Q.1 The set of all positive real values of $k$, for which the equation $x^3 - 9x^2 + 24x - k = 0$ has three distinct real roots, is the interval:

Options 1. (18, 21)
2. (16, 20)
3. (14, 18)
4. (12, 16)
Q.2 In a certain town, 25% families own a phone, 15% families own a car, 65% families own neither a phone nor a car and 2000 families own both a car and a phone. Consider the following Statements (S):

\( (S_1) \) : 35% families own at least one of a car or a phone.

\( (S_2) \) : 40,000 families live in the town.

Then:

Options

1. Both \((S_1)\) and \((S_2)\) are false.
2. Both \((S_1)\) and \((S_2)\) are true.
3. \((S_1)\) is true and \((S_2)\) is false.
4. \((S_1)\) is false and \((S_2)\) is true.
Q.3
The integral \( \int \frac{(2 \sin\theta - 1)\cos\theta}{5 - \cos^2\theta - 4 \sin\theta} \, d\theta \) is equal to:

(where \( C \) is a constant of integration)

Options
1. \( 3 \log_e(2 - \cos\theta) + \frac{2}{2 - \sin\theta} + C \)
2. \( 2 \log_e(2 - \sin\theta) + \frac{3}{2 - \sin\theta} + C \)
3. \( 3 \log_e(2 + \cos\theta) + \frac{2}{2 - \cos\theta} + C \)
4. \( 2 \log_e(2 + \sin\theta) + \frac{3}{2 - \cos\theta} + C \)

Question Type: MCQ
- Question ID: 405036720
- Option 1 ID: 4050362688
- Option 2 ID: 4050362689
- Option 3 ID: 4050362687
- Option 4 ID: 4050362690
- Status: Not Answered
- Chosen Option: --

Q.4
The Boolean expression \( \sim (p \lor q) \lor (\sim p \land q) \) is equivalent to:

Options
1. \( p \)
2. \( \sim p \)
3. \( q \)
4. \( \sim q \)

Question Type: MCQ
- Question ID: 405036730
- Option 1 ID: 4050362727
- Option 2 ID: 4050362730
- Option 3 ID: 4050362728
- Option 4 ID: 4050362729
- Status: Not Answered
- Chosen Option: --
Q.5 Let X be a random variable which takes values k with the probability kp, where k = 1, 2, 3, 4 and p \epsilon (0, 1). Then the standard deviation of X is:

Options:
1. \sqrt{7}
2. \sqrt{10}
3. 3
4. 1

Q.6 If \( f(x) = \begin{vmatrix} \sin x & \cos x & \tan x \\ x^3 & x^2 & x \\ 2x & 1 & x \end{vmatrix} \),
then \( \lim_{x \to 0} \frac{f(x)}{x^2} \) is equal to:

Options:
1. 0
2. 3
3. 1
4. 2
Q.7 For non-zero real numbers \( l, m, n \) and \( a \), let
\[ f(x) = lx^3 + mx + n \] and \( f(4a) = f(a) \). Then the
value \( x \in [a, 4a] \), at which the tangent to the
curve \( y = f(x) \) is parallel to the \( x \)-axis,
is:

Options 1. \( \sqrt[5]{5} \ a \)
2. \( 3a \)
3. \( 2a \)
4. \( \sqrt[7]{a} \)

Q.8 Let \( C \) be the circle concentric with the circle,
\[ 2x^2 + 2y^2 - 6x - 10y = 183 \] and having area
\( \left( \frac{1}{10} \right)^{th} \) of the area of this circle. Then a
tangent to \( C \), parallel to the line, \( 3x + y = 0 \) makes an intercept on the \( y \)-axis, which is
equal to:

Options 1. \(-10\)
2. \(-4\)
3. \(17\)
4. \(14\)
Q.9
Let \( S = 3 + 55 + 333 + 5555 + 33333 + \ldots \text{upto } 22 \text{ terms. If } 9S + 88 = A(10^{22} - 1), \) then \( A \) is equal to:

Options:
1. \( \frac{450}{99} \)
2. \( \frac{530}{99} \)
3. \( \frac{630}{88} \)
4. \( \frac{350}{88} \)

Question Type: MCQ
Question ID: 405036716
Option 1 ID: 4050362673
Option 2 ID: 4050362671
Option 3 ID: 4050362674
Option 4 ID: 4050362672
Status: Not Answered
Chosen Option: --

