2023 12th april shift2

EE24BTECH11066 - YERRA AKHILESH

16) If the circles $x^2 + y^2 - 2x - 4y + 4 = 0$ and $x^2 + y^2 - 6x - 10y + 20 + 2\sqrt{13} = 0$ touch each other at the point (a, b), then $(3a - 2b)^2$ is equal to :

a) 1
b) 4
c) 9
d) 13

17) If the angle between the line $l : \frac{x-1}{2} = \frac{y+1}{1} = \frac{z-2}{2}$ and the plane $P : \lambda x + 4y - 7 = 0, \lambda \neq 0$, is $\text{cosec}^{-1}\left(\frac{3}{2}\right)$, then the sum of co-ordinates of the point where line l crosses the plane P is :

a) -33
b) -2
c) 3
d) 6

18) Let three distinct normal be drawn to the parabola $y^2 + 4y - 6x - 8 = 0$ from a point (a, b) on the axis of the parabola. Then :

a) $a \in (1, \infty)$ and $b = -2$
b) $a \in (0, \infty)$ and $b = -2$
c) $a \in (1, \infty)$ and $b = 2$
d) $a \in (2, \infty)$ and $b = 2$

19) Given ${}^nC_r = \frac{n!}{r!(n-r)!}, 0 \leq r \leq n$ and n is a non-negative integer. Then a possible value of k for which the equality
${}^{50}C_{k-1} + \sum_{r=1}^{50} {}^{100-r}C_{k-2} = {}^{100}C_{49}$ holds, is :

a) 40
b) 49
c) 50
d) 25

20) If an unbiased die, marked with $-3, -2, -1, 0, 1, 2$ on its faces, is thrown four times, then the probability of getting -1 as the sum of outputs is :

a) $\frac{7}{81}$
b) $\frac{35}{324}$
c) $\frac{8}{81}$
d) $\frac{26}{243}$

21) $(\sin 5^\circ \sin 55^\circ \sin 65^\circ \sin 75^\circ)^{-1}$ is equal to _____

22) If the shortest distance between the lines
$3x + 2y - 4z - 5 = 0 = 5x - 7y - 17z + 2$ and $\frac{x-2}{3} = \frac{y-1}{-5} = \frac{z+1}{2}$ is $\frac{10}{\sqrt{k}}$, then k is equal

to _____

23) For $p \in \mathbb{N}$, if the angle between pair of tangents drawn to the ellipse $3x^2 + 2y^2 = 5$ from the point $(1, p)$ is $\tan^{-1}\left(\frac{12}{\sqrt{5}}\right)$, then the distance of the vertex of the parabola $y = x^2 - px + p + 1$ from the point $(-7, 8)$ is equal to _____

24) Let P be a polygon with n vertices such that the line segment joining any two points of P remains entirely in P. If the number of diagonals of P is $n + 25$, then n is equal to _____

25) Let $f(x)$ be a polynomial of degree 5 such that $\lim\limits_{x\to 0} \frac{f(x)}{x^2} = 1, f(-1) = -1, f(x) - 14x$ has an extrema at $x = 1$ and $f(x) - 10x$ has an extrema at $x = -1$. Then $f(2)$ is equal to _____

26) The number of 7 digits integers formed by using the digits $2, 3, 4, 5$ only and having the sum of digits equal to 18 is _____

27) The remainder when $(556)^{40}$ is divided by 7 is _____

28) Let $[t]$ denote the greatest integer less than or equal to t.Then the value of $10 - 10\int\limits_{-2}^{2} [x + x^3]\text{dx}$ is _____

29) Let $A = \frac{1}{\sqrt{2}}\begin{pmatrix} 1 & 1 \\ -1 & 1 \end{pmatrix}$ and $B = \begin{pmatrix} 1 & 0 \\ 0 & -1 \end{pmatrix}$. If $k, l \in \mathbb{N}$ be such that $A^k B^l = I$, then the minimum value of $k + l$ is _____

30) Let $A_1 = \begin{pmatrix} 1 \end{pmatrix}, A_2 = \begin{pmatrix} 2 & 3 \\ 4 & 5 \end{pmatrix}, A_3 = \begin{pmatrix} 6 & 7 & 8 \\ 9 & 10 & 11 \\ 12 & 13 & 14 \end{pmatrix}, \cdots$ Then the sum of the diagonal elements of A_{20} is _____