1. The solution of the equation $\log_7 \log_5(\sqrt{x+5}+\sqrt{x})=0$ is

(a) $x=2$ (b) $x=4$

(c) $x=0$ (d) $x=-\frac{5}{2}$

2. The equation $x^{\frac{3}{4}(\log_2 x)^2+\log_2 x-\frac{5}{4}}=\sqrt{2}$ has

(a) at least one real root

(b) exactly three real solutions

(c) exactly one irrational solution

(d) complex roots

3. The equation $\sqrt{x+1}-\sqrt{x-1}=\sqrt{4x-1}$ has

(a) no solution (b) one solution

(c) two solution (d) more than two solution

4. The number of solution of $\log_4(x-1)=\log_2(x-3)$ is

(a) 3 (b) 1

(c) 2 (d) 0

5. Number of real roots of the equation $\sqrt{x}+\sqrt{x-\sqrt{1-x}}=1$ is

(a) 0 (b) 1

(c) 2 (d) 3

6. The set of real values of x satisfying $|x-1|\leq 3$ and $|x-1|\geq 1$ is

(a) $[2,4]$ (b) $(-\infty, 2]\cup[4, +\infty)$

(c) $[-2, 0]\cup[2, 4]$ (d) none of these

7. The set of real values of x satisfying $\big||x-1|-1\big|\leq 1$ is

(a) $[-1, 3]$ (b) $[0,2]$

(c) $[-1, 1]$ (d) none of these

8. The solution set of $\left|\frac{x+1}{x}\right|+|x+1|=\frac{(x+1)^2}{|x|}$ is

(a) $\{x\,|\,x\geq 0\}$ (b) $\{x\,|\,x>0\}\cup\{-1\}$

(c) $\{-1, 1\}$ (d) $\{x\}x\geq 1$ or $x\leq -1\}$

9. The system of equation $|x-1|+3y=4, x-|y-1|=2$ has

(a) No solution

(b) A unique solution

(c) Two solutions

(d) More than two solutions

10. The solution set of $\frac{x^2-3x+4}{x+1}>1$, $x \in R$, is

(a) $(3, +\infty)$ (b) $(-1, 1) \cup (3, +\infty)$

(c) $[-1, 1] \cup [3, +\infty)$ (d) none of theses

11. The number of integral solutions of $\frac{x+2}{x^2+1}>\frac{1}{2}$ is

(a) 4 (b) 5

(c) 3 (d) none of these

12. The number of real roots of the equation

$|2-|1-|x|||=1$ is

(a) 1 (b) 3

(c) 5 (d) 6

13. The number of integral roots of the equation

$|x-1|+|x+2|-|x-3|=4$ is

(a) 0 (b) 1

(c) 2 (d) none of these

14. The solution set of the inequality $|x+2|-|x-1|<x-\frac{3}{2}$ is

(a) $\left(\frac{9}{2}, \infty\right)$ (b) $\left(-\infty, \frac{3}{2}\right)$

(c) $\left(-2, -\frac{3}{2}\right)$ (d) $\left(-1, \frac{3}{2}\right)$

15. The solution set of the inequality $5^{x+2}>\left(\frac{1}{25}\right)^{1/x}$ is

(a) $(-2, 0)$ (b) $(-2, 2)$

(c) $(-5, 5)$ (d) $(0, \infty)$

16. The solution set of the inequality

$|9^x-3^{x+1}-15|<2.9^x-3^x$ is

(a) $(-\infty, 1)$ (b) $(1, \infty)$

(c) $(-\infty, 1]$ (d) none of these

17. If $\left|\frac{12x}{4x^2+9}\right| \geq 1$ for all real values of x, the inequality being satisfied only if $|x|$ is equal to

(a) $\frac{3}{2}$ (b) $\frac{2}{3}$

(c) $\frac{1}{3}$ (d) $\frac{1}{2}$

18. The number of solutions of the equation

$4^x - 3^{x-\frac{1}{2}} = 3^{x+\frac{1}{2}} - 2^{2x-1}$, $x \in R$ is

(a) 0 (b) 1

(c) 2 (d) none of these

19. The number of ordered pairs (x, y) satisfying $3^x \cdot 5^y = 75$ and $3^y \cdot 5^x = 45$ is

(a) 0 (b) 1

(c) 3 (d) none of these

20. Number of real solutions of the equation $(2+\sqrt{3})^{x^2-2x+1} + (2-\sqrt{3})^{x^2-2x-1} = \frac{2}{2-\sqrt{3}}$ is

(a) 0 (b) 1

(c) 2 (d) none of these

21. The equation $|x+1|^{\log_{(x+1)}(3+2x-x^2)} = (x-3)|x|$ has

(a) unique solution

(b) two solution

(c) no solution

(d) More than two solutions

22. The equation $\log_3(3^x - 8) = 2 - x$ has the solution

(a) $x=1$ (b) $x=2$

(c) $x=3$ (d) $x=4$

23. The number of real values of parameter k for which $(\log_{16} x)^2 - \log_{16} x + \log_{16} k = 0$ will have exactly one solution is

