3_B_Mains

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24) The equation $e^{\sin x} - e^{-\sin x} - 4 = 0$ has: (2012)
   a. infinite number of real roots
   b. no real roots
   c. exactly one real root
   d. exactly four roots

25) The real number k for which the equation, $2x^3 + 3x + 4 = 0$ has two distinct real roots in $[0, 1]$ ($JEEM2013$)
   a. lies between 1 and 2
   b. lies between 2 and 3
   c. lies between -1 and 0
   d. does not exist.

26) The number of values of k, for which the system of equations:
   $(k+1)\,x + 8y = 4k$
   $kx + (k+3)\,y = 3k - 1$
   has no solution, is ($JEEM2013$)

   a. infinite
   b. 1
   c. 2
   d. 3

27) If the equations $x^2 + 2x + 3 = 0$ and $ax^2 + bx + c = 0, a, b, c \in \mathbb{R}$, have a common root , then $a : b : c$ is ($JEEM2013$)

   a. 1:2:3
   b. 3:2:1
   c. 1:3:2
   d. 3:1:2

28) If $a \in \mathbb{R}$ and the equation $-3(x - [x])^2 + 2(x - [x]) + a^2 = 0$ (where $[x]$ denotes the greatest integer $\leq x$) has no integral solution, then all possible values of a lie in the interval: ($JEEM2014$)

   a. $(-2, -1)$
   b. $(-\infty, 2) \cup (2, \infty)$
   c. $(-1, 0) \cup 0, 1$
   d. $(1, 2)$

29) Let α and β be the roots of equation $px^2 + qx + r = 0$, $p \neq 0$. If p, q, r are in $A.P.$ and $\frac{1}{\alpha} + \frac{1}{\beta} = 4$, then the value of $|\alpha - \beta|$ is ($JEEM2014$)

   a. $\frac{\sqrt{34}}{9}$
   b. $\frac{2\sqrt{13}}{9}$
   c. $\frac{\sqrt{61}}{9}$
   d. $\frac{2\sqrt{17}}{9}$

30) Let α and β be the roots of the equation $x^2 - 6x - 2 = 0$. If $a_n = \alpha^n - \beta^n$, for $n \geq 1$, then the value of $\frac{a_{10} - 2a_8}{2a_9}$ is equal to: ($JEEM2015$)

   a. 3 b. -3 c. 6 d. -6

31) The sum of all real values of x satisfying the equation $\left(x^2 - 5x + 5\right)^{x^2+4x+60} = 1$ is : ($JEEM2016$)

a. 6 b. 5 c. 3 d. -4

32) If $\alpha, \beta \in \mathbb{C}$ are the distinct roots, of the equation $x^2 - x + 1 = 0$, then $\alpha^{101} + \beta^{107}$ is equal to : $(JEEM2018)$

a. 0 b. 1 c. 2 d. -1

33) Let $p, q \in \mathbb{R}$. If $2 - \sqrt{3}$ is a root of the quadratic equation, $x^2 + px + q = 0$,then: $(JEEM2019 - 9April(M))$

a. $p^2 - 4q + 12 = 0$
b. $q^2 - 4p - 16 = 0$
c. $q^2 + 4p + 14 = 0$
d. $p^2 - 4q - 12 = 0$