1. The range of the relations $R = \{(x, x^2) / x$ is a prime number less than $5\}$ is
(A) $\{2, 3, 5, 7\}$ (B) $\{2, 3, 5, 7, 11\}$ (C) $\{4, 9, 25, 49, 121\}$ (D) $\{1, 4, 9, 25, 49, 121\}$

2. Let $n(A) = m$ and $n(B) = n$ then the total No. of non empty relations that can be defined from A to B is
(A) m^n (B) n^m (C) $2^{mn} - 1$ (D) 2^{mn}

3. If $f(x) = 2x^2$ and $g(x) = \frac{1}{3x}$ then fog is
(A) $\frac{3}{2x^2}$ (B) $\frac{2}{3x^2}$ (C) $\frac{2}{9x^2}$ (D) $\frac{1}{6x^2}$

4. Let $f(x) = \sqrt{1 + x^2}$ then (A) $f(xy) = f(x).f(y)$
(B) $f(xy) \geq f(x).f(y)$ (C) $f(xy) \leq f(x).f(y)$ (D) None of these

5. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
(A) linear (B) Cubic (C) reciprocal (D) quadratic

6. If $n(A \times B) = 9$ $A = \{1, 2, 3\}$ then $n(B)$ is
(A) 1 (B) 2 (C) 3 (D) 6

7. If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b) is (A) $(2, -2)$ (B) $(5, 1)$ (C) $(2, 3)$ (D) $(3, -2)$

8. Let f and g be two functions given by $f = \{(0,1), (2,0), (3,-4), (4,2), (5,7)\}$ $g = \{(0,2), (1,0), (2,4), (-4,2), (7,0)\}$ then the range of fog is (A) $\{0, 2, 3, 4, 5\}$ (B) $\{-4, 1, 0, 2, 7\}$ (C) $\{1, 2, 3, 4, 5\}$ (D) $\{0, 1, 2\}$

9. Let $A = \{1, 2, 3, 4\}$ and $B = \{4, 8, 9, 10\}$. A function $f: A \to B$ given by $f = \{(1, 4), (2, 8), (3, 9), (4, 10)\}$ is a
(A) Many-one function (B) Identity function
(C) one-to-one function (D) into function

10. If there are 1024 relation from a set $A = \{1, 2, 3, 4, 5\}$ to a set B, then the No. of elements in B is
(A) 3 (B) 2 (C) 4 (D) 8

11. If the HCF of 65 and 117 is expressible in the form of $65m - 117$, then the value of m is
(A) 4 (B) 2 (C) 1 (D) 3

12. The least Number that is divisible by all the numbers from 1 to 10 (both inclusive) is
(A) 2025 (B) 5220 (C) 5025 (D) 2520

13. Given $F_1 = 1$, $F_2 = 3$ and $F_n = F_{n-1} + F_{n-2}$ then F_5 is
(A) 3 (B) 5 (C) 8 (D) 11

14. If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \ldots + 2^0$ which of the following is true? (A) B is 2^{64} more than A (B) A and B are equal (C) B is larger than A by 1 (D) A is larger than B by 1

15. An A.P consists of 31 terms. If its 16^{th} term is m, then the sum of all the terms of this A.P is
(A) 16m (B) 62m (C) 31m (D) $\frac{31}{2}$m

16. $7^{4k} \equiv$ ____ (mod 100) (A) 1 (B) 2 (C) 3 (D) 4

17. If 6 times of 6^{th} term of an A.P is equal to 7 times the 7^{th} term then the 13^{th} terms of the A.P is
(A) 0 (B) 6 (C) 7 (D) 18

18. The value of $(1^3 + 2^3 + 3^3 + \ldots + 15^3) - (1 + 2 + 3 + \ldots + 15)$ is
(A) 14400 (B) 14200 (C) 14280 (D) 14520

19. The next term of the sequence $\frac{3}{16}, \frac{1}{8}, \frac{1}{12}, \frac{1}{18}, \ldots$ is
(A) $\frac{1}{24}$ (B) $\frac{1}{27}$ (C) $\frac{2}{3}$ (D) $\frac{1}{81}$

20. In an A.P, the first term is 1 and the common difference is 4. How many terms of the A.P must be taken for their sum to be equal to 120?
(A) 6 (B) 7 (C) 8 (D) 9

21. The solution of $(2x-1)^2 = 9$ is equal to
(A) 1 (B) 2 (C) -1, 2 (D) None of these

22. The value of a and b if $4x^4 - 24x^3 + 76x^2 + ax + b$ is a perfect square are (A) 100, 120 (B) 10, 12 (C) -120, 100 (D) 12, 10

23. $\frac{3y-3}{y} \div \frac{7y-7}{3y^2}$ is (A) $\frac{9y}{7}$ (B) $\frac{9y^3}{21y-21}$ (C) $\frac{21y^2-42y+21}{3y^3}$ (D) $\frac{7(y^2-2y+1)}{y^2}$

24. If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is (A) 3 (B) 5 (C) 6 (D) 8

25. The square root of $\frac{256x^8y^4z^{10}}{25x^6y^6z^6}$ (A) $\frac{16}{5}\left|\frac{x^2z^4}{y^2}\right|$
(B) $16\left|\frac{y^2}{x^2z^4}\right|$ (C) $\frac{16}{5}\left|\frac{y}{xz^2}\right|$ (D) $\frac{16}{5}\left|\frac{xz^2}{y}\right|$

