ASSIGNMENT 1

EE24BTECH11003 - Akshara Sarma Chennubhatla

C: MCQs with One Correct Answer

20. If $\alpha+\beta=\frac{\pi}{2}$ and $\beta+\gamma=\alpha$, then $\tan\alpha$ equals *(2001S)*

(a) $2(\tan\beta+\tan\gamma)$ (b) $\tan\beta+\tan\gamma$
(c) $\tan\beta+2\tan\gamma$ (d) $2\tan\beta+\tan\gamma$

21. The number of integral values of k for which the equation $7+5=2k+1$ has a solution is *(2002S)*

(a) 4 (b) 8 (c) 10 (d) 12

22. Given both θ and ϕ are acute angles and $\sin\theta=\frac{1}{2}$, $cos\phi=\frac{1}{3}$, then the value of $\theta+\phi$ belongs to *(2004S)*

(a) $(\frac{\pi}{3},\frac{\pi}{2}]$ (b) $(\frac{\pi}{2},\frac{2\pi}{3})$

(c) $(\frac{2\pi}{3},\frac{5\pi}{6}]$ (d) $(\frac{5\pi}{6},\pi]$

23. $\cos(\alpha-\beta)=1$ and $\cos(\alpha+\beta)=\frac{1}{e}$ where $\alpha,\beta\in[-\pi,\pi]$. Pairs of α,β which satisfy both the equations is/are *(2005S)*

(a) 0 (b) 1 (c) 2 (d) 4

24. The values of $\theta\in(0,2\pi)$ for which $2\sin^2\theta-5\sin\theta+2>0$, are *(2006-3M,-1)*

(a) $(0,\frac{\pi}{6})\cup(\frac{5\pi}{6},2\pi)$ (b) $(\frac{\pi}{8},\frac{5\pi}{6})$

(c) $(0,\frac{\pi}{8})\cup(\frac{\pi}{6},\frac{5\pi}{6})$ (d) $(\frac{41\pi}{48},\pi)$

25. Let $\theta\in(0,\frac{\pi}{4})$ and $t_1=(\tan\theta)^{\tan\theta}, t_2=(\tan\theta)^{cot\theta}, t_3=(cot\theta)^{\tan\theta}, t_4=(cot\theta)^{cot\theta}$, then *(2006-3M,-1)*

(a) $t_1>t_2>t_3>t_4$ (b) $t_4>t_3>t_1>t_2$
(c) $t_3>t_1>t_2>t_4$ (d) $t_2>t_3>t_1>t_4$

26. The number of solutions of the pair of equations
$2\sin^2\theta-\cos2\theta=0$
$2\cos^2\theta-3\sin\theta=0$
in the interval $[0,2\pi]$ is *(2007-3 Marks)*

(a) zero (b) one (c) two (d) four

27. For $x\in(0,\pi)$, the equation $+2\sin2x-\sin3x=3$ has *(JEE Adv.2014)*

(a) infinitely many solutions
(b) three solutions
(c) one solution
(d) no solution

28. Let S $=\{x\in(-\pi,\pi):x\neq0,\pm\frac{\pi}{2}\}$. The sum of all distinct solutions of the equation $\sqrt{3}secx+$ $+2(-cotx)=0$ in the set S is equal to *(JEE Adv.2016)*

(a) $-\frac{7\pi}{9}$ (b) $-\frac{2\pi}{9}$

(c) 0 (d) $\frac{5\pi}{9}$

29. The value of $\sum_{k=1}^{13} \frac{1}{\sin(\frac{\pi}{4}+\frac{(k-1)\pi}{6})\sin(\frac{\pi}{4}+\frac{k\pi}{6})}$ is equal to

(JEE Adv.2016)

(a) $3-\sqrt{3}$ (b) $2(3-\sqrt{3})$

(c) $2(\sqrt{3}-1)$ (d) $2(2-\sqrt{3})$

D: MCQs with One or More than One Correct

1. $(1+\cos\frac{\pi}{8})(1+\cos\frac{3\pi}{8})(1+\cos\frac{5\pi}{8})(1+\cos\frac{7\pi}{8})$ is equal to

(1984-3 Marks)

(a) $\frac{1}{2}$ (b) $\cos\frac{\pi}{8}$

(c) $\frac{1}{8}$ (d) $\frac{1+\sqrt{2}}{2\sqrt{2}}$

2. The expression $3[\sin^4(\frac{3\pi}{2}-\alpha)+\sin^4(3\pi+\alpha)]-2[\sin^6(\frac{\pi}{2}+\alpha)+\sin^6(5\pi-\alpha)]$ is equal to

(1986-2 Marks)

(a) 0 (b) 1
(c) 3 (d) $\sin 4\alpha+\cos 6\alpha$
(e) none of these

3. The number of all possible triplets (a_1, a_2, a_3) such that $a_1+a_2\cos(2x)+a_3\sin^2(x)=0$ for all x is

(1987-2 Marks)

(a) zero (b) one (c) three
(d) infinite (e) none

4. The values of θ lying between $\theta=0$ and $\theta=\frac{\pi}{2}$ and satisfying the equation

$$\begin{vmatrix} 1+\sin^2\theta & \cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & 1+\cos^2\theta & 4\sin 4\theta \\ \sin^2\theta & \cos^2\theta & 1+4\sin 4\theta \end{vmatrix} = 0$$

are

(1988-2 Marks)

(a) $\frac{7\pi}{24}$ (b) $\frac{5\pi}{24}$ (c) $\frac{11\pi}{24}$ (d) $\frac{\pi}{24}$

5. Let $2\sin^2 x+3-2>0$ and $x^2-x-2<0$ (x is measured in radians). Then x lies in the interval

(1994)

(a) $(\frac{\pi}{6}, \frac{5\pi}{6})$ (b) $(-1, \frac{5\pi}{6})$

(c) $(-1, 2)$ (d) $(\frac{\pi}{6}, 2)$