



# PARISHRAM ACADEMY

NAME of Student : \_\_\_\_\_

Subject : Maths

Class : XII

State

Topic :- 3 – Trigonometric Functions

M. M. :- 40

## SECTION – A (8 Marks)

Q. 1. Multiple choice questions:

(i) The general solution of the equation  $\sqrt{3} \operatorname{cosec} x = 2$  is

- (a)  $n\pi + (-1)^n \frac{\pi}{3}$       (b)  $\frac{n\pi}{2} + (-1)^n \frac{\pi}{3}$       (c)  $n\pi + (-1)^n \frac{\pi}{6}$       (d)  $\frac{n\pi}{2} - (-1)^n \frac{\pi}{3}$

(ii) The general solution of the trigonometric equation  $\tan^2 \theta = 1$  is

- (a)  $\theta = nx \pm \frac{\pi}{3}, n \in Z$       (b)  $\theta = nx \pm \frac{\pi}{6}, n \in Z$       (c)  $\theta = nx \pm \frac{\pi}{4}, n \in Z$       (d)  $\theta = nx, n \in Z$

(iii)  $\sin\left(2 \sin^{-1}\left(\frac{3}{5}\right)\right) =$

- (a)  $\frac{24}{27}$       (b)  $\frac{24}{25}$       (c)  $\frac{25}{24}$       (d)  $\frac{27}{24}$

(iv) If  $\cos^{-1} \frac{3}{5} - \sin^{-1} \frac{4}{5} = \cos^{-1} x$ , then  $x =$

- (a) 0      (b) 1      (c) -1      (d) 2

## SECTION – B (8 Marks)

Solve Any Four

Q. 2. Find polar coordinate of a point whose cartesian coordinates are  $\left(\frac{-1}{\sqrt{2}}, \frac{-1}{\sqrt{2}}\right)$ .

Q. 3. Find principal value of  $\cot^{-1}\left(\frac{-1}{\sqrt{3}}\right)$ .

Q. 4. Find the general solution of  $\cos 4x = \cos 2x$ .

Q. 5. Show that  $\cos^{-1}\left(\frac{4}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \cos^{-1}\left(\frac{33}{65}\right)$

Q. 6. Find the general solution of the equations (i)  $\tan 2x = 0$

Q. 7. Find the Cartesian co-ordinates of a point, whose polar co-ordinates are  $\left(2, \frac{\pi}{4}\right)$

## SECTION – C (12 Marks)

Solve Any Four

Q. 8. In any triangle ABC, prove that  $a^2 = b^2 + c^2 - 2bc \cos A$ .

Q. 9. In  $\Delta ABC$ , prove that  $a^3 \sin(B - C) + b^3 \sin(C - A) + c^3 \sin(A - B) = 0$ .

Q. 10. In triangle ABC, if  $a = 13$ ,  $b = 14$  and  $c = 15$ , find the values of  $\sin\left(\frac{A}{2}\right)$ ,  $\cos\left(\frac{A}{2}\right)$  and  $\tan\left(\frac{A}{2}\right)$ .

Q. 11. Prove that,  $\sin^{-1}\left(\frac{3}{5}\right) + \cos^{-1}\left(\frac{12}{13}\right) = \tan^{-1}\left(\frac{63}{16}\right)$ .

Q. 12. In  $\Delta ABC$ , prove that  $\sin\left(\frac{B-C}{2}\right) = \left(\frac{b-c}{a}\right) \cos \frac{A}{2}$ .

Q. 13. In  $\Delta ABC$  prove that  $a(b \cos C - c \cos B) = b^2 - c^2$ .

**SECTION – D (12 Marks)**

**Solve Any Three**

Q. 14. In  $\Delta ABC$  with usual notation prove that,  $(a - b)^2 \cos^2\left(\frac{C}{2}\right) + (a + b)^2 \sin^2\left(\frac{C}{2}\right) = c^2$

Q. 15. Show that,  $\sin^{-1}\left(\frac{8}{17}\right) + \sin^{-1}\left(\frac{3}{5}\right) = \sin^{-1}\left(\frac{77}{85}\right)$

Q. 16. If  $\tan^{-1}\left(\frac{x-1}{x-2}\right) + \tan^{-1}\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$ , find the value of x.

Q. 17. Show that  $\tan^{-1} x + \tan^{-1}\left(\frac{2x}{1-x^2}\right) = \tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$  for  $|x| < \frac{1}{\sqrt{3}}$ .

Q. 18. If  $2 \tan^{-1}(\cos x) = \tan^{-1}(2 \operatorname{cosec} x)$ , then find the value of x.