Q.10
If \( x = e^t \sin t \) and \( y = e^t \cos t, \) \( t \) is a parameter,
then the value of \( \frac{d^2x}{dy^2} + \frac{d^2y}{dx^2} \) at \( t = 0, \) is:

Options:
1. \(-2\)
2. \(\frac{1}{2}\)
3. \(2\)
4. \(0\)

Question Type: MCQ
Question ID: 405036717
Option 1 ID: 4050362676
Option 2 ID: 4050362677
Option 3 ID: 4050362678
Option 4 ID: 4050362675
Status: Answered
Chosen Option: 1
Q.11 If an ellipse has centre at (0, 0), a focus at 
(−3, 0) and the corresponding directrix is
3x + 25 = 0, then it passes through the
point:
Options 1. (−5, −4)
2. \(\left(\frac{5}{2}, 4\right)\)
3. \(−5, −\frac{4}{\sqrt{2}}\)
4. \(\left(\sqrt{2}, \frac{4}{\sqrt{2}}\right)\)

Question Type: MCQ
Question ID: 405036724
Option 1 ID: 4050362704
Option 2 ID: 4050362703
Option 3 ID: 4050362706
Option 4 ID: 4050362705
Status: Not Answered
Chosen Option: --

Q.12 If the roots α and β of the equation,
\(x^2 - \sqrt{2}x + c = 0\) are complex for some
real number \(c \neq 1\) and \(|\frac{α - β}{1 - αβ}| = 1\), then a
value of c is:
Options 1. \(−2 + \sqrt{6}\)
2. \(4 − \sqrt{6}\)
3. \(3 − \sqrt{6}\)
4. \(−1 + \sqrt{6}\)

Question Type: MCQ
Question ID: 405036712
Option 1 ID: 4050362655
Option 2 ID: 4050362656
Option 3 ID: 4050362657
Option 4 ID: 4050362658
Status: Not Answered
Chosen Option: --
Q.13
If the probability of a shooter A not hitting a target is 0.5 and that for the shooter B is 0.7, then the probability that either A or B fails to hit the target is:

Options
1. 0.20
2. 0.35
3. 0.25
4. 0.85

Question Type: MCQ
Question ID: 405036728
Option 1 ID: 4050362721
Option 2 ID: 4050362719
Option 3 ID: 4050362720
Option 4 ID: 4050362722
Status: Not Answered
Chosen Option: --

Q.14
If \( \theta \) is the angle between the line \( \vec{r} = (\hat{i} + 2\hat{j} - \hat{k}) + \lambda (\hat{i} - \hat{j} + 2\hat{k}), \lambda \in \mathbb{R} \)
and the plane \( \vec{n} \cdot (2\hat{i} - \hat{j} + \hat{k}) = 4 \), then a value of \( \cos \theta \) is:

Options
1. \( \frac{\sqrt{11}}{6} \)
2. \( \frac{\sqrt{35}}{6} \)
3. \( \frac{\sqrt{13}}{6} \)
4. \( \frac{\sqrt{7}}{3} \)

Question Type: MCQ
Question ID: 405036726
Option 1 ID: 4050362711
Option 2 ID: 4050362713
Option 3 ID: 4050362712
Option 4 ID: 4050362714
Status: Not Answered
Chosen Option: --
Q. 15  The area (in sq. units) of the region enclosed by the lines, \(ax \pm by \pm c = 0\) (\(a, b, c \in \mathbb{R}\) are positive and distinct) is:

Options

1. \(\frac{2b^2}{ac}\)
2. \(\frac{2a^2}{bc}\)
3. \(\frac{2c^2}{ab}\)
4. \(\frac{4c^2}{ab}\)

Q. 16  The value of \(\cot \frac{\pi}{24}\) is:

Options

1. \(1 + \sqrt{2} + \sqrt{3} + \sqrt{6}\)
2. \(1 - \sqrt{2} + \sqrt{3} + \sqrt{6}\)
3. \(2 + \sqrt{2} + \sqrt{3} - \sqrt{6}\)
4. \(2 + \sqrt{2} + \sqrt{3} + \sqrt{6}\)
**Q.17**

Let $P$ be the point of intersection of two lines

\[
\frac{x + 10}{1} = \frac{y - 21}{7} = \frac{z + 11}{5} \quad \text{and} \quad \frac{x - 1}{5} = \frac{y - 46}{9} = \frac{z}{3}.
\]

