Trigonometric Functions

Q.No.1: Two poles standing on a horizontal ground are of heights 5 m and 10 m respectively. The line joining their tops makes an angle of 15° with the ground. Then the distance (in m) between the poles, is : **JEE 2019**

A. $5\left(2+\sqrt{3}\right)$

B. $5\left(\sqrt{3}+1\right)$

C. $\frac{5}{2}\left(2+\sqrt{3}\right)$

D. $10\left(\sqrt{3}-1\right)$

Q.No.2:

The expression $\frac{\tan A}{1-\cot A}+\frac{\cot A}{1-\tan A}$ can be written as :

JEE 2013

A. sinA cosA + 1

B. secA cosecA + 1

C. tanA + cotA

D. secA + cosecA

Q.No.3: If the angles of elevation of the top of a tower from three collinear points A, B and C, on a line leading to the foot of the tower, are 30°, 45° and 60° respectively, then the ratio AB : BC is : **JEE 2015**

A. $\sqrt{3}:1$

B. $\sqrt{3}:\sqrt{2}$

C. $1:\sqrt{3}$

D. 2 : 3

Q.No.4: If $0 \le x < 2\pi$, then the number of real values of x, which satisfy the equation $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$, is : **JEE 2016**

A. 5

B. 7

C. 9

D. 3

Q.No.5: A man is walking towards a vertical pillar in a straight path, at a uniform speed. At a certain point *A* on the path, he observes that the angle of elevation of the top of the pillar is 30°. After walking for 10 minutes from *A* in the same direction, at a point B, he observes that the angle of elevation of the top of the pillar is 60°. Then the time taken (in minutes) by him, from *B* to reach the pillar, is : **JEE 2016**

A. 10

B. 20

C. 5

D. 6

Q.No.6: If $5(\tan^2 x - \cos^2 x) = 2\cos 2x + 9$, then the value of $\cos 4x$ is : **JEE 2017**

A. $\frac{-3}{5}$

B. $\frac{1}{3}$

C. $\frac{2}{9}$

D. $-\frac{7}{9}$

Q.No.7: If sum of all the solutions of the equation $8\cos x \cdot \left(\cos\left(\frac{\pi}{6}+x\right)\cdot \cos\left(\frac{\pi}{6}-x\right)-\frac{1}{2}\right)=1$ in [0, π] is *k*π, then *k* is equal to : **JEE 2018**

A. $\frac{8}{9}$

B. $\frac{20}{9}$

C. $\frac{2}{3}$

D. $\frac{13}{9}$

Q.No.8: PQR is a triangular park with PQ = PR = 200 m. A T.V. tower stands at the mid-point of QR. If the angles of elevation of the top of the tower at P, Q and R are respectively 45°, 30° and 30°, then the height of the tower (in m) is : **JEE 2018**

A. $100\sqrt{3}$

B. $50\sqrt{2}$

C. 100

D. 50

Q.No.9: For any $\theta \in \left(\frac{\pi}{4}, \frac{\pi}{2}\right)$, the expression $3(\sin\theta - \cos\theta)^4 + 6(\sin\theta + \cos\theta)^2 + 4\sin^6\theta$ equals: **JEE 2019**

A. $13 - 4\cos^2\theta + 6\sin^2\theta\cos^2\theta$

B. $13 - 4\cos^6\theta$

C. $13 - 4\cos^2\theta + 6\cos^4\theta$

D. $13 - 4\cos^4\theta + 2\sin^2\theta\cos^2\theta$

Q.No.10: If $0 \le x < \frac{\pi}{2}$, then the number of values of *x* for which $\sin x - \sin 2x + \sin 3x = 0$, is: **JEE 2019**

A. 3

B. 1

C. 4

D. 2