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JEE MAIN SAMPLE PAPER

Paper 2 for B.Arch

SET B

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Maths

Q1. If the shortest distance between the lines x+2λ=2y=−12z, x=y+4λ=6z−12λ is $4\sqrt{2}$ units, then a value of λ is :
1. 2
2. $\sqrt{2}$
3. $2\sqrt{2}$
4. $\frac{\sqrt{2}}{2}$

Correct. 2

Q2. The perpendicular distance from the point (3, 1, 1) on the plane passing through the point (1, 2, 3) and containing the line, $\overrightarrow{\mathrm{r}} = \hat{i} + \hat{j} + \lambda(2\hat{i} + \hat{j} + 4\hat{k})$ is :
1. $\frac{1}{\sqrt{11}}$
2. $\frac{4}{\sqrt{41}}$
3. 0
4. $\frac{3}{\sqrt{11}}$

Correct. 3

Q3. Three vectors $\vec{a}, \vec{b}$ and $\vec{c}$ are such that
$|\vec{a}| = 1, |\vec{b}| = 2, |\vec{c}| = 4$ and
$\vec{a} + \vec{b} + \vec{c} = \overrightarrow{0}$ Then the value of
$4\vec{a} \cdot \vec{b} + 3\vec{b} \cdot \vec{c} + 3\vec{c} \cdot \vec{a}$ is equal to :
1. −68
2. −26
3. −34
4. 27

Correct. 2

Q4. If A and B are two independent events such that P(a) = 3/10 and P(A∪B) = 4/5 , then P(A∩B) is equal to :
1. 1/5
2. 1/10

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3. 3/14
4. 3/35

Correct. 3

Q5. An observer standing at a point P on the top of a hill near the sea-shore notices that the angle of depression of a ship moving towards the hill in a straight line at a constant speed is 30°. After 45° minutes, this angle becomes 45°. If T (in minutes) is the total time taken by the ship to move to a point in the sea where the angle of depression from P of the ship is 60°, then T is equal to :
1. $45(1+\sqrt{3})$
2. $45\left(1+\frac{2}{\sqrt{3}}\right)$
3. $45\left(2+\frac{1}{\sqrt{3}}\right)$
4. $45\left(1+\frac{1}{\sqrt{3}}\right)$

Correct. 4

Q6. If any tangent to the parabola $x^2 = 4y$ intersects the hyperbola $xy = 2$ at two points P and Q, then the mid - point of line segment PQ lies on a parabola with axis along:
1. x-axis and focus on positive x-axis
2. y-axis and focus on positive y-axis
3. y-axis and focus on negative y-axis
4. x-axis and focus on negative x-axis

Correct. 3

Q7. The distance of the point (1, 2, 3) from the plane x+y+z=2 measured parallel to the line $\frac{x+1}{-1}=\frac{y}{-2}=\frac{z-3}{1}$ is :
1. $\sqrt{23}$
2. $\sqrt{22}$
3. $\sqrt{24}$
4. $\sqrt{21}$

Correct. 3

Q8. Let $\vec{a}=2\hat{i}+\hat{j}-2\hat{k}$ and $\vec{b}=\hat{i}+\hat{j}$. If $\vec{c}$ be a vector such that $\vec{a}\cdot\vec{c}=|\vec{c}|, |\vec{c}-\vec{a}|=2\sqrt{2}$ and the angle between $\vec{a}\times\vec{b}$ and $\vec{c}$ is 30°, then the value of $|(\vec{a}\times\vec{b})\times\vec{c}|$ is:
1. 3
2. 3/2
3. 1/2
4. 6

Correct. 2

Q9. If $f(x)=\int_e^{e^x}\log_e\left(\frac{x}{\log_e t}\right)dt$, then the value of $\frac{3f'(3)}{e}$ is:

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1. $-3\log_e 3$
2. $3\log_e 3$
3. $e^2 - 1$
4. $e^3 - e$

Correct. 3

Q10. If $B = \begin{bmatrix} -2 & -2 \\ -1 & 0 \end{bmatrix}$ and A is a matrix such that $A^{-1}B = B^{-1}$ and $kA^{-1} = 2B^{-1}+I$, where k is some scalar and I is the 2x2 identity matrix, then the value of k is:
1. -2
2. -1
3. 1
4. 2

