

6A
(Arivayaludi district)

Register Number :

010301

QUARTERLY EXAMINATION - 2024

STD: 10

MATHEMATICS

Marks : 100

Time : 3.00 hrs

PART - I

Answer all the questions

14x1=14

- Let $n(A)=m$ and $n(B)=n$ then the total number of non empty relations that can be defined from A to B is
 - m^n
 - n^m
 - $2^{mn}-1$
 - $2 m^n$
- $f(x)+f(1-x)=2$ then $f(1/2)=\dots\dots\dots$
 - 1
 - 1
 - 5
 - 9
- The least number that is divisible by all the numbers from 1 to 10 (both inclusive) is $2+2+\dots+n$
 - 2025
 - 5220
 - 5025
 - 2520
- Find the sum of n terms of the series $2+2+2+\dots$ to n terms.
 - 2^n
 - $2n$
 - n^2
 - $n+2$
- If $(x-6)$ is the HCF of pair of polynomials $x^2-2x-24$ and x^2-k-6 then find the value of k.
 - 3
 - 5
 - 6
 - 8
- The solution of $(2x-1)^2-9$ is equal to
 - 1, 2
 - 2
 - 1, 2
 - One of these
- $7^{4k} \equiv \dots\dots\dots \pmod{100}$
 - 4
 - 3
 - 2
 - 1
- If in triangle ABC and EDF $\frac{AB}{DE} = \frac{BC}{FD}$ then they will be similar when
 - $\angle B = \angle E$
 - $\angle A = \angle D$
 - $\angle B = \angle D$
 - $\angle A = \angle E$
- When proving that a quadrilateral is a trapezium, it is necessary to show
 - Two sides are parallel
 - Two parallel and two non parallel
 - opposite sides are parallel
 - all sides are of equal length
- If $\triangle ABC$ is an isosceles triangles with $\angle C = 90^\circ$ and $AC = 5$ cm then AB is
 - $5\sqrt{2}$ cm
 - 10 cm
 - 2.5cm
 - 5 cm
- Find the slope of the equation is $2y = x + 8$
 - $\frac{1}{2}$
 - 1
 - 8
 - 2
- The straight line given by the equation $x = 11$ is
 - passing through the origin point
 - passing through the point (0,11)
 - parallel to the x axis
 - parallel to the y axis
- If $\sin \theta = \cos \theta$ when $2 \tan^2 \theta + \sin \theta = 1$ is equal to
 - $\frac{3}{2}$
 - $-\frac{3}{2}$
 - $\frac{2}{3}$
 - $-\frac{2}{3}$
- If $\sin \theta + \cos \theta = a$ and $\sec \theta + \operatorname{cosec} \theta = b$ then the value of $b(a^2-1)$ is equal to
 - 0
 - 2a
 - 2ab
 - 3a

PART - II

Answer any 10 questions. Question No. 28 is compulsory

10x2=20

- $A \times B = \{(3,2) (3,4) (5,2) (5,4)\}$, then find A and B
- Show that the function $f: \mathbb{N} \rightarrow \mathbb{N}$ defined by $f(m) = m^2 + m + 3$ is one - one function.
- Find the 3rd term and 4th term of a sequence if $a^n = \begin{cases} n^2 & \text{if } n \text{ is odd} \\ n^2/2 & \text{if } n \text{ is even} \end{cases}$
- Find the sum of the series. $1+4+9+16+\dots+2225$
- simplify : $\frac{x^2-16}{x^2+8x+16}$
- Find the LCM of the expressions are (p^2-3p+2) , (p^2-4)
- If the difference between a number and its reciprocal is $\frac{24}{5}$, find the numbers.
- The length of the tangent to a circle from a point p, which is 25cm away from the centre is 24 cm. what is the radiuses of the circle.
- In $\triangle ABC$, if $DE \parallel BC$ $AD = x$, $DB = x$ $AE = x+2$ then find the length of the sides AB and AC

Std : 10 Maths

2

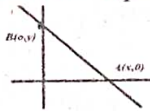
24. Find the value of 'a' if the line through (-2, 3) and (8, 15) is perpendicular to $y = ax + 2$
25. Find the slope of a line joining the points are (14, 10) and (14, -6)
26. Prove that $\sqrt{\frac{1+\sin\theta}{1-\sin\theta}} = \sec\theta + \tan\theta$
27. Prove that $\frac{\sec\theta - \sin\theta}{\sin\theta \cos\theta} = \cot\theta$
28. $f(x) = 3x - 2$, $g(x) = 2x + k$ and if $f \circ g = g \circ f$ then find the value of k .

PART - III

Answer any 10 questions, question No. 42 is compulsory.

10x5=50

29. A function f is defined by $f(x) = 2x - 3$ i) Find $\frac{f(0) + f(1)}{2}$ ii) Find x such that $f(x) = 0$
iii) Find x such that $f(x) = x$ iv) find x such that $f(x) = f(1-x)$
30. If $f(x) = 2x + 3$, $g(x) = 1 - 2x$ and $h(x) = 3x$ prove that $f \circ (g \circ h) = (f \circ g) \circ h$
31. Find the sum of all natural number between 100 and 1000 which are divisible by 11
32. Find the sum of series is $10^3 + 11^3 + 12^3 + \dots + 20^3$
33. Find the GCD of the polynomials $x^4 + 3x^3 - x - 3$, and $x^3 + x^2 - 5x + 3$
34. Find the square root of the expression $289x^4 - 612x^3 + 970x^2 - 684x + 361$
35. If vertices of a quadrilateral are at A (-4, -2), B(-3, k) (3, -2) and D(2, 3) and its area is 28 sq.units. Find the value of k .
36. Find the equation of the perpendicular bisector of the line joining the points A(-4, 2) and B(6, -4).
37. State and prove Thales theorem.
38. An insect 8 m away initially from the foot of a lamp post which is 6m tall, crawls towards it moving through a distance, from the top to the lamp P post is equal to the distance it has moved. How far is the insect away from the foot of the lamp post?
39. prove that $\sqrt{\frac{1+\cos\theta}{1-\cos\theta}} + \sqrt{\frac{1-\cos\theta}{1+\cos\theta}} = 2 \operatorname{cosec}\theta$
40. A straight line AB cuts the co-ordinate axes at A and B. If the mid-point of AB is (2, -3) find the equation of AB.



41. Let $f: A \rightarrow B$ be a function defined by $f(x) = \frac{x}{2} - 1$ where $A = \{2, 4, 6, 10, 12\}$,
 $B = \{0, 1, 2, 4, 5, 9\}$ represented f by
i) set of ordered pairs ii) a table iii) an arrow diagram iv) a graph
42. The ratio of 6th and 8th term of an A.P is 7: 9 find the ratio of 9th term to 13th term

PART - IV

Answer the following

2x8=16

43. a) construct a triangle to a given triangle ABC with its sides equal to $\frac{6}{5}$ of the corresponding sides of the triangle ABC (scale factor $\frac{6}{5}$) (OR) >
b) Construct a triangle PQR such that $\angle R = 5^\circ$, $\angle P = 30^\circ$ and the altitude from p to QR is of length 4:2 cm.
44. a) Graph the quadratic equation $x^2 - 8x + 16 = 0$ and state the nature of their solution. (OR)
b) A school announces that for a certain competitions, the cash prize will be distributed for all the participants equally as show below.

No of participants (x)	(x)	2	4	6	8	10
Amount for each participants in(y)	(y)	180	90	60	45	36

- i) Find the content of variation
ii) graph the above data and hence, find how much will each participant get. If the number of participants are 12.

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