UNIT III - TRIGNOMETRY

Angles and Trignometric Ratios

13

1m	2m	3m	4m	5m	Total
1(K)	–	1(U)	–	1(U)	09

1 MARK QUESTIONS

1. Define angle.
2. Convert 25° into radians.
3. Convert 720° into radians.
4. Convert $67\frac{1}{2}°$ into radians.
5. Convert $\frac{2\pi^C}{3}$ into degrees [Sexagesimal measure].
6. Convert $\frac{3\pi^C}{5}$ into degrees.
7. Convert $\frac{3^C}{4}$ into degrees $\left[\text{Hint: Use } \pi = \frac{22}{7}\right]$
8. Prove that cosA.tanA = sinA.
9. Prove that sinA.secA = tanA.
10. Prove that $(1 - \sin^2 A).\sec^2 A = 1$.
11. Prove that $(\sec^2 A - 1).\cot^2 A = 1$.
12. Prove that $(1 - \cos^2 A).\operatorname{cosec}^2 A = 1$.
13. Prove that $\sin^2\theta.\sec^2\theta = \sec^2\theta - 1$.
14. prove that $\sec^2 A + \operatorname{cosec}^2 A = \sec^2 A.\operatorname{cosec}^2 A$.
15. Prove that $1 + \tan^2\theta = \sec^2\theta$.
16. Prove that $\sin^2\theta + \cos^2\theta = 1$.
17. Define radian.

3 MARKS QUESTIONS

1. Prove that $\cos^4 A - \sin^4 A = 1 - 2\sin^2 A = 2\cos^2 A - 1$.
2. The angles of a triangle are in the ratio 2:3:4. Express them in radians and as well as in degrees.

3. The angles of a triangle are inthe ratio 4:5:6. Find them in degrees and radians.
4. The angles of a triangle are in A.P. and the greatest is double the least. Express them in degrees and radians.
5. The angles of a triangle are in A.P. The least being 36°. Find the angles in degrees and radians.
6. The angles of a triangle are in A.P and the greatest is 5 times the least. Find them in degrees and radians.
7. The angles of a quadrilateral are in the ratio 2:3:5:8. Find them in radians and degrees.
8. In right angle triangle, the difference between the two acute angles is $\frac{\pi}{9}$ radians. Find them in degrees.
9. If $x = a\cos^3\theta$; $y = a\sin^3\theta$. Show that $x^{2/3} + y^{2/3} = a^{2/3}$.
10. If $\cos A = \frac{12}{13}$ and A is acute, find other five trignometric functions.
11. If $\sec A = \frac{2}{\sqrt{3}}$ and A is acute, find other five trignometric functions.
12. Prove that $(1 + \tan A + \sec A).(1 + \cot A - \operatorname{cosec} A) = 2$.
13. If $\cos\theta = \frac{a}{b}$. Show that $\frac{a\sin\theta - b\cos\theta}{a\sin\theta + b\cos\theta} = \frac{a^2 - b^2}{a^2 + b^2}$.
14. Prove that $(1 + \sin\theta + \cos\theta)^2 = 2(1 + \sin\theta)(1 + \cos\theta)$.
15. Prove that $\frac{\cot A + \tan B}{\cot B + \tan A} = \frac{\cot A}{\cot B}$.
16. Prove that $\sqrt{\frac{1+\cos A}{1-\cos A}} = \operatorname{cosec} A + \cot A$.
17. Prove that $\frac{\cos\theta}{1-\tan\theta} + \frac{\sin\theta}{1-\cot\theta} = \cos\theta + \sin\theta$.
18. Prove that $\frac{1}{1+\sin^2 A} + \frac{1}{1+\operatorname{cosec}^2 A} = 1$.
19. Prove that $\frac{1}{1+\cos A} + \frac{1}{1-\cos A} = 2\operatorname{cosec}^2 A$.
20. If $\cot A = \frac{5}{12}$ and A is acute, then show that $2\operatorname{cosec} A - 4\sec A = \frac{247}{30}$.
21. If $\tan\theta = \frac{5}{12}$ and θ is acute. Show that $3\sin\theta - 4\cos\theta = -\frac{33}{13}$.

22. If $x = a\sin\alpha.\cos\beta$, $y = b\sin\alpha.\sin\beta$ & $Z = \cos\alpha$. Show that $\frac{x^2}{a^2}+\frac{y^2}{b^2}+\frac{z^2}{c^2}=1$.

23. If $\sin A + \cos A = \sqrt{2}\sin A$. Show that $\sin A - \cos A = \sqrt{2}\cos A$.

5 MARKS QUESTIONS

1. The angles of a quadrilateral are in A.P. such that the greatest is double the least. Find them in degrees as well as in radians.

2. Prove that: $\frac{\tan A}{1-\cot A}+\frac{\cot A}{1-\tan A}=1+\sec A.\operatorname{cosec} A$.

3. If $\tan A + \sin A = m$ and $\tan A - \sin A = n$. Show that $m^2-n^2=4\sqrt{mn}$.

4. If $\tan A + \sin A = m$ and $\tan A - \sin A = n$, then prove that $(m^2 - n^2)^2 = 16$.

5. Prove that: $\frac{\tan A}{\sec A-1}+\frac{\tan A}{\sec A+1}=2\operatorname{cosec} A$.

6. If $\tan\theta + \sec\theta = \frac{5}{2}$. Then find the value of $\sin\theta$.

7. Prove that $\frac{\cos^3 A+\sin^3 A}{\cos A+\sin A}+\frac{\cos^3 A-\sin^3 A}{\cos A-\sin A}=2$.

8. If $\tan\theta=\frac{p}{q}$. Then prove that $\frac{p\sin A-q\cos A}{p\sin A+q\cos A}=\frac{p^2-q^2}{p^2+q^2}$.

9. (*a*) If $\sin x + \sin^2 x = 1$. Then prove that $\cos^2 x + \cos^4 x = 1$.

   (*b*) If $\cot\theta=\frac{5}{2}$ and q is acute show that $\frac{5\cos\theta+2\sin\theta}{5\cos\theta-2\sin\theta}=\frac{29}{21}$.

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