Correct. 4

Q11. Let $x_1, x_2....,x_{20}$ be 20 observations and $d_i = 2(x_i - 5)$, i=1,2,..., 20. If the mean and variance of $d_1, d_2.....d_{20}$ are 20 and 12 respectively, then the mean and variance of $x_1, x_2....,x_{20}$ are respectively,
1. 10 and 3
2. 10 and 4
3. 15 and 3
4. 15 and 4

Correct. 3

Q12. Let z(≠ -1) be any complex number such that |z|=1. Then the imaginary part of $\frac{\bar{z}(1-z)}{z(1+\bar{z})}$ is:
1. -tan(θ/2) Sinθ
2. tan(θ/2) Cosθ
3. -tan(θ/2) Cosθ
4. tan(θ/2) Sinθ

Correct. 3

Q13. The set of all real values of ∝ for which the equation, $|x+2|*|x-2| = \propto^2 - 2\propto$ has real solutions for x is:
1. ([-∞,0]∪[2,∞])
2. ([-∞,0]∪[2, 1+√5])
3. ([-1-√5, 1-√5]∪[1+√5, ∞])
4. ([1-√5,0], ∪[2, 1+√5])

Correct. 4

Q14. Let f:[0,5]→R be a continuous function such that $|f(x)| \leq 3$ for all xϵ[0,5] and $\int_0^5 f(t)dt = 3$

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. Then the value of $\int_0^3 f(t)dt$:
1. -4
2. 6
3. 10
4. 12

Correct. 2

Q15. Let the abscissae of two points A and B on a circle be the roots of $x^2 + 2x - 4 = 0$ and the ordinates of A and B be the roots of $y^{2}+4 y-16=0$. If AB is a diameter of this circle, then the radius of this circle is ::
1. 5
2. 6
3. 2√6
4. 2√10

Correct. 1

Q16. Let the ellipse $x^2 + 16y^2 = 16$ be inscribed in a rectangle whose sides are parallel to the coordinate axes. If the rectangle is inscribed in another ellipse that passes through the point (16, 0), then the equation of the outer ellipse is :
1. $x^2 + 256y^2 = 16^2$
2. $x^2 + 248y^2 = 16^2$
3. $x^2 + 240y^2 = 16^2$
4. $x^2 + 232y^2 = 16^2$

Correct. 3

Q17. Let the planes x -2y +kz-0 and x + 5y -z = 0 be perpendicular. Then the plane through the point (2, -2, -2) and perpendicular to the given planes also passes through the point :
1. (0,5,8)
2. (0,5,-8)
3. (-1,0,-7)
4. (1,0,7)

Correct. 4

Q18. If for two event A and B , in random experiment $P(A|B) = \frac{4}{5}$ and $P(B|A) = \frac{1}{4}$ then $\mathrm{P(A|A \cup B)}$ is equal to
1. $\frac{5}{16}$
2. $\frac{5}{17}$
3. $\frac{16}{17}$
4. $\frac{11}{16}$

Correct. 3

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Q19. If a , b and c (all distinct) are the sides of a triangle ABC opposite angles a , b and c respectively then $\frac{c\sin(A-B)}{a^2-b^2} - \frac{b\sin(C-A)}{c^2-a^2}$ is equal to

1. 0
2. 1
3. 2
4. -1

Correct. 1

Q20. The expression $\sim (p \leftrightarrow q)$ is equivalent to

1. $(p \wedge \sim q) \wedge (q \wedge \sim p)$
2. $p \vee q$
3. $p \wedge \sim q$
4. $(\sim p \wedge q) \vee (\sim q \wedge p)$

Correct. 4

Q21. Consider a class of 5 girls and 7 boys. The number of different teams consisting of 2 girls and 3 boys that can be formed from this class, if there are two specific boys A and B, who refuse to be the members of the same team, is _____?

Correct. 300

Q22. Let A and B be two sets containing 2 elements and 4 elements respectively. The number of subsets of A × B having 3 or more elements is ___?

Correct. 219

Q23. The intercepts on x-axis made by tangents to the curve, y= 0∫x |t| dt, x ∈ R, which are parallel to the line y = 2x, are equal to (±)_____.

Correct. 1

Q24. In a class of 140 students numbered 1 to 140, all even numbered students opted Mathematics course, those whose number is divisible by 3 opted Physics course and those whose number is divisible by 5 opted Chemistry course. Then the number of students who did not opt for any of the three courses is ____ ?

