

Class: 10th

Pre-Quarterly Exam - 2022

Total Marks: 100

Part-A

14 x 1 = 14

I Answer All the Questions:-

1. If $n(A \times B) = 20$ and $n(A) = 5$ then $n(B)$ is
 a) 15 b) 4 c) 25 d) 5
2. If the ordered pairs $(a+2, 4)$ and $(5, 2a+b)$ are equal then (a, b) is
 a) $(3, -2)$ b) $(2, -2)$ c) $(5, 1)$ d) $(2, 3)$
3. $f(x) = (x+1)^3 - (x-1)^3$ represents a function which is
 a) reciprocal b) quadratic c) linear d) cubic
4. The sum of the exponents of the prime factors in the prime factorization of 1729 is
 a) 1 b) 2 c) 3 d) 4
5. $7^{4k} \equiv \text{---} \pmod{100}$
 a) 1 b) 2 c) 3 d) 4
6. The common difference of a constant A.P. is
 a) 0 b) 1 c) -1 d) 2
7. 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) 6 c) 8 d) 2
8. The solution of $(2x-1)^2 = 9$ is equal to
 a) -1 b) 2 c) -1, 2 d) None of these
9. The square root of $12|x^2y^8z^6|(1-m)^2$ is
 a) $11x^2y^4z^3|1-m|$ b) $11x^4y^4z^3(1-m)$ c) $11x^2y^4z^3|1-m|$ d) $11x^2y^4z^6|1-m|$
10. How many tangents can be drawn to the circle from an exterior point?
 a) one b) two c) infinite d) zero
11. The area of triangle formed by the points $(-5, 0)$, $(0, -5)$ and $(5, 0)$ is
 a) 0 sq. units b) 5 sq. units c) 25 sq. units d) None of these
12. If slope of the line PQ is $\frac{1}{\sqrt{3}}$ then slope of the perpendicular bisector of PQ is
 a) $-\sqrt{3}$ b) $\sqrt{3}$ c) $\frac{1}{\sqrt{3}}$ d) -1

13. The value of $\sin^2 \theta + \frac{1}{1+\tan^2 \theta}$ is equal to
 a) $\cot^2 \theta$ b) $\tan^2 \theta$ c) 1 d) 0.
14. $\sin(90^\circ - \theta) \cos \theta + \cos(90^\circ - \theta) \sin \theta$ is equal to
 a) 1 b) 0 c) -1 d) 2.

Part-B.

10x2=20

II Answer Any 10 Questions:- (Q.no 28 is compulsory)

15. If $A \times B = \{(3,2), (3,4), (5,2), (5,4)\}$ then find A and B.
16. If $A = \{-2, -1, 0, 1, 2\}$ and $f: A \rightarrow B$ is an onto function defined by $f(x) = x^2 + x + 1$ then find B.
17. Find the value of K, such that $f \circ g = g \circ f$ if $f(x) = 3x+2$, $g(x) = 6x+1$.
18. Find the greatest number that will divide 445 and 572 leaving remainders 4 and 5 respectively.
19. Find the 19th term of an A.P. $-11, -15, -19, \dots$
20. Find the sum of $1+3+5+\dots+55$.
21. The father's age is six times his son's age, six years hence the age of father will be four times his son's age. Find the present ages (in years) of the son and father.
22. Simplify: $\frac{x^3}{x-y} + \frac{y^3}{y-x}$.
23. Discuss the nature of roots for the quadratic equation $x^2 - x - 20 = 0$.
24. Show that the points P(-1, 5, 3), Q(6, -2), R(-3, 4) are collinear.
25. Find the equation of straight line through the points (2, 3) and (-7, -1).
26. Prove that $\frac{1+\cos \theta}{1-\cos \theta} = \sec \theta + \tan \theta$.
27. Prove that $\cot \theta + \tan \theta = \sec \theta \cdot \csc \theta$.
28. Form the quadratic equation whose roots are $7+\sqrt{3}$ and $7-\sqrt{3}$.

Part-C

II Answer Any 10 Questions:- (Q.no +2 is compulsory)

29. Let $A = \{x \in \mathbb{W} \mid x < 2\}$, $B = \{x \in \mathbb{N} \mid 1 \leq x \leq 4\}$ and $C = \{3, 5\}$.

Verify that $A \times (B \cap C) = (A \times B) \cap (A \times C)$.

30. Let $A = \{1, 2, 3, 4\}$ and $B = \{2, 5, 8, 11, 14\}$ be two sets.

Let $f: A \rightarrow B$ be a function given by $f(x) = 3x - 1$. Represent this function

i) Arrow diagram

ii) in a table form.

iii) Set of ordered pairs.

iv) in a graphical form.

31. If the function f is defined by $f(x) = \begin{cases} x+2 & \text{if } x > 1 \\ 2 & \text{if } -1 \leq x \leq 1 \\ x-1 & \text{if } -3 < x < -1 \end{cases}$;

find i) $f(3)$ ii) $f(0)$ iii) $f(-1.5)$ iv) $f(4) + f(-2)$.

32. The sum of three consecutive terms that are in A.P. is 27 and their product is 288. Find the three terms.

33. Find the sum to n terms of the series

$$5 + 55 + 555 + \dots$$

34. Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm, 24cm. How much area can be decorated with these colour papers?

35. Solve: $x + y + z = 5$; $2x - y + z = 9$; $x - 2y + 3z = 16$.

36. If $9x^4 + 12x^3 + 28x^2 + 10x + b$ is a Perfect square, find the values of 'a' and 'b'.

37. The roots of the equation $x^2 + 6x - 4 = 0$ are α, β . Find the quadratic equation whose roots are $\alpha^2\beta$ and $\beta^2\alpha$.

38. State and Prove Angle bisector theorem.

39. Find the area of the quadrilateral formed by the points $(9, 6)$, $(5, 11)$, $(-5, 12)$ and $(-4, 3)$.

40. Find the equation of the median and altitude of ΔABC through A where the vertices are $A(6, 2)$, $B(-5, -1)$ and $C(1, 9)$.

11. If $\frac{\cos A}{\cos B} = m$ and $\frac{\sin A}{\sin B} = n$, then Prove that $(m^2 + n^2) \cos^2 B = n^2$.

12. If the equation $(1+m^2)x^2 + 2mcx + c^2 - a^2 = 0$ has equal roots, then Prove that $c^2 = a^2(1+m^2)$.

Part - D

4 × 8 = 16

IV Answer All the questions:-

13. a) Construct a triangle similar to a given triangle PQR with its sides equal to $\frac{7}{4}$ of the corresponding sides of the triangle PQR (Scale factor $\frac{7}{4} > 1$).

(OR)

b) Construct a ΔPQR in which $PQ = 8\text{ cm}$, $\angle R = 60^\circ$ and the median RG from R to PQ is 5.8 cm . Find the length of the altitude from R to PQ .

14. a) Draw the graph of $x^2 - 4x + 4 = 0$ and state the nature of their solution.

(OR)

b) Draw the graph of $y = x^2 - 4x + 3$ and use it to solve $x^2 - 6x + 9 = 0$.

..... All the Best