If $Q$ be the point $(-10, 21, -11)$; then $PQ$ is equal to:

Options
1. 3
2. 5
3. $5\sqrt{3}$
4. $5\sqrt{2}$

**Q.18**

The area (in sq. units) of the region,

$R = \{(x, y) : y \leq x^2, y \leq 2x + 3, x \leq 1 \text{ and } y + 1 \geq 0\}$ is:

Options
1. $\frac{11}{3}$
2. $\frac{13}{3}$
3. $\frac{10}{3}$
4. $\frac{8}{3}$
Q.19 If \( \alpha \) and \( \beta \) are the coefficients of \( x^8 \) and \( x^{-24} \) respectively, in the expansion of 
\[
\left(x^4 + 2 + \frac{1}{x^4}\right)^{10}
\]
in powers of \( x \), then \( \frac{\alpha}{\beta} \) is equal to:

Options
1. 39
2. 26
3. \( \frac{32}{3} \)
4. \( \frac{13}{2} \)

Q.20 Let \( A \) be a 2\( \times \)2 matrix such that \( 3A^2 + 6A - 4I = 0 \). Then a value of \( |A + I| \) is:

Options
1. \( \frac{7}{\sqrt{3}} \)
2. \( \frac{7}{3} \)
3. \( \sqrt{\frac{7}{3}} \)
4. \( \frac{3}{7} \)
Q.21
If \( y = y(x) \) is the solution of the differential equation, \( x \frac{dy}{dx} = y(\log_e y - \log_e x + 1) \), when \( y(1) = 2 \), then \( y(2) \) is equal to ________.

Given --
Answer :

Question Type : SA
Question ID : 405036732
Status : Not Answered

Q.22
If \( S = \{ z \in \mathbb{C} : \bar{z} = iz^2 \} \), then the maximum value of \( |z - \sqrt{3} - i|^2 \) on \( S \) is ________.

Given --
Answer :

Question Type : SA
Question ID : 405036735
Status : Not Answered

Q.23
\[
\lim_{y \to 0} \frac{(y - 2) + 2\sqrt{1 + y + y^2}}{2y}
\]
is equal to ________.

Given --
Answer :

Question Type : SA
Question ID : 405036734
Status : Not Answered

Q.24
The interior angles of a polygon are all obtuse and are in A.P. If the smallest angle is 120° and common difference of this A.P. is 5°, then the number of sides of the polygon is ________.

Given --
Answer :

Question Type : SA
Question ID : 405036733
Status : Not Answered
Q.25  The largest value of \( n \in \mathbb{N} \) for which
\[
74 > \frac{n+3}{n} \frac{\text{P}_{3}}{\text{P}_{n+1}}
\]
is __________.

Given --
Answer:

Section: Aptitude Test

Q.1  Which one of the following floorings is ideal for indoor badminton courts?

Options
1. Granite
2. Brick
3. Marble
4. Wood

Question Type: SA
Question ID: 405036731
Status: Not Answered
Q.2 The 3-D figure shows the view of an object. Identify the correct view when the figure is opened up, from amongst the answer figures.

Options

1.

2.

3.

4.

Question Type: MCQ
Question ID: 405036768
Option 1 ID: 4050362865
Option 2 ID: 4050362867
Option 3 ID: 4050362864
Option 4 ID: 4050362866
Status: Answered
Chosen Option: 4
Q.3
Find the odd figure out of the problem figures given below.

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036763
Option 1 ID: 4050362847
Option 2 ID: 4050362845
Option 3 ID: 4050362846
Option 4 ID: 4050362844
Status: Answered
Chosen Option: 3
Q.4 One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

Options
1. 
2. 
3. 
4. 

Q.5 In the Northern Hemisphere the summer sun sets in which one of the following directions?

Options
1. North East
2. South West
3. North West
4. South East
Q.6 The 3 – D figure shows the view of an object. Identify the correct view when the figure is opened up, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036766
Option 1 ID: 4050362856
Option 2 ID: 4050362858
Option 3 ID: 4050362859
Option 4 ID: 4050362857
Status: Answered
Q.7  The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

Options
1.  
2.  
3.  
4.  

Q.8  In which one of the following States is the Konark Sun Temple?

Options
1.  Andhra Pradesh
2.  Haryana
3.  Odisha
4.  Karnataka
Q.9 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options
1. 
2. 
3. 
4. 