Correct. 38

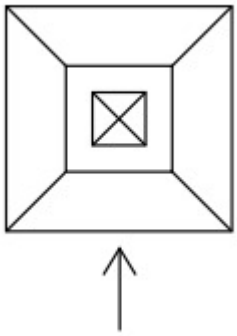
Q25. The coefficient of t^4 in the expansion of $\left(\frac{1-t^6}{1-t}\right)^3$ is _____?

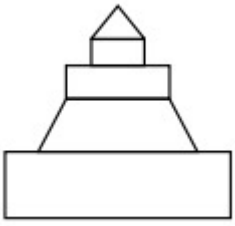
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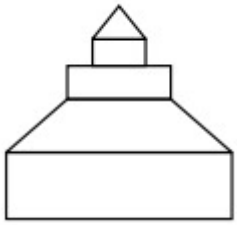
Correct. 15

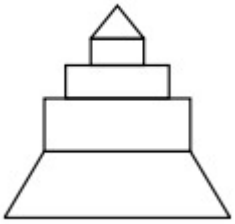
Aptitude

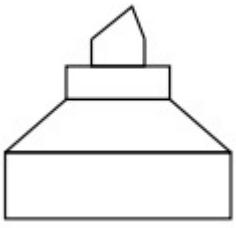
Q1. The problem figure shows the top view of an object. Identify the correct elevation from amongst the answer figures looking in the direction of the arrow.



1. 

2. 

3. 

4. 

Correct. 2

Q2. Problem Figures



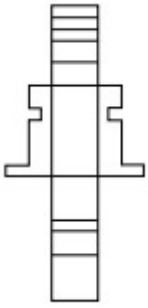
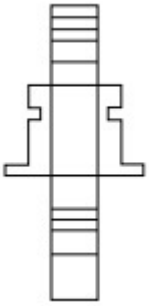
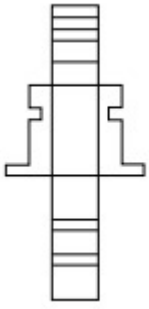
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1. 
2. 
3. 
4. 

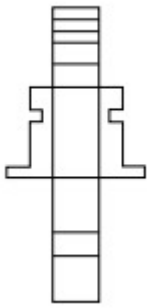
Correct. 2

Q3. Which one of the answer figures shows the correct view of the 3–D problem figure after the problem figure is opened up ?



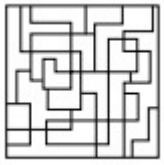
1. 
2. 
3. 

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4. 

Correct. 1

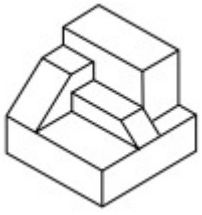
Q4. One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.

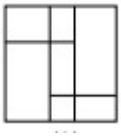


1. 
2. 
3. 
4. 

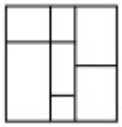
Correct. 2

Q5. The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.



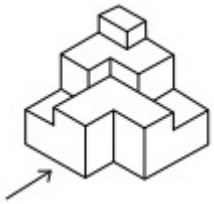
1. 
2. 
3. 

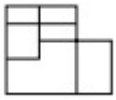
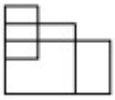
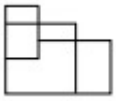
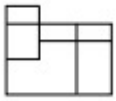
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4. 

Correct. 3

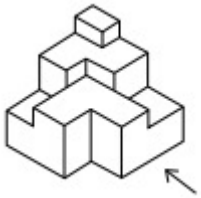
Q6. The 3–D problem figure shows a view of an object. Identify the correct front view, from amongst the answer figures, looking in the direction of arrow.

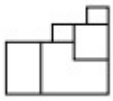
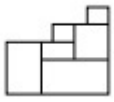
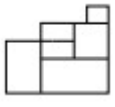


1. 
2. 
3. 
4. 

Correct. 3

Q7. The 3-D problem figure shows a view of an object. Identify the correct front view, from amongst the answer figures, looking in the direction of arrow.

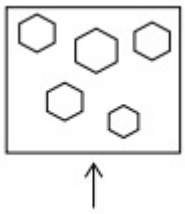


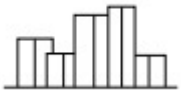
1. 
2. 
3. 
4. 

