Ekalavya (Mathematics Assessment)

Marks: 30 **Batch-II** **07.02.26**

Section- A (1 X 10)

1. $(\sec^2\theta - 1)(\operatorname{cosec}^2\theta - 1)$ is equal to:
(a) –1 (b) 1 (c) 0 (d) 2

2. In Δ ABC right angled at B, $\sin A = \frac{7}{25}$, then the value of cos C is .....
(a) $\frac{7}{25}$ (b) $\frac{24}{25}$ (c) $\frac{7}{24}$ (d) $\frac{24}{7}$

3. If 5 tan θ = 4, then the value of $\frac{5\sin\theta - 3\cos\theta}{5\sin\theta + 2\cos\theta}$ is
(a) 1/6 (b) 1/7 (c) 1/4 (d) 1/5

4. If cosec A = 13/12, then the value of $\frac{2\sin A - 3\cos A}{4\sin A - 9\cos A}$
(a) 4 (b) 5 (c) 6 (d) 3

5. Given that sin α = 1/2 and cos β = 1/2, then the value of (β – α) is
(a) 0° (b) 30° (c) 60° (d) 90°

6. If tan θ = 1, then the value of sec θ + cosec θ is:
(a) $3\sqrt{2}$ (b) $4\sqrt{2}$ (c) $2\sqrt{2}$ (d) $\sqrt{2}$

7. If $\sin 2A = \frac{1}{2}\tan^2 45°$ where A is an acute angle, then the value of A is
(a) 60° (b) 45° (c) 30° (d) 15°

8. If θ is an acute angle and $\tan\theta + \cot\theta = 2$, then the value of $\sin^3\theta + \cos^3\theta$ is
(a) 1 (b) $\frac{1}{2}$ (c) $\frac{\sqrt{2}}{2}$ (d) $\sqrt{2}$

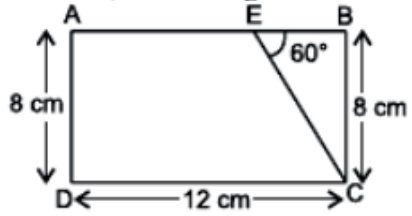
In the following questions 9 and 10, a statement of assertion (A) is followed by a statement of reason (R). Mark the correct choice as:
(a) Both assertion (A) and reason (R) are true and reason (R) is the correct explanation of assertion (A).
(b) Both assertion (A) and reason (R) are true but reason (R) is not the correct explanation of assertion (A).
(c) Assertion (A) is true but reason (R) is false.

9. **Assertion (A):** In a right ΔABC, right angled at B, if tan A = 1, then 2 sin A. cos A = 1.
Reason (R): tan 45° = 1 and sin 45° = cos 45° = $1/\sqrt{2}$

10. **Assertion (A):** sin (A + B) = sin A + sin B
Reason (R): For any value of θ, $1 + \tan^2\theta = \sec^2\theta$

Section- B (3 X 5)

11. In the given figure, ABCD is a rectangle with AD = 8 cm and CD = 12 cm. Line segment CE is drawn, making an angle of 60° with AB, intersecting AB at E. Find the length of CE and BE.



12. A pole casts a shadow of length $2\sqrt{3}$ m on ground, when the sun's elevation is 60°. Find the height of the pole.

13. Evaluate: $3\cos^2 60° \sec^2 30° - 2\sin^2 30° \tan^2 60°$.

14. The shadow of a flagstaff is three times as long as the shadow of the flagstaff when the sunrays meet the ground at an angle of 60°. Find the angle between the sunrays and the ground at the time of longer shadow.

15. If cosecθ + cotθ = p, then prove that $\cos\theta = \frac{p^2 - 1}{p^2 + 1}$

Section- C (5 X 1)

16.

As observed from the top of a 100 m high light house from the sea-level, the angles of depression of two ships are 30° and 45°. If one ship is exactly behind the other on the same side of the light house, find the distance between the two ships [Use $\sqrt{3} = 1.732$]