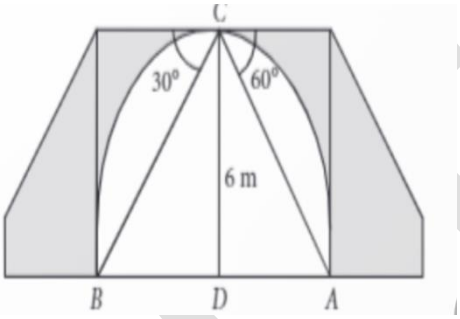
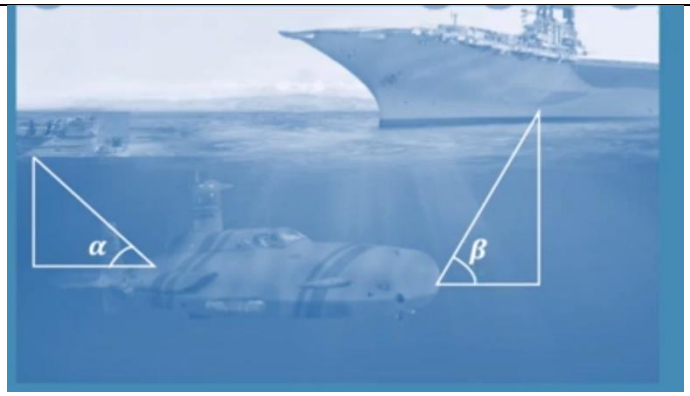
CHAPTER-3

TRIGONOMETRIC FUNCTIONS

05 MARK TYPE QUESTIONS

Q. NO	QUESTION	MARK
1.	One day while sitting on the bridge across a river Arun observes angles of depression of the banks on opposite sides of the river are 30° and 60° respectively as shown in the figure. (Take $\sqrt{3}$ =1.73)   Based on the above information, answer the following questions. i) If the bridge is at height of 6m , then AD= a) 6m b) $\frac{\sqrt{3}}{6}$m c) $6\sqrt{3}$m d) $\frac{6}{\sqrt{3}}$m ii) Width of the river is a) 10.85m b) 11.87m c) 13.85m d) 19.85m iii) The angles of the elevation and depression are always a)Acute angles b) obtuse angles c)right angles d) straight angles iv) If BD=21m, then height of the bridge is a) 7m b) 21m c) $7\sqrt{3}$m d) $\frac{7}{\sqrt{3}}$m v) BD= a) 6m b) $6\sqrt{3}$m c) $\sqrt{3}$m d) $10\sqrt{3}$m	5
2.	A submarine is moving in such way that at a particular moment of time its angle of elevation for two ships, situated at different positions on the surface of water, is α and β respectively. If cosec$\alpha = \sqrt{3}$ and $sec\ sec\ \beta$ =2, then answer the following.	5

	 1. What will be the value of $sec\,\alpha$? a) $\sqrt{\frac{2}{3}}$ b) $\sqrt{\frac{3}{2}}$ c) $\frac{1}{\sqrt{3}}$ d) $\frac{1}{\sqrt{6}}$ 2. What will be the measure of the angle β? a) $\frac{\pi}{3}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{4}$ d) $\frac{\pi}{12}$ 3. What will be the value of $tan\,tan\,\alpha$? a) $\sqrt{3}$ b) $\frac{1}{\sqrt{3}}$ c) $\frac{1}{\sqrt{2}}$ d) $\frac{1}{\sqrt{6}}$ 4. What will be the value of $tan\,\beta$? a) $\sqrt{3}$ b) $\sqrt{2}$ c) $\frac{1}{\sqrt{3}}$ d) $\frac{\sqrt{2}}{\sqrt{3}}$ 5. What will be the value of $tan\,(\alpha+\beta)$? a) $\sqrt{3}-\sqrt{2}$ b) $\sqrt{6}+1$ c) $\frac{1+\sqrt{6}}{\sqrt{2}-\sqrt{3}}$ d) $\frac{1-\sqrt{6}}{\sqrt{2}+\sqrt{3}}$	
3.	Prove that $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right)=\frac{1}{8}$.	5
4.	Prove that $\cos^2 x+\cos^2(x+\frac{2\pi}{3})+\cos^2(x-\frac{2\pi}{3})=\frac{3}{2}$.	5

ANSWERS:

Q. NO	ANSWER	MARKS
1.	i) d) ii) c) iii) a) iv) c) v) b)	
2.	i) b) ii) a) iii) c) iv) a) v) c)	
3.	$\cos\frac{7\pi}{8}=\cos\left(\pi-\frac{\pi}{8}\right)=-\cos\frac{\pi}{8}$, $\cos\frac{5\pi}{8}=\cos\left(\pi-\frac{3\pi}{8}\right)=-\cos\frac{3\pi}{8}$ LHS = $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right)$ = $\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1-\cos\frac{3\pi}{8}\right)\left(1-\cos\frac{\pi}{8}\right)$ = $\left(1-\cos^2\frac{\pi}{8}\right)\left(1-\cos^2\frac{3\pi}{8}\right)$ =$\sin^2\frac{\pi}{8}\sin^2\frac{3\pi}{8}=\frac{1}{4}(2\sin^2\frac{\pi}{8})\,(2\sin^2\frac{3\pi}{8})$ =$\frac{1}{4}(1-\cos\frac{\pi}{4})\,\left(1-\cos\frac{3\pi}{4}\right)=\frac{1}{4}\left(1-\frac{1}{\sqrt{2}}\right)\left(1-\frac{1}{\sqrt{2}}\right)=\frac{1}{8}$	5
4.	LHS = $\cos^2 x+\cos^2(x+\frac{2\pi}{3})+\cos^2(x-\frac{2\pi}{3})$ = $\frac{1}{2}\left(2\cos^2 x+2\cos^2(x+\frac{2\pi}{3})+2\cos^2(x-\frac{2\pi}{3})\right)$ = $\frac{1}{2}\left[1+\cos 2x+1+\cos 2\left(x+\frac{2\pi}{3}\right)+1+\cos 2\left(x-\frac{2\pi}{3}\right)\right]$ = $\frac{1}{2}\left[3+\cos 2x+\cos 2\left(x+\frac{2\pi}{3}\right)+\cos 2\left(x-\frac{2\pi}{3}\right)\right]$ $=\frac{1}{2}\left[3+\cos 2x+\cos\left(2x+\frac{4\pi}{3}\right)+\cos\left(2x-\frac{4\pi}{3}\right)\right]$ $=\frac{1}{2}\left[3+\cos 2x+2\cos 2x\cos\left(\frac{4\pi}{3}\right)\right]$ $=\frac{1}{2}\left[3+\cos 2x+2\cos 2x\left(\frac{-1}{2}\right)\right]$ As, $\cos\left(\frac{4\pi}{3}\right)=\frac{-1}{2}$ = $\frac{3}{2}$	5