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Correct. 1

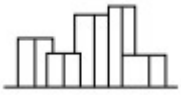
Q8. The problem figure shows the top view of objects. Looking in the direction of the arrow, identify the correct elevation, from amongst the answer figures.



1. 

2. 

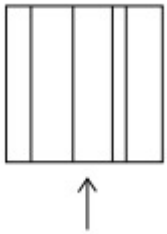
3. 

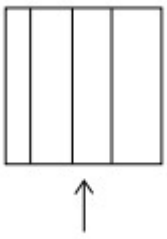
4. 

Correct. 2

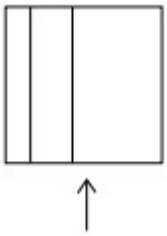
Q9. The problem figure shows the elevation of an object. Identify the correct top view from amongst the answer figures.

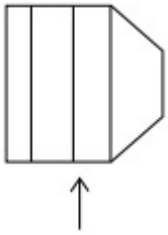


1. 

2. 

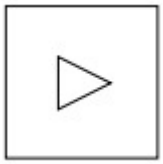
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3. 

4. 

Correct. 2

Q10. Find the odd figure out of the problem figures given below.

1. 

2. 

3. 

4. 

Correct. 4

Q11. Salim Chisti mosque is located in :
1. Gwalior
2. Fatehpur Sikri
3. Hyderabad
4. Delhi

Correct. 2

Q12. Temperature of the Earth due to the 'Greenhouse Effect' :
1. Increases

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2. Decreases
3. Remains constant
4. Keeps increasing/decreasing

Correct. 1

Q13. Which type of roof will provide maximum protection from heat radiation in a building ?
1. Painted aluminium sheeting
2. Concrete slab with plaster
3. Concrete slab with mud and brick tiles
4. Concrete slab, water proofed and covered with a roof garden

Correct. 4

Q14. Buland Darwaza is located in :
1. Fatehpur Sikri
2. Red Fort
3. Agra Fort
4. Golconda

Correct. 1

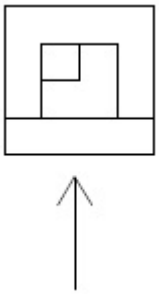
Q15. IGBC stands for :
1. International Great Beautiful City
2. Indian Green Building Council
3. Indian Great Building Center
4. Indian Government Biological Center

Correct. 2

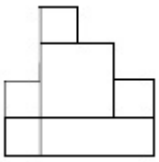
Q16. Solar energy is converted to electrical energy by :
1. Photovoltaic cells
2. Electro magnets
3. Bio technology
4. Rain water

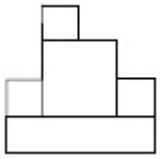
Correct. 1

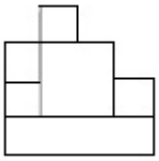
Q17. Directions: The problem figure shows the top view of an object. Identify the correct elevation from amongst the answer figures looking in the direction of the arrow.

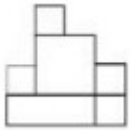


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1. 

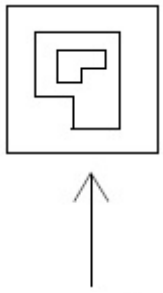
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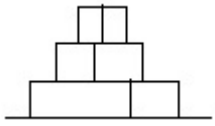
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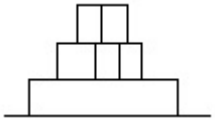
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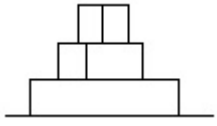
Correct. 2

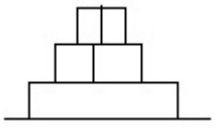
Q18. Directions: The problem figure shows the top view of an object. Identify the correct elevation from amongst the answer figures looking in the direction of the arrow.



1. 

2. 

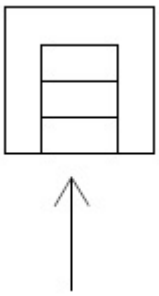
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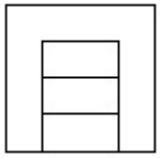
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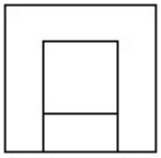
Correct. 4

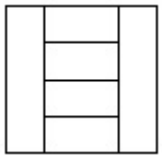
Q19. Directions: The problem figure shows the top view of an object. Identify the correct elevation from amongst the answer figures looking in the direction of the arrow.

