DPP: 03

Subjective Questions

1. Prove that $\left(1+\cos\frac{\pi}{4}\right)\left(1+\cos\frac{3\pi}{4}\right)\left(1+\cos\frac{5\pi}{4}\right)\left(1+\cos\frac{7\pi}{4}\right)=\frac{1}{4}$.

2. If $x = y\cos\frac{2\pi}{3} = z\cos\frac{4\pi}{3}$, then prove that xy + yz + zx = 0.

3. Show that $\sec^2\theta + \operatorname{cosec}^2\theta \ge 4$.

Only One Option Correct Type

4. Which statement is correct, when a, b, m and n are non-zero real numbers?

(a) $4\sin^2\theta = 5$ (b) $(a^2+b^2)\cos\theta = 2ab$

(c) $(m^2+n^2)\operatorname{cosec}\theta = m^2-n^2$ (d) $\sin\theta = 2.375$

5. The value of $e^{\log_{10}\tan 1^o + \log_{10}\tan 2^o + \log_{10} 3^o + ...+\log_{10}\tan 89^o}$ is

(a) 0 (b) e (c) 1/e (d) None of these

6. The set of all possible values of α in $[-\pi,\pi]$ such that $\sqrt{\frac{1-\sin\alpha}{1+\sin\alpha}} = \sec\alpha - \tan\alpha$, is

(a) $\left[-\frac{\pi}{2},\frac{\pi}{2}\right]$ (b) $\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$ (c) $\left(\frac{\pi}{2},\pi\right)$ (d) None of these

7. If $4n\alpha = \pi$, then the value of $\cot\alpha\cdot\cot 2\alpha\cdot\cot 3\alpha\cdot ....\cdot\cot(2n-1)\alpha$ is

(a) 0 (b) 1 (c) 2 (d) None of these

8. The number of real solutions of the equation $\cos^7 x + \sin^4 x = 1$ in interval $[-\pi,\pi]$, is

(a) 0 (b) 1 (c) 2 (d) 3

9. The value of $\cos^2 5^o + \cos^2 10^o + \cos^2 15^o + ... + \cos^2 85^o + \cos^2 90^o$ is

(a) 7 (b) 8 (c) 9 (d) None of these

10. If $x \in R - \{0\}$, then $\cos\theta$ is

(a) $> x+\frac{1}{x}$ (b) $= x+\frac{1}{x}$ (c) $\ne x+\frac{1}{x}$ (d) None of these

11. The value of $3\left[\sin^4\left(\frac{3\pi}{2}-\alpha\right)+\sin^4(3\pi+\alpha)\right]-2\left[\sin^6\left(\frac{\pi}{2}+\alpha\right)+\sin^6(5\pi-\alpha)\right]$ is

(a) 0 (b) 1 (c) –1 (d) 2

12. If $\frac{\sin^3\theta-\cos^3\theta}{\sin\theta-\cos\theta}-\frac{\cos\theta}{\sqrt{1+\cot^2\theta}}-2\tan\theta\cot\theta=-1, \theta\in[0,2\pi]$ then θ belongs to

(a) $[0,\pi]-\left\{\frac{\pi}{4},\frac{\pi}{2}\right\}$ (b) $(0,\pi)$ (c) $(0,\pi)-\left\{\frac{\pi}{4},\frac{\pi}{2}\right\}$ (d) None of these

13. The number of solutions for which $e^{\sin x} - e^{-\sin x} = 4$, is

(a) 0 (b) 1 (c) 2 (d) 3

Answer Key

4. (b) 5. (d) 6. (b) 7. (b) 8. (d) 9. (d) 10. (c) 11. (b) 12. (c) 13. (a)