac{1}{x^2}$ is equal to

   (a) 0 (c) 2
   (b) 1 (d) 3

7. Which of the following conditions imply that the real number x is rational?

   (i) $x^{\frac{1}{2}}$ is rational
   (ii) x^2 and x^5 are rational
   (iii) x^2 and x^4 are rational

   (a) (i) and (ii) only (c) (ii) and (iii) only
   (b) (i) and (iii) only (d) (i), (ii) and (Iii) only

8. The number of real roots of the equation, $(x-1)^2 + (x-2)^2 + (x-3)^2 = 0$ is:

   (a) 0 (c) 2
   (b) 1 (d) 3

9. If $a^4.b^5 = 1$ then the value of $\log_a(a^5b^4)$ equals

   (a) 9/5 (c) 5
   (b) 4 (d) 8/5

10. $\frac{1}{1+\log_b a + \log_b c} + \frac{1}{1+\log_c a + \log_c b} + \frac{1}{1+\log_a b + \log_a c}$ has the value equal to

    (a) abc (c) 0
    (b) $\frac{1}{abc}$ (d) 1

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11. $(\log_2 10).(\log_2 80)-(\log_2 5).(\log_2 160)$ is equal to:

(a) $\log_2 5$ (c) $\log_2 10$

(b) $\log_2 20$ (d) $\log_2 16$

12. Let $x=2^{\log 3}$ and $y=3^{\log 2}$ where base of the logarithm is 10, then which one of the following holds good?

(a) $2x<y$ (c) $3x=2y$

(b) $2y<x$ (d) $x=y$

13. If $\log_a(ab)=x$, then $\log_b(ab)$ is equal to

(a) $\frac{1}{x}$ (c) $\frac{x}{1-x}$

(b) $\frac{x}{1+x}$ (d) $\frac{x}{x-1}$

14. $10^{\log_p(\log_q(\log_r x))}=1$ and $\log_q(\log_r(\log_p x))=0$ then p equals

(a) $r^{\frac{q}{r}}$ (c) 1

(b) rq (d) $r^{\frac{r}{q}}$

15. Which one of the following is the smallest?

(a) $\log_{10}\pi$ (c) $\sqrt{\log_{10}\pi^2}$

(b) $\left(\frac{1}{\log_{10}\pi}\right)^3$ (d) $\left(\frac{1}{\log_{10}\sqrt{\pi}}\right)$

16. $\log_{10}(\log_2 3)+\log_{10}(\log_3 4)+\log_{10}(\log_4 5)+\ldots+\log_{10}(\log_{1023}1024)$ simplifies to

(a) A composite (c) Rational which is not an integer

(b) A prime number (d) An integer

17. If $\log_x \log_{18}\left(\sqrt{2}+\sqrt{8}\right)=\frac{1}{3}$. Then the value of $1000x$ is equal to

(a) 8 (c) 1/125

(b) 1/8 (d) 125

18. Let $A=\{x: x\in R, |x|<1\}$, $B=\{x: x\in R, |x-1|\geq 1\}$ and $A\cup B=R-D$, then the set D is

(a) $\{x: 1<x\leq 2\}$ (c) $\{x: 1\leq x\leq 2\}$

(b) $\{x: 1\leq x<2\}$ (d) None of these

19. A and B are two sets such that $n(A)=3$ and $n(B)=6$, then

(a) Minimum value of $n(A\cup B)=6$ (c) Maximum value of $n(A\cup B)=6$

(b) Minimum value of $n(A\cup B)=9$ (d) Maximum value of $n(A\cup B)=9$

20. A class has 175 students. The following data shows the number of students obtaining one or more subjects: Mathematics 100, Physics 70, Chemistry 40, Mathematics and Physics 30, Mathematics and Chemistry 28, Physics and Chemistry 23, Mathematics & Physics & Chemistry 18. How many students have offered Mathematics alone?

(a) 35 (c) 60

(b) 48 (d) 22

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Answer key

Que	1	2	3	4	5	6	7	8	9	10
Ans	a	b	a	c	b	c	a	a	a	d
Que	11	12	13	14	15	16	17	18	19	20
Ans	d	d	d	a	a	d	d	b	a, d	c

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