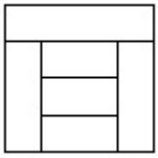
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1. 

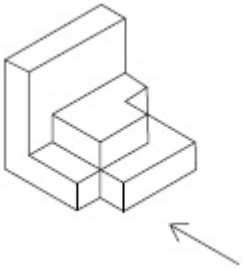
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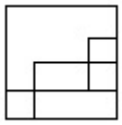
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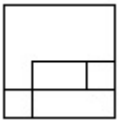
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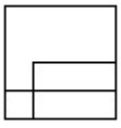
Correct. 3

Q20. Directions : The 3-D figure shows the view of an object. Identify the correct front view in the direction of the arrow, from amongst the answer figures.

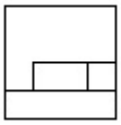


1. 

2. 

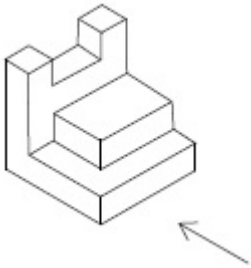
3. 

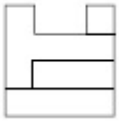
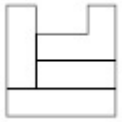
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4. 

Correct. 2

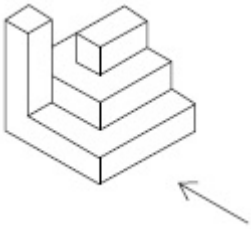
Q21. Directions : The 3-D figure shows the view of an object. Identify the correct front view in the direction of the arrow, from amongst the answer figures.

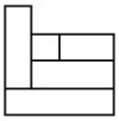
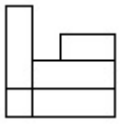
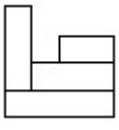


1. 
2. 
3. 
4. 

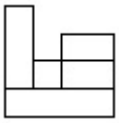
Correct. 4

Q22. Directions : The 3-D figure shows the view of an object. Identify the correct front view in the direction of the arrow, from amongst the answer figures.



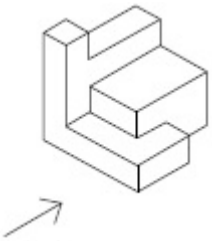
1. 
2. 
3. 

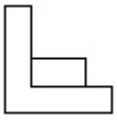
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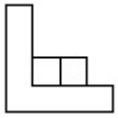
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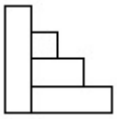
Correct. 3

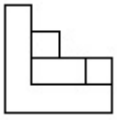
Q23. Directions : The 3-D figure shows the view of an object. Identify the correct front view in the direction of the arrow, from amongst the answer figures.



1. 

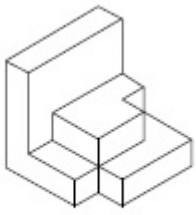
2. 

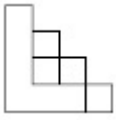
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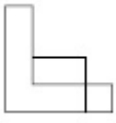
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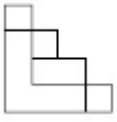
Correct. 1

Q24. Directions : The 3-D figure shows the view of an object. Identify the correct front view in the direction of the arrow, from amongst the answer figures.

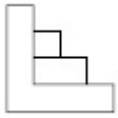


1. 

2. 

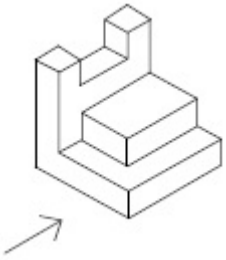
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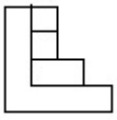
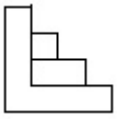
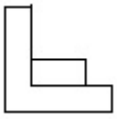
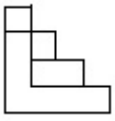
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4. 

Correct. 2

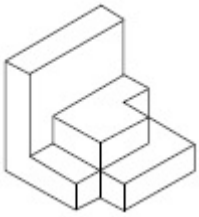
Q25. Directions: The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

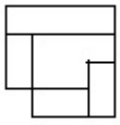
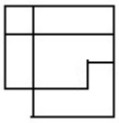
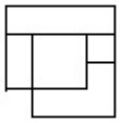


1. 
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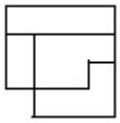
Correct. 3

Q26. Directions: The 3-D figure shows the view of an object. Identify the correct top view from amongst the answer figures.



