B.K. BIRLA CENTRE FOR EDUCATION
SARALA BIRLA GROUP OF SCHOOLS
A CBSE DAY–CUM–BOYS' RESIDENTIAL SCHOOL

PERIODIC TEST-1 2025-26
MATHEMATICS
MARKING SCHEME

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Class: X	**Time: 1hr**
Date: 04.07.25	**Max Marks: 25**
Admission no:	**Roll no:**

General Instructions:

1. This Question Paper has 4 Sections A, B, C and D.
2. Section A has 5 MCQs carrying 1 mark each
3. Section B has 2 questions carrying 02 marks each.
4. Section C has 2 questions carrying 03 marks each.
5. Section D has 2 questions carrying 05 marks each.
6. All Questions are compulsory.

SECTION A

1. **If a tower 6m high casts a shadow of $2\sqrt{3}$ m long on the ground, then the sun's elevation is:** 1m
   (a) 60^0   (b) 45^0 (c) 30^0 (d) None of these

2. **The angle formed by the line of sight with the horizontal when the point is below the horizontal level is called:** 1m
   (a) Angle of elevation   **(b) Angle of depression**   (c) No such angle is formed   (d) None of these

3. A steel wire is tied to the top of an electric pole and the ground making an angle of 60° with the ground. If the height of electric pole is 12 m, then length of steel wire is 1m

   (a) $4\sqrt{3}$ m   **(b) $8\sqrt{3}$ m**   (c) $4\sqrt{3}$ m   (d) None of these

4. Which of the following is not irrational? 1m
   (a) $(2 – \sqrt{3})2$ (b) $(\sqrt{2} + \sqrt{3})2$ (c) **$(\sqrt{2} -\sqrt{3})(\sqrt{2} + \sqrt{3})$**   (d) None of these

5. LCM of the given number 'x' and 'y' where y is a multiple of 'x' is given by 1m
   (a) x   **(b) y**   (c) xy   (d) None of these

6. An observer 1.5 m tall is 28.5 m away from a tower of height 30 m. Find the angle of elevation of the top of tower from his eye. 2m

A:-   In right $\triangle ABC$,
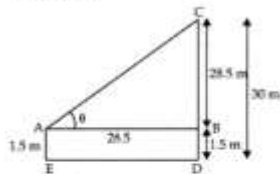
$$\tan \theta = \frac{BC}{AB}$$

$$\tan \theta = \frac{28.5}{28.5}$$

$\tan \theta = 1 = \tan 45°$

$\theta = 45°$

1m

1m

7. Check whether 6^n can end with the digit 0 for any natural number n.   2m

A:- 6^n will end with 0 if 5 is one of the primes of 6.

Prime factors of 6 = 2 and 3.   1m

Since 5 is not a prime factor of 6,
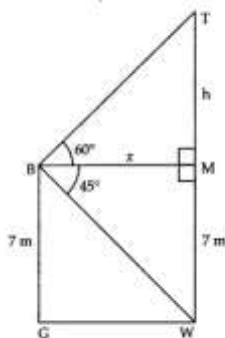
therefore, 6^n cannot end with the digit 0.   1m

8. From the top of a 7 m high building, the angle of elevation of the top of a tower is 60° and the angle of depression of its foot is 45°. Find the height of the tower.   3m

A:- Let BG be building

TW be Tower, then:

1m

BM = x, $\angle MBT = 60°$, $\angle MBW = 45°$

Draw BM $\perp$ TW.

In rt. $\angle d \triangle BMW$

$\tan 45° = \frac{WM}{BM} \Rightarrow 1 = \frac{7}{x} \Rightarrow x = 7$ m

In rt. $\angle d \triangle TMB$

$\tan 60° = \frac{TM}{BM} \Rightarrow \sqrt{3} = \frac{h}{x}$ 1m

$\Rightarrow h = \sqrt{3}x = 7\sqrt{3}$

Height of Tower = TW = TM + MW

$= (7\sqrt{3} + 7)$m $= 7(\sqrt{3} + 1)$m

1m

9. Find the HCF and LCM of 26 and 91 and verify that for any two positive integers 'a' and 'b',   3m
HCF X LCM = a x b.

A:- 26 = 2 x 13

91 = 7 x 13   1m

HCF = 13

LCM = 2 x 7 x 13 = 182   1m

a x b = 26 x 91 = 2366

HCF x LCM = 13 x 183 = 2366   1m

10. A group of students of class X visited India Gate on an education trip. The teacher and students had interest in history as well. The teacher narrated that India Gate, official name Delhi Memorial, originally called All-India War Memorial, monumental sandstone arch in New Delhi, dedicated to the troops of British India who died in wars fought between 1914 and 1919. The teacher also said that India Gate, which is located at the eastern end of the Rajpath (formerly called the Kingsway), is about 138 feet (42 metres) in height.   5m

i. What is the angle of elevation if they are standing at a distance of 42 m away from the monument?

OR

If the altitude of the sun is at 60∘ then the what will be height of vertical tower that will cast a shadow of length 20 m?

ii. The ratio of the height of India gate and its shadow is 1:1. Then what will be angle of elevation of the sun?

iii. What do we call the angle formed by the line of sight with the horizontal when the object view is above the horizontal level?

A:-

i. For question i, we need to find the angle of elevation (θ) when standing 42 m away from a 42 m tall monument. We can use the tangent function: $\tan(\theta)$ = opposite/adjacent = height/distance. Here, $\tan(\theta) = 42/42 = 1$.

Thus, $\theta = 45°$.
Or
we need to find the height (h) of a tower that casts a shadow of 20 m when the sun's altitude is 60°. Using the tangent function: $\tan(60°) = h/20$. We know $\tan(60°) = \sqrt{3}$.
So, $h = 20 * \tan(60°) = 20 * \sqrt{3} = 20\sqrt{3}$.   2m

ii. 45^0 1m

iii. Angle of elevation   1m

11. Prove that $\sqrt{2}$ is irrational.   5m

A:-

Let, if possible to the contrary that $\sqrt{2}$ is not irrational number i.e., $\sqrt{2}$ is a rational number.

That mean $\sqrt{2}$ can be expressed in $\frac{p}{q}$ form where

p and q are coprime positive integers and $q \neq 0$.

So, $\sqrt{2} = \frac{p}{q}$

$\Rightarrow p^2 = 2q^2$ 1m

Thus, p^2 is a multiple of 2

$\Rightarrow$ p is a multiple of 2.

Let p = 2m for some integer m.

$\Rightarrow q^2 = 2m^2$.   2m

Thus, q^2 is a multiple of 2.

$\Rightarrow$ q is a multiple of 2

Hence, 2 is a common factor of p and q

This contradicts the fact that p and q are coprimes.

∴ Our supposition is wrong.   2m

Hence, $\sqrt{2}$ is an irrational number.

****BEST OF LUCK****