Q.10 In which one of the following countries are Zen gardens popular?
Options
1. China
2. Pakistan
3. Thailand
4. Japan

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Q.11  Which one of the answer figures is the correct mirror image of the problem figure with respect to X – X?

Options
1.  
2.  
3.  
4.  

Q.12  Which one of the following colors absorbs all light falling on it?

Options
1.  Green
2.  Black
3.  Pink
4.  Blue
Q.13 One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

Options
1. 
2. 
3. 
4. 

Q.14 Which one of the following architects designed the Madhya Pradesh Assembly Building?

Options
1. Charles Correa
2. B.V. Doshi
3. A.P. Kanvinde
4. Raj Rewal
Q.15 The 3-D figure shows the view of an object. Identify the correct view when the figure is opened up, from amongst the answer figures.

Options

1.

2.

3.

4.

Question Type: MCQ
Question ID: 405036770
Option 1 ID: 4050362872
Option 2 ID: 4050362874
Option 3 ID: 4050362875
Option 4 ID: 4050362873
Status: Answered
Chosen Option: 1
Q.16
Find the odd figure out of the problem figures given below.

Options
1.  
2.  
3.  
4.  

Question Type: MCQ
Question ID: 405036762
Option 1 ID: 4050362841
Option 2 ID: 4050362843
Option 3 ID: 4050362842
Option 4 ID: 4050362840
Status: Answered
Chosen Option: 1
Q.17  The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

Options

1.  

2.  

3.  

4.  

Question Type: MCQ
Question ID: 405036747
Option 1 ID: 4050362781
Option 2 ID: 4050362783
Option 3 ID: 4050362780
Option 4 ID: 4050362782
Status: Answered
Chosen Option: 4
Q.18 The 3-D figure shows the view of an object. Identify the correct view when the figure is opened up, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036767
Option 1 ID: 4050362861
Option 2 ID: 4050362860
Q. 19  The Louvre in Paris is which one of the following?

Options
1. A Banquet Hall
2. A Dance Hall
3. A Residence
4. A Museum

Q. 20  What is the normal height of a doorway in residences?

Options
1. 2.8 meters
2. 2.1 meters
3. 1.5 meters
4. 2.5 meters
Q.21  Find the odd figure out of the problem figures given below.

Options
1. 
2. 
3. 
4. 

Q.22  What is the thickness of a half brick thick wall?

Options
1. 4.5”
2. 8”
3. 9”
4. 6”
Q. 23

The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1.  

2.  

3.  

4.  

```
Question Type: MCQ
Question ID: 405036738
Option 1 ID: 4050362745
Option 2 ID: 4050362744
Option 3 ID: 4050362747
Option 4 ID: 4050362746
Status: Answered
Chosen Option: 4
```
Q.24 One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

Options
1.
2.
3.
4.

Question Type: MCQ
Question ID: 405036755
Option 1 ID: 4050362813
Option 2 ID: 4050362815
Option 3 ID: 4050362814
Option 4 ID: 4050362812
Status: Answered
Chosen Option: 4
Q.25 The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

Options
1.

2.

3.

4.
Q.26  The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036739
Option 1 ID: 4050362751
Option 2 ID: 4050362750
Option 3 ID: 4050362749
Option 4 ID: 4050362748
Status: Answered
Chosen Option: 1
Q.27 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 
2. 
3. 
4. 

Question Type: MCQ
Question ID: 405036742
Option 1 ID: 4050362762
Option 2 ID: 4050362763
Option 3 ID: 4050362761
Option 4 ID: 4050362760
Status: Answered
Chosen Option: 2
Q.28 Which one of the answer figures is the correct mirror image of the problem figure with respect to X - X?

Options
1. 
2. 
3. 
4. 

Question Type: MCQ
Question ID: 405036757
Option 1 ID: 4050362820
Option 2 ID: 4050362821
Option 3 ID: 4050362822
Option 4 ID: 4050362823
Status: Answered
Chosen Option: 2

Q.29 In which one of the following countries is Piazza San Marco located?

Options
1. Italy
2. Germany
3. France
4. England

Question Type: MCQ
Question ID: 405036776
Option 1 ID: 4050362899
Option 2 ID: 4050362896
Option 3 ID: 4050362897
Option 4 ID: 4050362898
Status: Not Answered
Chosen Option: --
Q.30
One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

Options
1.
2.
3.
4.
Q.31 Which one of the answer figures is the correct mirror image of the problem figure with respect to X - X?

