ASSIGNMENT1

EE24BTECH11028-JADHAV RAJESH

1) Let $S(K) = 1+3+5\cdots+(2K-1) = 3+k^2$.Then which of the following is true (2004)
   a) Principal of mathematical statement can be used to prove this formula
   b) $S(K) \Rightarrow S(K+1)$
   c) $S(K) \nRightarrow S(K+1)$
   d) $S(1)$ is correct

2) The coefficient of the middle term in the binomial expansion in powers of x of $(1+\alpha x)^4$ and of $(1-\alpha x)^6$ is the same if equals (2004)
   a) $\frac{3}{5}$
   b) $\frac{10}{3}$
   c) $\frac{-3}{10}$
   d) $\frac{-5}{3}$

3) The coefficient of x^n in expansion of $(1+x)(1-x)^n$ is (2004)
   a) $(-1)^{n-1}\, n$
   b) $(-1)^n (1-n)$
   c) $(-1)^{n-1}(n-1)^2$
   d) $(n-1)$

4) The value of ${}^{50}C_4 + \sum_{r=1}^{6} {}^{56-r}C_3$ is (2005)
   a) ${}^{55}C_4$
   b) ${}^{55}C_3$
   c) ${}^{56}C_3$
   d) ${}^{56}C_4$

5) If A= $\begin{pmatrix} 1 & 0 \\ 1 & 1 \end{pmatrix}$ and I= $\begin{pmatrix} 1 & 0 \\ 0 & 1 \end{pmatrix}$,then which of the following holds for all $n \geq 1$,by the principle of mathematical induction (2005)
   a) $A^n = nA - (n-1)\, I$
   b) $A^n = 2^{n-1}A - (n-1)\, I$
   c) $A^n = nA + (n-1)\, I$
   d) $A^n = 2^{n-1} + (n-1)\, I$

6) If the coefficient of x^7 in $\left[ax^2 + \left(\frac{1}{bx}\right)\right]^{11}$ equals the coefficient of x^{-7} in $\left[ax - \left(\frac{1}{bx^2}\right)\right]^{11}$, then a and b satisfy the relation (2005)
   a) $a - b = 1$
   b) $a + b = 1$
   c) $\frac{a}{b} = 1$
   d) $ab = 1$

7) The circle $x^2 + y^2 = 4x + 8y +$ intersects the line $3x - 4y = m$ at two distinct points if (2010)
   a) $-35 < m < 15$
   b) $15 < m < 65$
   c) $35 < m < 85$
   d) $-85 < m < -35$

8) The two circles $x^2 + y^2 = ax$ and $x^2 + y^2 = c^2$ $(c > 0)$ touch each other if (2011)
   a) $|a| = c$
   b) $a = 2c$
   c) $|a| = 2c$

d) $2|a| = c$

9) The lenght of the diameter of the circle which toughes the x-axis at the point $(1, 0)$ and passes through the point $(2, 3)$ is: (2012)

a) $\frac{10}{3}$

b) $\frac{3}{5}$

c) $\frac{6}{5}$

d) $\frac{5}{3}$

10) The circle passing through $(1, 2)$ and toughing the axis of x at $(3, 0)$ and also passes the point (JEE M 2013)

a) $(-5, 2)$

b) $(2, -5)$

c) $(5, -2)$

d) $(-2, 5)$

11) Let C be the Circle with centre at $(1, 1)$and radius equal to 1. If T is the centre of the at $(0, y)$, passing through orgin and toughing the circle C externally,then the radius of T is equal to (JEE M 2014)

a) $\frac{1}{2}$

b) $\frac{1}{4}$

c) $\frac{\sqrt{3}}{\sqrt{2}}$

d) $\frac{\sqrt{3}}{2}$

12) LOCUS of the image of the point $(2, 3)$ in the line $(2x - 3y + 4) + K(x - 2y + 3) = 0, K \in R$, is a : (JEE M 2015)

a) circle of radius $\sqrt{2}$

b) circle of radius $\sqrt{3}$

c) straight line parallel to x-axis

d) straight line parallel to y-axis

13) The number of common tangents to the circles $x^2 + y^2 - 4x - 6y - 12 = 0$ and $x^2 + y^2 + 6x + 18y + 26 = 0$, is : (JEE M 2015)

a) 3

b) 4

c) 1

d) 2

14) The centres of the those circles which tough the circle, $x^2 + y^2 - 8x - 8y - 4 = 0$, externally and also tough the x-axis, lie on: (JEE M 2016)

a) a hyperbola

b) a parabole

c) a circle

d) an ellipse which is not a circle

15) If one of the diameter of the circle, given by the equation, $x^2+y^2-4x+6y-12 = 0$, is a chord of the circle S, whose centre is at $(-3, 2)$, then the radius of S is: (JEE M 2016)

a) 5

b) 10

c) $5\sqrt{2}$

d) $5\sqrt{3}$

16) If a tangent to the circle $x^2 + y^2 = 1$ intersects the coordinate axes at distinct point P and Q, then the locus of the mid-point of PQ is:(JEE M 2019-9 April)

a) $x^2 + y^2 - 4x^2y^2 = 0$

b) $x^2 + y^2 - 2xy = 0$

c) $x^2 + y^2 - 16x^2y^2 = 0$

d) $x^2 + Y^2 - 2x^2y^2 = 0$