

FIRST REVISION TEST - 2024

Exam No.

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Time : 3-00 Hours

X - MATHS

Marks : 100

PART - I

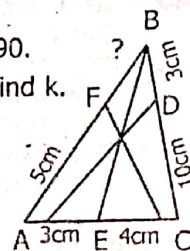
Note : 1) Answer all the questions. 2) Choose the correct answer. (14x1=14)

- If $g = \{(1, 1), (2, 3), (3, 5), (4, 7)\}$ is a function given by $g(x) = \alpha x + \beta$ then the values of α and β are
1) $(-1, 2)$ 2) $(2, -1)$ 3) $(-1, -2)$ 4) $(1, 2)$
- The range of the relation $R = \{(x, x^2) \mid x \text{ is a prime number less than } 13\}$ is
1) $\{2, 3, 5, 7\}$ 2) $\{2, 3, 5, 7, 11\}$ 3) $\{4, 9, 25, 49, 121\}$ 4) $\{1, 4, 9, 25, 49, 121\}$
- The remainder when $7 \times 13 \times 19 \times 23 \times 29 \times 31$ is divided by 6 is _____
1) 1 2) -1 3) 0 4) 6
- If $A = 2^{65}$ and $B = 2^{64} + 2^{63} + 2^{62} + \dots + 2^0$ which of the following is true?
1) B is 2^{64} more than A 2) A and B are equal
3) B is larger than A by 1 4) A is larger than B by 1
- If $(x-6)$ is the HCF of $x^2 - 2x - 24$ and $x^2 - kx - 6$ then the value of k is
1) 3 2) 5 3) 6 4) 8
- The non-diagonal elements in any unit matrix are _____
1) 1 2) 0 3) -1 4) 2
- No tangent can be drawn from _____ of the circle
a) Interior point 2) Exterior 3) A point on the circle 4) A point on the perimeter
- $(1 + \tan \theta + \sec \theta) (1 + \cot \theta - \operatorname{cosec} \theta)$ is equal to
1) 0 2) 1 3) 2 4) -1
- In a hollow cylinder, the sum of the external and internal radii is 14cm and the width is 4cm. If its height is 20cm, the volume of the material in it is
1) $5600\pi \text{ cm}^3$ 2) $1120\pi \text{ cm}^3$ 3) $56\pi \text{ cm}^3$ 4) $3600\pi \text{ cm}^3$
- The height and radius of the cone of which the frustum is a part are h_1 units and r_1 units respectively. Height of the frustum is h_2 units and radius of the smaller base is r_2 units. If $h_2 : h_1 = 1 : 2$ then $r_2 : r_1$ is
1) 1:3 2) 1:2 3) 2:1 4) 3:1
- The sum of all deviations of the data from its mean is
1) Always positive 2) Always negative 3) Zero 4) Non-zero integer
- The probability a red marble selected at random from a jar containing p red, q blue and r green marbles is
1) $\frac{q}{p+q+r}$ 2) $\frac{p}{p+q+r}$ 3) $\frac{p+q}{p+q+r}$ 4) $\frac{p+r}{p+q+r}$
- A straight line has equation $8y = 4x + 21$. Which of the following is true
1) The slop is 0.5 and the y intercept is 2.6 2) The slop is 5 and the y intercept is 1.6
3) The slop is 0.5 and the y intercept is 1.6 4) The slop is 5 and the y intercept is 2.6
- A man walks near a wall, such that the distance between him and the wall is 10 units. Consider the wall to be the Y axis. The path travelled by the man is.
1) $x=10$ 2) $y=10$ 3) $x=0$ 4) $y=0$

PART - II

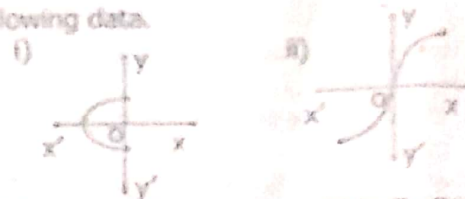
Note: Answer any 10 questions. Question No.28 is compulsory. (10x2=20)

- Find k if $f \circ f(k) = 5$ where $f(k) = 2k - 1$.
- A man has 532 flower pots. He wants to arrange them in rows such that each row contains 21 flower pots. Find the number of completed rows and how many flower pots are left over.
- Find the number of terms in the A.P. 3, 6, 9, 12, ..., 111.
- Find the LCM of each pair of the following polynomials
(i) $a^2 + 4a - 12$, $a^2 - 5a + 6$ whose GCD is $a - 2$.
- Find two consecutive odd positive integers, sum of whose squares is 290.
- If the difference between the roots of the equation $x^2 - 13x + k = 0$ is 17 find k .
- An artist has created a triangular stained glass window and has one Strip of small length left before completing the window. She needs to figure out the length of left out portion based on the lengths of the other sides as shown in the figure.
- If the three points $(3, -1)$, $(a, 3)$ and $(1, -3)$ are collinear, find the value of a .
- Find the equation of a line which passes through $(5, 7)$ and makes intercepts on the axes equal in magnitude but opposite in sign.