Options

1.

2.

3.

4.

Question Type: MCQ
Question ID: 405036758
Option 1 ID: 4050362826
Option 2 ID: 4050362825
Option 3 ID: 4050362827
Option 4 ID: 4050362824
Status: Answered
Chosen Option: 3
Q.32  Which one of the answer figures is the correct mirror image of the problem figure with respect to X - X?

Options

1.  

2.  

3.  

4.  

Question Type : MCQ
Question ID : 405036756
Option 1 ID : 4050362817
Option 2 ID : 4050362816
Option 3 ID : 4050362818
Option 4 ID : 4050362819
Status : Answered
Chosen Option : 3
Q.33 The 3 – D figure shows the view of an object. Identify the correct view when the figure is opened up, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Status: Answered
Chosen Option: 2
Q.34 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options
1. 
2. 
3. 
4. 

Q.35 Which one of the following colors is perceived as cowardice?

Options
1. Pink
2. Yellow
3. Orange
4. Purple
Q.36

Find the odd figure out of the problem figures given below.

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036764
Option 1 ID: 4050362849
Option 2 ID: 4050362850
Option 3 ID: 4050362851
Option 4 ID: 4050362848
Status: Answered
Chosen Option: 2
Q.37 The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.
Q.38 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 
2. 
3. 
4. 

Question Type: MCQ
Question ID: 405036737
Option 1 ID: 4050362740
Option 2 ID: 4050362743
Option 3 ID: 4050362741
Option 4 ID: 4050362742
Status: Answered
Chosen Option: 2
Q.39 One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

Options

1. 
2. 
3. 
4. 

Question Type: MCQ
Question ID: 405036752
Option 1 ID: 4050362801
Option 2 ID: 4050362802
Option 3 ID: 4050362800
Option 4 ID: 4050362803
Status: Answered
Chosen Option: 2
Q.40 Find the odd figure out of the problem figures given below.

Options
1. 
2. 
3. 
4. 

Q.41 What is the purpose of louvers in buildings?

Options
1. As sun breakers
2. To stop wind from entering
3. To support buildings
4. To hide something
Q.42 The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

Options
1. 
2. 
3. 
4. 

Question Type: MCQ
Question ID: 405036750
Option 1 ID: 4050362794
Option 2 ID: 4050362793
Option 3 ID: 4050362792
Option 4 ID: 4050362795
Status: Answered
Chosen Option: 3
Q.43  The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Question Type : MCQ
Question ID : 405036740
Option 1 ID : 4050362753
Option 2 ID : 4050362752
Option 3 ID : 4050362754
Option 4 ID : 4050362755
Status : Answered
Chosen Option : 4
Q.44 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Q.45 Which one of the following textures describes the surface of a mirror?

Options

1. Grainy
2. Coarse
3. Shiny
4. Wrinkled
Q.46 The 3-D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options
1. 
2. 
3. 
4. 

Q.47 Chhatrapati Shivaji Terminus is located in which one of the following cities?

Options
1. Bangalore
2. Kolkata
3. Mumbai
4. Delhi
Q.48 The 3 – D figure shows the view of an object. Identify the correct view in the direction of the arrow, from amongst the answer figures.

Options

1. 

2. 

3. 

4. 

Q.49 In which one of the following situations are trusses normally used in buildings?

Options

1. Large Span Buildings

2. Buildings in Deserts

3. High Rise Buildings

4. Under Water Buildings
Q.50  Which one of the answer figures is the correct mirror image of the problem figure with respect to X - X?

Options

1. 

2. 

3. 

4. 

Question Type: MCQ
Question ID: 405036759
Option 1 ID: 4050362829
Option 2 ID: 4050362830
Option 3 ID: 4050362828
Option 4 ID: 4050362831
Status: Answered
Chosen Option: 1

Section: Drawing

Q.1  In the space provided for the answer of this question, draw an aesthetic composition appropriate to this space using only cylinders. There is no restriction to numbers, sizes, placement and directions of these shapes. Color this composition so that it becomes visually exciting.

Question Type: SUBJECTIVE
Question ID: 405036786
Status: Answered
Q2: Draw from imagination a gymnast doing exercise.

OR

Draw from imagination a scene of a school playground with children playing.

OR

Draw from memory a grandparent's face.