26. The Number of Points of Intersection of the quadratic Polynomial $x^2 + 4x + 4$ with the x-axis is
(A) 0 (B) 1 (C) 0 or 1 (D) -2

27. If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
(A) 3 (B) 5 (C) 6 (D) 8

28. If in triangles ABC and EDF, $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar, when
(A) $\angle B = \angle E$ (B) $\angle A = \angle D$ (C) $\angle B = \angle D$ (D) $\angle A = \angle E$

29. If $\triangle ABC$ is an isosceles triangle with $\angle C = 90^\circ$ and AC = 5cm then AB is (A) 2.5cm (B) 5cm (C) 10cm (D) $5\sqrt{2}$ m

30. The Perimeters of two similar triangles $\triangle ABC$ and $\triangle PQR$ are 36cm and 24cm respectively. If PQ = 10cm, then the length of AB is (A) $6\frac{2}{3}$ cm (B) $\frac{10\sqrt{6}}{3}$ cm (C) $66\frac{2}{3}$ cm (D) 15 cm

31. In a $\triangle ABC$, AD is the bisector of $\angle BAC$. If AB = 8cm BD = 6cm DC = 3cm. The length of side AC is
(A) 6cm (B) 4cm (C) 3cm (D) 8cm

32. The area of Triangle formed by the points (-5,0), (0,-5) and (5,0)
(A) 0 sq.units (B) 25 sq.units (C) 5 sq.units (D) none of these

33. The Straight line given by the equation $x = 11$ is
(A) Parallel to x axis (B) Parallel to y axis
(C) passing through the origin (D) passing through the point (0,11)

34. The point of intersection $3x - y = 4$ and $x + y = 8$ is
(A) (5, 3) (B) (2, 4) (C) (3, 5) (D) (4, 4)

35. When proving that a quadrilateral is a parallelogram by using Slopes you must find (A) The slopes of two sides
(B) The slopes of two pair of opposite sides (C) The length of all sides
(D) Both the length and slopes of two sides

36. (2,1) is the point of intersection of two lines
(A) $x - y - 3 = 0$, $3x - y - 7 = 0$ (B) $x + y = 3$, $3x + y = 7$
(C) $3x + y = 3$, $x + y = 7$ (D) $x + 3y - 3 = 0$, $x - y - 7 = 0$

37. The equation of the line passing through the origin and perpendicular to the line $7x - 3y + 4 = 0$
(A) $7x - 3y + 4 = 0$ (B) $3x - 7y + 4 = 0$ (C) $3x + 7y = 0$ (D) $7x - 3y = 0$

38. Find the slope and the y-intercept of the line $3y - \sqrt{3}x + 1 = 0$ is (A) $\frac{1}{\sqrt{3}}, \frac{-1}{3}$ (B) $-\frac{1}{\sqrt{3}}, -\frac{1}{3}$
(C) $\sqrt{3}, 1$ (D) $-\sqrt{3}, 3$

39. The slope of the line joining (12, 3) and (4, a) is $\frac{1}{8}$ the value of 'a' is
(A) 1 (B) 4 (C) -5 (D) 2

40. The value of $\sin^2\theta + \frac{1}{1+\tan^2\theta}$ is equal to
(A) $\tan^2\theta$ (B) 1 (C) $\cot^2\theta$ (D) 0

41. $\tan\theta \operatorname{cosec}^2\theta - \tan\theta$ is equal to
(A) $\sec\theta$ (B) $\cot^2\theta$ (C) $\sin\theta$ (D) $\cot\theta$

42. If $5x = \sec\theta$ and $\frac{5}{x} = \tan\theta$, then $x^2 - \frac{1}{x^2}$ is equal to
(A) 25 (B) $\frac{1}{25}$ (C) 5 (D) 1

43. If $\sin\theta + \cos\theta = a$ and $\sec\theta + \operatorname{cosec}\theta = b$, then value of $b(a^2 - 1)$ is equal to
(A) 2a (B) 3a (C) 0 (D) 2ab

44. Which of the following is not a measure of dispersion?
(A) Range (B) Standard deviation (C) Arithmetic mean
(D) Variance

45. The sum of all deviation of the data from its mean is
(A) Always Postive (B) Always negative (C) zero
(D) Non-zero Integer

46. Which of the following is incorrect?
(A) $P(A) > 1$ (B) $0 \le P(A) \le 1$ (C) $P(\Phi) = 0$ (D) $P(A) + P(\bar{A}) = 1$

47. The Probability of getting a job for a person is $\frac{x}{3}$. If the probability of not getting the job is $\frac{2}{3}$ then the value of x is (A) 2 (B) 1 (C) 3 (D) 1.5

48. Kamalam went to play a lucky draw contest. 135 tickets of the lucky draw were sold. If the probability of kamalam winning is $\frac{1}{9}$ then the no. of tickets bought by kamalam is (A) 5 (B) 10 (C) 15 (D) 20

49. If a letter is chosen at random from the English alphabets {a, b . . . z} then the probability that the letter chosen precedes x
(A) $\frac{12}{13}$ (B) $\frac{1}{13}$ (C) $\frac{23}{26}$ (D) $\frac{3}{26}$

50. Variance of first 20 natural numbers is
(A) 32.25 (B) 44.25 (C) 33.25 (D) 30

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