

COMPOUND ANGLES, MULTIPLE ANGLES, SUB MULTIPLES ANGLES AND TRANSFORMATION FORMULAE



1m	2m	3m	4m	5m	6m	Total
1(K)	2(S+A)	–	–	1(K)	–	10

1 MARK QUESTIONS

(Knowledge)

- Find the value of $\sin 75^\circ$.
- Find the value of $\cos 75^\circ$.
- Find the value of $\sin 15^\circ$.
- Find the value of $\cos 15^\circ$.
- Find the value of $\sin 105^\circ$.
- Find the value of $\cos 105^\circ$.
- Find the value of $\tan 75^\circ$.
- Find the value of $\tan 15^\circ$.
- Find the value of $\tan 105^\circ$.
- If $\sin \theta = \frac{1}{2}$, then find $\sin 2\theta$ [θ is $< 90^\circ$]
- If $\cos A = \frac{\sqrt{3}}{2}$, then find $\cos 2A$.
- If $\tan x = \frac{1}{\sqrt{3}}$, then find $\sin 2x$.
- If $\sin \theta = \frac{1}{\sqrt{2}}$, then find $\tan 2\theta$.
- Find the value of $3 \sin 10^\circ - 4 \sin^3 10^\circ$
- Find value y : $4 \cos^3 30^\circ - 3 \cos 30^\circ$.
- Express each the following as product of 2 trigono metric ratio.
 $\sin 5\theta + \sin \theta$.
- $\sin 4\theta + \sin 3\theta$.

QUESTION BANK**II PUC**

18. $\cos 4A + \cos 2A$.

19. $\cos 10^\circ - \cos 50^\circ$.

Express each of the following as the sum or difference of two trigonometric function.

20. $\sin 5x \cos 3x$.

21. $\cos 4A \sin 2A$.

22. $2\cos 70^\circ \cos 10^\circ$.

23. $\cos\left(\frac{5\theta}{2}\right) \cdot \sin\left(\frac{\theta}{2}\right)$

Express as a sum of or difference of 2 different trigonometric ratio

24. $2 \sin A \cdot \sin 3A$.

25. $2 \cos A \cdot \cos 5A$.

26. find the value of $4 \cos^3 10^\circ - 3 \cos 10^\circ$.

27. $2\cos 4x \cdot \sin x$

28. $2\sin 3x \cdot \cos x$

2 MARKS QUESTIONS

(Skill and Application)

1. If $\sin A = \frac{4}{5}$ and $\sin B = \frac{5}{13}$ ($A, B < 90^\circ$), find $\sin (A + B)$ and $\cos (A - B)$.

2. If $\sin A = \frac{4}{5}$ and $\sin B = \frac{5}{13}$ find $\tan (A + B)$ and $\tan (A - B)$.

3. If $\tan A = \frac{1}{2}$ and $\tan (A - B) = \frac{2}{7}$ find $\tan B$.

4. If $A + B = 45^\circ$, show that $(1 + \tan A)(1 + \tan B) = 2$.

5. Show that $\frac{\cos 2A}{\sec A} - \frac{\sin 2A}{\operatorname{cosec} A} = \cos 3A$

6. Show that : $\cos\left(\frac{\pi}{3} + A\right) \cdot \cos\left(\frac{\pi}{3} - A\right) - \sin\left(\frac{\pi}{3} + A\right) \cdot \sin\left(\frac{\pi}{3} - A\right) = -\frac{1}{2}$

7. Show that $\cot 2\theta + \tan \theta = \operatorname{cosec} 2\theta$.

8. If $\tan A = \frac{1}{3}$, $\tan B = \frac{2}{7}$ then find $\cot (A - B)$.

9. Show that $\tan (45^\circ + A) = \frac{1 + \tan A}{1 - \tan A}$

BASIC MATHEMATICS

10. Show that $\tan(45^\circ - A) = \frac{1 - \tan A}{1 + \tan A}$
11. If $A + B + C = 180^\circ$, $\tan A = 1$, $\tan B = 2$ show that $\tan C = 3$.
12. If $\sin A = \frac{5}{13}$, $\cos B = -\frac{4}{5}$ $\left(\frac{\pi}{2} < A < \pi\right)$ and $\left(\pi < B < \frac{3\pi}{2}\right)$. Find $\cos(A - B)$.
13. Show that $\tan(45^\circ + A) \tan(45^\circ - A) = 1$.
14. Show that $\sin(A + B) \sin(A - B) = \sin^2 A - \sin^2 B$.
15. Show that $\tan 75^\circ + \cot 75^\circ = 4$.
16. Show that $\sin 105^\circ + \cos 105^\circ = \frac{1}{\sqrt{2}}$.
17. Show that $\sec 15^\circ + \operatorname{cosec} 15^\circ = 2\sqrt{6}$
18. If $\cos A = \frac{5}{13}$, $\cos B = \frac{24}{25}$, $(A, B < 90^\circ)$ find $\sin(A - B)$.
19. If $\sin A = \frac{7}{25}$, $\cos B = \frac{-12}{13}$ $(90^\circ < A < 180^\circ)$ and $(180^\circ < B < 270^\circ)$ find $\tan(A + B)$.
20. If $\tan A = \frac{1}{2}$ and $\tan B = \frac{1}{3}$ find $\tan(A + B)$.
21. If $\tan A = \frac{5}{6}$, $\tan(A + B) = 1$ show that $\tan B = \frac{1}{11}$.
22. Prove that $\frac{\cos 2A}{\sec A} + \frac{\sin 2A}{\operatorname{cosec} A} = \cos A$
23. Prove that $\sin(45^\circ + A) + \cos(45^\circ + A) = \sqrt{2} \cos A$
24. Prove that $\cos\left(\frac{\pi}{6} + A\right) \cdot \cos\left(\frac{\pi}{6} - A\right) - \sin\left(\frac{\pi}{6} + A\right) \cdot \sin\left(\frac{\pi}{6} - A\right) = \frac{1}{2}$
25. Prove that $\frac{\sin(A + B)}{\cos A \cos B} = \tan A + \tan B$
26. Show that $\cos(120^\circ + A) + \cos(120^\circ - A) = -\cos A$.
27. Show that $\tan 15^\circ + \cot 15^\circ = 4$.
28. Prove that $\sin 2A = \frac{2 \tan A}{1 + \tan^2 A}$