(a) 0 (b) 2

(c) 1 (d) 4

24. The set of real values of x for which $\log_{0.2} \frac{x+2}{x} \le 1$ is

(a) $\left(-\infty, -\frac{5}{2}\right] \cup (0, \infty)$ (b) $\left[\frac{5}{2}, \infty\right)$

(c) $(-\infty, -2) \cup [0, \infty)$ (d) none of these

25. If $\log_{1/2} \frac{x^2+6x+9}{2(x+1)} < -\log_2(x+1)$, then x lies in the interval

(a) $(-1, -1+2\sqrt{2})$ (b) $(1-2\sqrt{2}, 2)$

(c) $(-1, \infty)$ (d) none of these

31. The equation $||x-1|+a|=4$ can have real solutions for x if 'a' belongs to the interval

(a) $(-\infty, +\infty)$ (b) $(-\infty, 4]$

(c) $(4, +\infty)$ (d) $[-4, 4]$

32. The solution set of the equation $4\{x\} = x + [x]$, where $\{x\}$ and $[x]$ denote the fractional and integral parts of a real number 'x' respectively, is

(a) $\{0\}$ (b) $\left\{0, \frac{5}{3}\right\}$

(c) $[0, \infty)$ (d) none of these

33. For $x \in R$, $\langle x \rangle$ is defined as follows :

$$\langle x \rangle = \begin{cases} x+1, & 0 \le x < 2 \\ |x-4|, & x \ge 2 \end{cases}$$

Then the solution set of the equation $\langle x \rangle^2 + x = \langle x \rangle + x^2$ is

(a) $\{-1, 1\}$ (b) $[2, \infty)$

(c) $[0, 2)$ (d) $\{0, 2\}$

34. The values of x satisfying the inequality $|x^3-1| \geq 1-x$ belong to

(a) $(-\infty, -1]$ (b) $[0, 1]$

(c) $[1, \infty]$ (d) none of these

35. Set of values of x satisfying the inequality $\frac{x^2+6x-7}{|x+4|} < 0$ is /are

(a) $(-\infty, -7)$ (b) $(-7, -4)$

(c) $(-4, 1)$ (d) $(1, \infty)$

36. Which of the following represents the complete solution of $\frac{|x+3|+x}{x+2} > 1$?

(a) $(-\infty, -5)$ (b) $(-5, -2)$

(c) $(-2, -1)$ (d) None of these

37. Root of the equation $|x^2+4x+3|+2x+5=0$ is /are

(a) $x=-4$ (b) $x=-1-\sqrt{3}$

(c) $x=-1+\sqrt{3}$ (d) $x=4$

38. The inequality $\frac{x^2-|x|-2}{2|x|-x^2-2} > 2$ holds only if

(a) $-1 < x < -\frac{2}{3}$

(b) $\frac{2}{3} < x < 1$

(c) $-1 < x < 1$

(d) $-1 < x < -\frac{2}{3}$ or $\frac{2}{3} < x < 1$

39. The interval(s) that satisfy the equation $\left|\frac{x^2-8x+12}{x^2-10x+21}\right| = -\frac{x^2-8x+12}{x^2-10x+21}$ is /are

(a) $(-\infty, 2]$ (b) $[2, 3)$

(c) $[6, 7)$ (d) $[3, 6] \cup [7, \infty)$

40. The integral values of x , which satisfy the equation $\left|\frac{x}{x-1}\right| + |x| = \frac{x^2}{|x-1|}$ is /are

(a) 0 (b) -1

(c) 2 (d) 100

41. The real solution of simultaneous equations $xy+3y^2-x+4y-7=0$ and $2xy+y^2-2x-2y+1=0$ is

(a) $x=2, y=-3$ (b) $x \in R,\ y=1$

(c) $x=1, y=1$ (d) none of these

42. The least integer a, for which

$1+\log_5(x^2+1) \le \log_5(ax^2+4x+a)$ is true for all $x \in R$ is

(a) 6 (b) 7

(c) 10 (d) 1

43. The integral value(s) of a for which the equation

$$(x^2+x+2)^2-(a-3)(x^2+x+2)(x^2+x+1)$$
$$+(a-4)(x^2+x+1)^2=0$$

has at least one real root is /are

(a) 5 (b) 6

(c) 4 (d) none of these

44. The set of all real numbers x for which $x^2 - [x+2] + x > 0$, is

(a) $(-\infty,-2)\cup(2,\infty)$ (b) $\left(-\infty,-\sqrt{2}\right)\cup\left(\sqrt{2},\infty\right)$

(c) $(-\infty,-1)\cup(1,\infty)$ (d) $\left(\sqrt{2},\infty\right)$

45. Product of real roots of the equation $t^2x^2+|x|+9=0$

(a) is always positive (b) is always negative

(c) does not exist (d) none of these