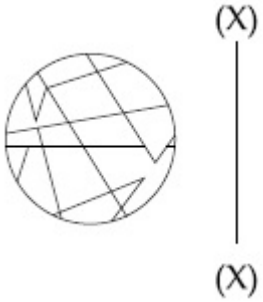
1. 
2. 
3. 

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4. 

Correct. 4

Q27. Directions : Which one of the answer figure is the correct mirror image of the problem figure with respect to X-X?



1. 

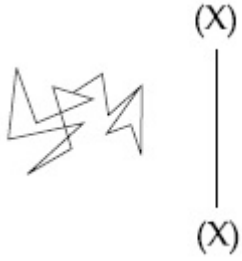
2. 

3. 

4. 

Correct. 2

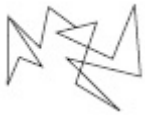
Q28. Directions : Which one of the answer figure is the correct mirror image of the problem figure with respect to X-X?

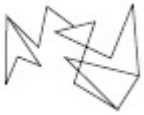


1. 

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2. 

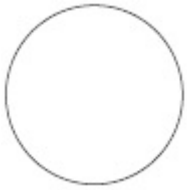
3. 

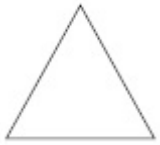
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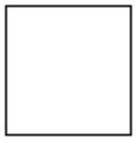
Correct. 3

Q29. Directions : Find the odd figure out of the answer figures given below:

1. 

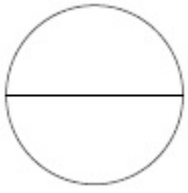
2. 

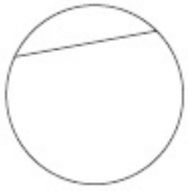
3. 

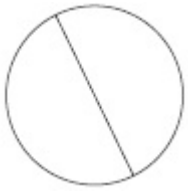
4. 

Correct. 2

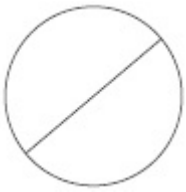
Q30. Directions : Find the odd figure out of the answer figures given

1. 

2. 

3. 

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4. 

Correct. 2

Q31. Directions: One of the following answer figure is hidden in the problem figure in the same size and direction Select the correct one.



1. 
2. 
3. 
4. 

Correct. 2

Q32. What does the abbreviation ISRO stand for amongst the following?
1. Indian Studies and Result Office
2. International Settlements and Relief Organization
3. Indian Space Research Organization
4. International Sea and Rain Office

Correct. 3

Q33. Chajjas above windows are meant to protect the building from which of the following ?
1. Sun
2. Birds
3. Typhoon
4. Wind

Correct. 1

Q34. What does the abbreviation NASA stand for amongst the following ?
1. National Art and Science Association
2. National Architecture and Science Association
3. National Archeology Studies Academy
4. National Aeronautics and Space Administration

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Correct. 4

Q35. A small lift for carrying small loads only is known as which of the following ?
1. A Deaf Bearer
2. A Dump Waiter
3. A Jockey Boy
4. A Push Upper

Correct. 2

Q36. Parquet flooring is usually made of which of the following ?
1. Granite
2. Marble
3. Cement
4. Wood

Correct. 4

Q37. The fort in Hyderabad is known as which of the following ?
1. Bahubali
2. Golconda
3. Siladhari
4. Virbanda

Correct. 2

Q38. Cement Plaster is used for which of the following ?
1. Covering Walls
2. Making roofs
3. Making Staircase
4. Making Floors

Correct. 1

Q39. Helical staircases are which one of the following ?
1. Dog leg staircases
2. Curving Staircases
3. Straight Flights
4. Staircase with no railings

Correct. 2

Q40. Zaha Hadid was born in which country amongst the following ?
1. Iran
2. Iraq
3. Afghanistan

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4. Turkistan

Correct. 2

Q41. Directions : One of the following answer figures is hidden in the problem figure in the same size and direction. Select the correct one.



1. 

2. 

3. 

4. 

Correct. 1

Q42. Directions : Which one Of the answer figure will complete the sequence Of the three problem figures ?



1. 

2. 