QUESTION BANK**II PUC**

29. Prove that $\cos 2A = 2\cos^2 A - 1$.
30. Prove that $\cos 2A = \frac{1 - \tan^2 A}{1 + \tan^2 A}$
31. Prove that $\cos 2A = 1 - 2 \sin^2 A$.
32. Prove that $\tan 2A = \frac{2 \tan A}{1 - \tan^2 A}$
33. If $2 \cos \theta = \left(x + \frac{1}{x}\right)$ show that $2 \cos 2\theta = x^2 + \frac{1}{x^2}$
34. Prove that $\cos 4\theta - \sin 4\theta = \cos 2\theta$.
35. Prove that $\frac{1 - \cos 2A}{\sin 2A} = \tan A$
36. Prove that $(\sin A + \cos A)^2 = 1 + \sin 2A$.
37. Prove that $\frac{\sin A + \sin 2A}{1 + \cos A + \cos 2A} = \tan A$
38. If $\sin \theta = \frac{1}{\sqrt{10}}$ find $\tan 2\theta$.
39. Prove that $\frac{\sin 4A + \sin 2A}{\sin 4A - \sin 2A} = \tan 3A - \cot A$
40. Prove that $\frac{\cos 2y - \cos 2x}{\sin 2x + \sin 2y} = \tan(x - y)$
41. Prove that $\frac{\cos 75^\circ + \cos 15^\circ}{\sin 75^\circ - \sin 15^\circ} = \sqrt{3}$

5 MARKS QUESTIONS**(Knowledge)**

1. Prove that $\cos A + \cos (120^\circ + A) + \cos (120^\circ - A) = 0$.
2. If $\tan A = \frac{n}{n+1}$ and $\tan B = \frac{1}{2n+1}$ show that $\alpha + \beta = \frac{\pi}{4}$
3. Prove that $\tan A \cdot \tan 3A \cdot \tan 4A = \tan 4A - \tan 3A - \tan A$.
4. Show that $\sum \frac{\sin(A - B)}{\cos A \cos B} = 0$

BASIC MATHEMATICS

5. Prove that $\sin 3A = 3\sin A - 4\sin^3 A$.
6. Prove that $\cos 3A = 4\cos^3 A - 3\cos A$.
7. Prove that $\tan 3A = \frac{3\tan A - \tan^3 A}{1 - 3\tan^2 A}$
8. Prove that $\frac{\sin 3\theta}{1 + 2\cos 2\theta} = \sin \theta$ and hence deduce the value of $\sin 15^\circ$.
9. Prove that $\frac{1 - \cos 2A + \sin 2A}{1 + \cos 2A + \sin 2A} = \tan A$
10. Prove that $\frac{\cot A}{\cot A - \cot 3A} + \frac{\tan A}{\tan A - \tan 3A} = 1$
11. Show that $\frac{1 + \tan^2(45^\circ - \theta)}{1 - \tan^2(45^\circ - \theta)} = \sec 2\theta$
12. Prove that $\frac{\sin 3A}{\sin A} - \frac{\cos 3A}{\cos A} = 2$
13. Prove that $\frac{1 + \cos 2A + \sin 2A}{1 - \cos 2A + \sin 2A} = \cot A$
14. If $\tan \alpha = \frac{1}{3}$, $\tan \beta = \frac{1}{7}$ Prove that $\tan(2\alpha + \beta) = \frac{\pi}{4}$
15. Prove that $\cos 130^\circ + \cos 110^\circ + \cos 10^\circ = 0$.
16. Prove that $\frac{\sin 5A + \sin 4A + \sin 2A + \sin A}{\cos 5A + \cos 4A + \cos 2A + \cos A} = \tan 3A$
17. Prove that $\sin 20^\circ \cdot \sin 40^\circ \cdot \sin 60^\circ \cdot \sin 80^\circ = \frac{1}{16}$
18. Prove that $\cos 20^\circ \cdot \cos 40^\circ \cdot \cos 60^\circ \cdot \cos 80^\circ = \frac{3}{16}$
20. Prove that $\frac{\cos 7x + \cos 3x - \cos 5x - \cos x}{\sin 7x - \sin 3x - \sin 5x + \sin x} = \cot 2x$
21. Prove that $\frac{\sin 6A + \sin 2A + 2\sin 4A}{\sin 7A + \sin 3A + 2\sin 5A} = \frac{\sin 4A}{\sin 5A}$
22. Prove that in any $\triangle ABC$ $\sin 2A + \sin 2B + \sin 2C = 4 \sin A \cdot \sin B \cdot \sin C$.
23. If $A + B + C = \pi$, prove that $\sin 2A + \sin 2B - \sin 2C = 4 \cos A \cdot \cos B \cdot \sin C$.
24. In any $\triangle ABC$, show that $\cos 2A + \cos 2B + \cos 2C = -1 - 4 \cos A \cos B \cos C$.
