Class - X
PA - I
(2025-26)
Mathematics

Date : 16 May 2025 Roll No.: _____
Time: 1.30 hrs. M M : 40

General Instructions

- There are 22 questions in this paper. All questions are compulsory.
- Section A consists of 12 questions of 1 mark each.
- Section B consists of 5 questions of 2 marks each.
- Section C consists of 3 questions of 3 marks each.
- Section D consists of 1 question and carries 5 marks.
- Section E consists of 1 question and carries 4 marks.

Section - A
(12 Marks)

1. $5\sin^2 A + 5\cos^2 A + 1$ is equal to _____. (1)

a) 6 b) -5
c) 1 d) -4

2. If $\sec A + \tan A = x$, then $\sec A =$ _____. (1)

a) $\frac{x^2-1}{x}$ b) $\frac{x^2-1}{2x}$
c) $\frac{x^2+1}{x}$ d) $\frac{x^2+1}{2x}$

3. Given that $\sin\theta = \frac{a}{b}$, then $\tan\theta =$ _____. (1)

a) $\frac{b}{\sqrt{b^2-a^2}}$ b) $\frac{\sqrt{b^2-a^2}}{b}$
c) $\frac{a}{\sqrt{b^2-a^2}}$ d) $\frac{\sqrt{b^2-a^2}}{a}$

4. If $\sin A - \cos A = 0$, then the value of $\sin^4 A + \cos^4 A$ is _____. (1)

a) 2 b) 1 c) $\frac{3}{4}$ d) $\frac{1}{2}$

5. HCF of 8,9,25 is _____. (1)

a) 8 b) 9 c) 25 d) 1

6. LCM of the given number ' x ' and ' y ' where y is a multiple of ' x ' is given by _____. (1)

a) x b) y c) xy d) $\frac{x}{y}$

7. The largest number which divides 70 and 125, leaving remainder 5 and 8 respectively, is_____. (1)

a)13 b) 65 c) 875 d) 1750

8. The angle of depression of a car standing on the ground, from the top of a 75 m high tower is 30°. The distance of the car from the base of the tower (in m) is: _____. (1)

a) $25\sqrt{3}$ b) $50\sqrt{3}$ c) $75\sqrt{3}$ d) 150

9. The angle of elevation of the top of a tower is 30°. If the height of the tower is doubled, then the angle of elevation of its top will _____. (1)

a) also get doubled b) will get halved

c) will be less than 60 degree d) None of these

10. The angle formed by the line of sight with the horizontal when the point is below the horizontal level is called: _____. (1)

a) Angle of elevation b) Angle of depression

c) No such angle is formed d) None of the above

Assertion-Reason Type Questions (Q11, Q12)

In the following questions, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:

a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
c) Assertion (A) is true but reason (R) is false.
d) Assertion (A) is false but reason (R) is true.

11. Assertion (A): When we move towards the object, angle of elevation decreases.
Reason (R): As we move towards the object, it subtends large angle at our eye than before. (1)

12. Assertion (A): For no value of n, where n is a natural number, the number 6^n ends with the digit zero.
Reason (R): For a number to end with digit zero, its prime factorization should have 2 and 5. (1)

Section - B
(10 Marks)

13. The ratio of the height of a tower and length of its shadow on the ground is $\sqrt{3}$: 1. What is the angle of elevation of the sun? (2)

14. If $\tan \alpha = \sqrt{3}$ and $\tan \beta = \frac{1}{\sqrt{3}}, 0 < \alpha, \beta < 90°$, find the value of $\cot(\alpha + \beta)$. (2)

15. If $\sin A = \frac{3}{4}$, calculate $\cos A$ and $\tan A$. (2)

16. Find the value of $\frac{\cos 45°}{\sec 30° + cosec\ 30°}$ (2)

17. Prove that $\frac{tanA}{1+\sec A} - \frac{tanA}{1-\sec A} = 2 \text{ cosec A}$ (2)

Section - C
(9 Marks)

17. i) Find the value of x for $\sqrt{3}\sin x = \cos x$. (1.5)
ii) Represent cosec θ in terms of tan θ (1.5)

18. Prove that $\sqrt{5}$ is irrational. (3)

19. Prove that: -
$\frac{\sin\theta - \cos\theta + 1}{\sin\theta + \cos\theta - 1} = \sec\theta + \tan\theta$ (3)

Section - D
(5 marks)

20. The angle of elevation of the top of a hill at the foot of a tower is 60° and the angle of elevation of the top of the tower from the foot of the hill is 30°. If height of the tower is 50 m, find the height of the hill (5)

Section - E
(4 Marks)

21. To enhance the reading skills of grade *X* students, the school nominates you and two of your friends to set up a class library. There are two sections- section *A* and section B of grade *X*. There are 32 students in section A and 36 students in section B.

i) What is the minimum number of books you will acquire for the class library, so that they can be distributed equally among students of Section A or Section B? (2)

ii) If the product of two positive integers is equal to the product of their HCF and LCM is true, then *find the* HCF of (32,36) (1)

iii) If p and q are positive integers such that $p=ab^2$ and $q=a^2b$, where a, b are prime numbers, then find the LCM of p and q. (1)