10-Maths-1

24. If $A = \begin{pmatrix} \sin^2 \theta & 1 \\ \cos^2 \theta & 0 \end{pmatrix}$, $B = \begin{pmatrix} \cos^2 \theta & 0 \\ -\cos \theta \sin^2 \theta & 1 \end{pmatrix}$, $C = \begin{pmatrix} 0 & -1 \\ +1 & 0 \end{pmatrix}$ find $A+B+C$.
25. Find the angle of elevation of the top of a tower from a point on the ground, which is 30m away from the foot of a tower of height $10\sqrt{3}$ m.
26. A Sphere, a Cylinder and a Cone are of the same height which is equal to its radius, where as cone and cylinder are of same height. Find the ratio of their curved surface areas.
27. Find the range and coefficient of range of the following data.
(i) 63, 89, 98, 125, 79, 108, 117, 68
28. Determine whether the graph given below represent functions. Give reasons for your answers concerning each graph.



PART - III

Note: Answer any 10 questions. Question No.42 is compulsory. (10x5=50)

29. Let $A = \{x \in \mathbb{N} \mid 1 < x < 4\}$, $B = \{x \in \mathbb{W} \mid 0 \leq x < 2\}$ and $C = \{x \in \mathbb{N} \mid x < 3\}$ then verify that $A \times (B \cup C) = (A \times B) \cup (A \times C)$.
30. A function $f: [-5, 9] \rightarrow \mathbb{R}$ is defined as follows:

$$f(x) = \begin{cases} 6x+1 & ; -5 \leq x < 2 \\ 5x^2-1 & ; 2 \leq x < 6 \\ 3x-4 & ; 6 \leq x \leq 9 \end{cases}$$

 (i) $f(7) - f(1)$ (ii) $2f(4) + f(8)$ (iii) $\frac{2f(-2) - f(6)}{f(4) + f(-2)}$
31. A contract on construction job specifies a penalty for delay of completion beyond a certain date as follows: Rs. 200 for the first day, Rs. 250 for the second day, Rs. 300 for the third day, etc., the penalty for each succeeding day being Rs. 50 more than for the preceding day. How much money the contractor has to pay as penalty, if he has delayed the work by 30 days?
32. Find the sum of $15^2 + 16^2 + 17^2 + \dots + 28^2$
33. Vani, her father and her grand father have an average age of 53. One-half of her grand father's age plus one-third of her father's age plus one fourth of Vani's age is 65. Four years ago if Vani's grandfather was four times as old as Vani then how old are they all now?
34. Let $A = \begin{pmatrix} 1 & 2 \\ 1 & 3 \end{pmatrix}$, $B = \begin{pmatrix} 4 & 0 \\ 1 & 5 \end{pmatrix}$, $C = \begin{pmatrix} 2 & 0 \\ 1 & 2 \end{pmatrix}$ show that (i) $A(BC) = (AB)C$.
35. State and prove Thales theorem.
36. Two trains leave a railway station at the same time. The first train travels due west and the second train due north. The first train travels at a speed of 20km/hr and the second train travels at 30km/hr. After 2 hours, what is the distance between them?
37. Let $A(3, -4)$, $B(9, -4)$, $C(5, -7)$ and $D(7, -7)$. Show that ABCD is a trapezium.
38. Find the equation of the perpendicular bisector of the line joining the points $A(-4, 2)$ and $B(6, -4)$.
39. A pole 5m high is fixed on the top of a tower. The angle of elevation of the top of the pole observed from a point 'A' on the ground is 60° and the angle of depression to the point 'A' from the top of the tower is 45° . Find the height of the tower. ($\sqrt{3} = 1.732$)
40. Seenu's house has an overhead tank in the shape of a cylinder. This is filled by pumping water from a sump (underground tank) which is in the shape of a cuboid. The sump has dimensions $2m \times 1.5m \times 1m$. The overhead tank has its radius of 60cm and height 105cm. Find the volume of the water left in the sump after the overhead tank has been completely filled water from the sump which has been full, initially.
41. If $9x^4 + 12x^3 + 28x^2 + ax + b$ is a perfect square, find the values of a and b.
42. A box contains 90 discs which are numbered from 1 to 90. If disc is drawn random from the box find the probability then it bears a two digit number or a number divisible by 5.

PART - IV

Answer all the questions.

43. a) Construct a triangle similar to a given triangle ABC with its sides equal to of the corresponding sides of the triangle ABC (scale factor $6/5 > 1$). (OR)
 b) Draw a triangle ABC of base $BC = 8$ cm, $\angle A = 60^\circ$ and the bisector of $\angle A$ meets BC at D such that $BD = 6$ cm.
44. a) The following table shows the data about the number of pipe and the time taken to fill the same tank.

No. of pipes (x)	2	3	6	9
Time taken (in min) (y)	45	30	15	10

Draw the graph for the above data and hence.

- (i) Find the time taken to fill the tank when five pipes are used
 (ii) Find the number of pipes when the time is 9 minutes
 b) Draw the graph of $y = x^2 - 5x - 6$ and hence solve $x^2 - 5x - 14 = 0$.

(OR)

10-Maths-2