JEE MAINS

EE1030

JULY 25 - SHIFT - 2

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QUESTIONS- 1 TO 15

SECTION A

1) For $z \in C$ if the minimum value of $\left(\left|z-3\sqrt{2}\right|+\left|z-p\sqrt{2}i\right|\right)$ is $5\sqrt{2}$, then a value of p is

a) 3 b) $\frac{7}{2}$ c) 4 d) $\frac{9}{2}$

2) The number of real values λ, such that the system of linear equations $2x-3y+5z=9$
$x+3y-z=-18$
$3x-y+\left(\lambda^2-|\lambda|\right)z=16$ has no solution, is

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

3) The number of bijective functions $f: 1,3,5,7,\ldots 99 \mapsto 2,4,6,8,\ldots 100$, such that $f(3) \geq f(9) \geq f(15) \geq f(21) \geq \cdots \geq f(99)$, is

a) ${}^{50}P_{17}$ b) ${}^{50}P_{33}$ c) $33! \times 17!$ d) $\frac{50!}{2}$

4) The remainer when $(11)^1 011 + (1011)^1 1$ is divided by 9 is

a) 1 b) 4 c) 6 d) 8

5) The sum $\sum_{n=1}^{21} \frac{3}{(4n-1)(4n+3)}$ is equal to

a) $\frac{7}{87}$ b) $\frac{7}{29}$ c) $\frac{14}{87}$ d) $\frac{21}{29}$

6) $\lim_{x\to\frac{\pi}{4}} \frac{8\sqrt{2}-(\cos x+\sin x)^7}{\sqrt{2}-\sqrt{2}\sin 2x}$ is equal to

a) 14 b) 7 c) $14\sqrt{2}$ d) $7\sqrt{2}$

7) $\lim_{x\to\frac{1}{2^n}} \left(\frac{1}{\sqrt{1-\frac{1}{2^n}}}+\frac{1}{\sqrt{1-\frac{2}{2^n}}}+\frac{1}{\sqrt{1-\frac{3}{2^n}}}+\cdots+\frac{1}{\sqrt{1-\frac{2^n-1}{2^n}}}\right)$ is equal to

a) $\frac{1}{2}$ b) 1 c) 2 d) -2

8) If A and B are two events such that $P(A) = \frac{1}{3}, P(B) = \frac{1}{5}$ and $P(A \cup B) = \frac{1}{2}$ then $P(A \mid B') + P(B \mid A')$ is equal to

a) $\frac{3}{4}$ b) $\frac{5}{8}$ c) $\frac{5}{4}$ d) $\frac{7}{8}$

9) Let $[t]$ denote the greatest integer less than or equal to t. Then the value of the integral $\int_{-3}^{101} ([\sin(\pi x)]) + e^{\cos(2\pi x)}\, dx$ is equal to

a) $\frac{52(1-e)}{e}$ b) $\frac{52}{e}$ c) $\frac{52(2+e)}{e}$ d) $\frac{104}{e}$

10) Let the point $\mathbf{P}(\alpha, \beta)$ be at a unit distance from each of the two lines $L_1 : 3x-4y+12 = 0$ and $L_2 : 8x + 6y + 11 = 0$. If $\mathbf{P}$ lies below L_1 and above L_2, then $100(\alpha + \beta)$ is equal to

a) -14 b) 42 c) -22 d) 14

11) Let a smooth curve $y = f(x)$ be such that the slope of the tangent at any point (x, y) on it is directly proportional to $\frac{-y}{x}$. If the curve passes through the point $(1, 2)$ and $(8, 1)$, then $\left|y\left(\frac{1}{8}\right)\right|$ is equal to

a) $2\ln 2$ b) 4 c) 1 d) $4\ln 2$

12) If the ellipse $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ meets the line $\frac{x}{7} + \frac{y}{2\sqrt{6}} = 1$ on the x-axis and the line $\frac{x}{7} - \frac{y}{2\sqrt{6}} = 1$ on the y-axis, then the eccentricity of the ellipse is

a) $\frac{5}{7}$ b) $\frac{2\sqrt{6}}{7}$ c) $\frac{3}{7}$ d) $\frac{2\sqrt{5}}{7}$

13) The tangents at the point $\mathbf{A}(1, 3)$ and $\mathbf{B}(1, -1)$ on the parabola $y^2 - 2x - 2y = 1$ meet at the point $\mathbf{P}$. Then the area of the triangle PAB is

a) 4 b) 6 c) 7 d) 8

14) If the foci of the ellipse $\frac{x^2}{16} + \frac{y^2}{7} = 1$ and the hyperbola $\frac{x^2}{144} - \frac{y^2}{\alpha} = \frac{1}{25}$ coincide. Then the length of the latus rectum of the hyperbola is

a) $\frac{32}{9}$ b) $\frac{18}{5}$ c) $\frac{27}{4}$ d) $\frac{27}{10}$

15) A plane E is perpendicular to the two planes $2x - 2y + z = 0$ and $x - y + 2z = 4$, and passes through the point $\mathbf{P}(1, -1, 1)$. If the distance of the plane E from the point $\mathbf{Q}(a, a, 2)$ is $3\sqrt{2}$. Then $(PQ)^2$ is equal to

a) 9 b) 12 c) 21 d) 33