

EE1030: Matrix Theory

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- 6) The number of distinct solutions of equation $\frac{5}{4}\cos^2 2x + \cos^4 x + \sin^4 x + \cos^6 x + \sin^6 x = 2$ in the interval $[0, 2\pi]$ is (JEEAdv.2015)
- 7) Let a, b, c be three non-zero real numbers such that the equation: $\sqrt{3}a \cos x + 2b \sin x = c, x \in \left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$, has two distinct real roots α and β with $\alpha + \beta = \frac{\pi}{3}$. Then, the value of $\frac{b}{a}$ is (JEEAdv.2018)
- 7) The number of values of x in the interval $[0, 3\pi]$ satisfying the equation $2 \sin^2 x + 5 \sin x - 3 = 0$ is (2006)

Section-B JEE Main/AIEEE

- 1) The period of $\sin^2 \theta$ is (2002)
- a) π^2 b) π c) 2π d) $\pi/2$
- 2) The number of solution of $\tan x + \sec x = 2 \cos x$ in $[0, 2\pi]$ is (2002)
- a) 2 b) 3 c) 0 d) 1
- 3) Which one is not periodic (2002)
- a) $|\sin 3x| + \sin^2 x$ c) $\cos 4x + \tan^2 x$
b) $\cos \sqrt{x} + \cos^2 x$ d) $\cos 2x + \sin x$
- 4) Let α, β be such that $\pi < \alpha - \beta < 3\pi$ If $\sin \alpha + \sin \beta = -\frac{21}{65}$ and $\cos \alpha + \cos \beta = -\frac{27}{65}$, then the value of $\cos \frac{\alpha - \beta}{2}$ (2004)
- a) $-\frac{6}{65}$ c) $\frac{6}{65}$
b) $\frac{3}{\sqrt{130}}$ d) $-\frac{3}{\sqrt{130}}$
- 5) If $u = \sqrt{a^2 \cos^2 \theta + b^2 \sin^2 \theta} + \sqrt{a^2 \sin^2 \theta + b^2 \cos^2 \theta}$ then the difference between the maximum and minimum values of u^2 is given by (2004)
- a) $(a - b)^2$ c) $(a + b)^2$
b) $2\sqrt{a^2 + b^2}$ d) $2(a^2 + b^2)$
- 6) A line makes the same angle θ , with each of the x and z axis. If the angle β , which it makes with y-axis, is such that $\sin^2 \beta = 3 \sin^2 \theta$, then $\cos^2 \theta$ equals (2004)
- a) $\frac{2}{5}$ c) $\frac{3}{5}$
b) $\frac{1}{5}$ d) $\frac{2}{3}$
- 8) If $0 < x < \pi$ and $\cos x + \sin x = \frac{1}{2}$, then $\tan x$ is (2006)
- a) $\frac{(1-\sqrt{7})}{4}$ c) $-\frac{(4+\sqrt{7})}{3}$
b) $\frac{(4-\sqrt{7})}{3}$ d) $\frac{(1+\sqrt{7})}{4}$
- 9) Let **A** and **B** denote the statements
A : $\cos \alpha + \cos \beta + \cos \gamma = 0$
B : $\sin \alpha + \sin \beta + \sin \gamma = 0$
If $\cos(\beta - \gamma) + \cos(\gamma - \alpha) + \cos(\alpha - \beta) = -\frac{3}{2}$, then: (2009)
- a) **A** is false and **B** is true
b) both **A** and **B** are true
c) both **A** and **B** are false
d) **A** is true and **B** is false
- 10) Let $\cos(\alpha + \beta) = \frac{4}{5}$ and $\sin(\alpha - \beta) = \frac{5}{13}$, where $0 \leq \alpha, \beta \leq \frac{\pi}{4}$. Then $\tan 2\alpha =$ (2010)
- a) $\frac{56}{33}$ b) $\frac{19}{12}$ c) $\frac{20}{7}$ d) $\frac{25}{16}$
- 11) If $A = \sin^2 x + \cos^4 x$, Then for all real x : (2010)
- a) $\frac{13}{16} \leq A \leq 1$ c) $\frac{3}{4} \leq A \leq \frac{13}{16}$
b) $1 \leq A \leq 2$ d) $\frac{3}{4} \leq A \leq 1$
- 12) In a ΔPQR , If $3 \sin P + 4 \cos Q = 6$ and $4 \sin Q + 3 \cos P = 1$, then the angle **R** is equal to: (2012)
- a) $\frac{5\pi}{6}$ b) $\frac{\pi}{6}$ c) $\frac{\pi}{4}$ d) $\frac{3\pi}{4}$
- 13) **ABCD** is a trapezium such that **AB** and **CD** are parallel and **BC** \perp **CD**. If $\angle ABD = \theta$, **BC**= p and **CD**= q , then **AB** is equal to: (JEEM2013)

$$\text{a) } \frac{(p^2+q^2)\sin\theta}{p\cos\theta+q\sin\theta}$$

$$\text{b) } \frac{p^2+q^2\cos\theta}{p\cos\theta+q\sin\theta}$$

$$\text{c) } \frac{p^2+q^2}{p\cos^2\theta+q\sin^2\theta}$$

$$\text{d) } \frac{(p^2+q^2)\sin\theta}{(p\cos\theta+q\sin\theta)^2}$$