

10 - Std**FIRST MID TERM TEST - 2023**

Time : 1.30 Hrs

MATHS

Marks : 50

I Choose the correct answer.

6 x 1 = 6

- Let $n(A) = p$ and $n(B) = q$, then the total number of relations that can be defined from A to B is a) p^q b) q^p c) 2^{pq-1} d) 2^{pq}
- If $f : A \rightarrow B$ is a bijective function and if $n(B) = 7$ then $n(A)$ is equal to a) 7 b) 49 c) 1 d) 14
- If $1 + 2 + 3 + \dots + n = 36$ then find $1^3 + 2^3 + 3^3 + \dots + n^3 =$ a) 46656 b) 1296 c) 108 d) 72
- Using Euclid's division lemma, if the cube of any positive integers is divided by 9 then the possible remainders are a) 0, 1, 8 b) 1, 4, 8 c) 0, 1, 3 d) 1, 3, 5
- The solution of the system of equations $x + y - 3z = -6$, $-7y + 7z = 7$, $3z = 9$ is a) $x = 1, y = 2, z = 3$ b) $x = -1, y = 2, z = 3$ c) $x = -1, y = -2, z = 3$ d) $x = 1, y = -2, z = 3$
- How many tangents can be drawn to the circle from an exterior point? a) one b) two c) infinite d) Zero

II Answer any 5 questions. (Questions No. 13 is compulsory).

5 x 2 = 10

- Let $A = \{1, 2, 3\}$ and $B = \{x / x \text{ is a prime number less than } 10\}$. Find $A \times B$ and $B \times A$.
- Let f be a function $f : N \rightarrow N$ be defined by $f(x) = 3x + 2, x \in N$
i) Find the image of 1, 2, 3 ii) Find the pre - images of 29, 53.
- If $13824 = 2^a \times 3^b$ then find a and b.
- Find the LCM of $8x^4y^2, 48x^2y^4$.
- If $\triangle ABC$ is similar to $\triangle DEF$ such that $BC = 3\text{cm}$, $EF = 4\text{cm}$ and area of $\triangle ABC = 54\text{cm}^2$. Find the area of $\triangle DEF$.
- What is the time 100 hours after 7 a.m.
- Find the sum of $1^2 + 2^2 + \dots + 20^2$. (Compulsory questions)

III Answer any 4 questions. (Questions No. 19 is compulsory).

4 x 5 = 20

- Let $f : A \rightarrow B$ be a function defined by $f(x) = x/2 - 1$ where $A = \{2, 4, 6, 10, 12\}$, $B = \{0, 1, 2, 4, 5, 9\}$. Represent f by i) set of ordered pairs ii) a table iii) an arrow diagram iv) a graph
- If $f(x) = x - 1$, $g(x) = 3x + 1$, $h(x) = x^2$ then show that $(f \circ g) \circ h = f \circ (g \circ h)$.
- Find the sum of n terms of the series $3 + 33 + 333 + \dots$
- Solve the linear equations $3x - 2y + z = 2$, $2x + 3y - z = 5$, $x + y + z = 6$.
- Find the sum of all natural numbers between 300 and 600 which are divisible by 7.
- Rekha has 15 square colour papers of sizes 10cm, 11cm, 12cm 24cm. How much area can be decorated with these colour papers? (Compulsory questions)

IV Answer all questions.

2 x 7 = 14

- Constructs a triangle similar to a given triangle PQR with its sides equal to $3/5$ of the corresponding sides of the triangle PQR (Scale factor $3/5 < 1$). (OR)
Take a point which is 11cm away from the centre of a circle of radius 4 cm and draw the two tangents to the circle from that point.
- A bus is travelling at a uniform speed of 50km/hr. Draw the distance time graph and hence find i) the constant of Variation ii) How far will it travel in $1\frac{1}{2}$ hrs. 3) The time required to cover a distance of 300 km from the graph. (OR)
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)	2	4	6	8	10
Amount for each participation in (Y)	180	90	60	45	36

i) Find the constant of variation. ii) Graph the above data and hence, find how much will each participant get if the number of participants are 12.