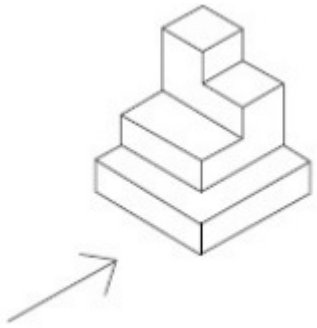
3. 

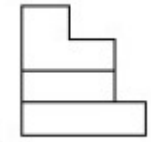
4. 

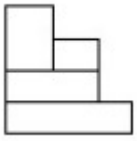
Correct. 1

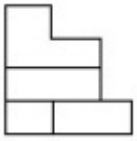
Q43. Directions : The 3D figure shows the view of an object. Identify the correct front view looking in the direction of the arrow, from amongst the answer figures.

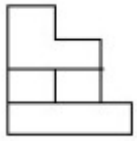
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1. 

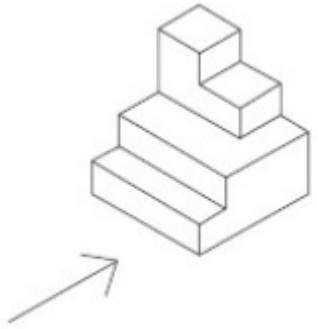
2. 

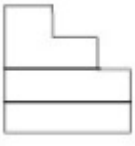
3. 

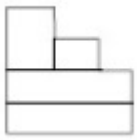
4. 

Correct. 1

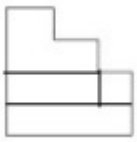
Q44. Directions : The 3D figure shows the view of an object. Identify the correct front view looking in the direction of the arrow, from amongst the answer figures.

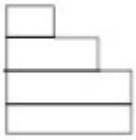


1. 

2. 

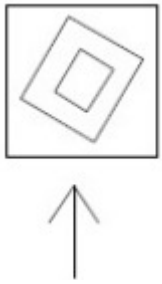
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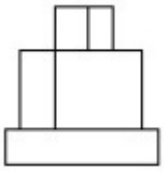
3. 

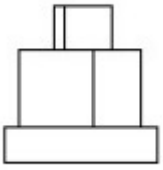
4. 

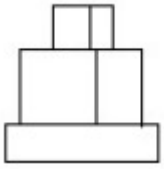
Correct. 1

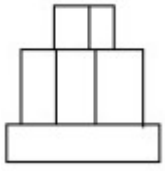
Q45. Directions : The problem figure shows the top view of an object. Identify the correct elevation from amongst the answer figures looking in the direction of the arrow.



1. 

2. 

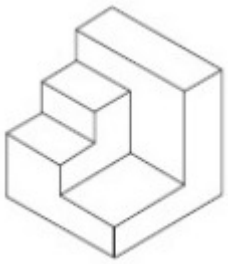
3. 

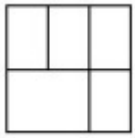
4. 

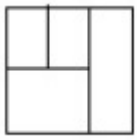
Correct. 3

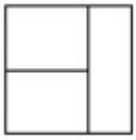
Q46. Directions : The 3D figure shows the view of an object. Identify the correct top view from amongst the answer figures.

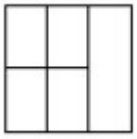
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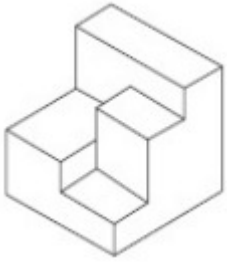
1. 

2. 

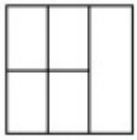
3. 

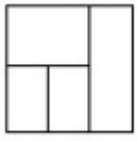
4. 

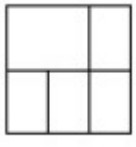
Correct. 2



Q47.

1. 

2. 

3. 

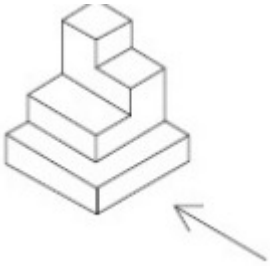
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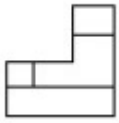


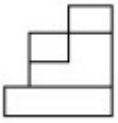
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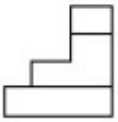
Correct. 2

Q48. Directions : The 3D figure shows the view of an object. Identify the correct side view looking in the direction of the arrow, from amongst the answer figures.



1. 

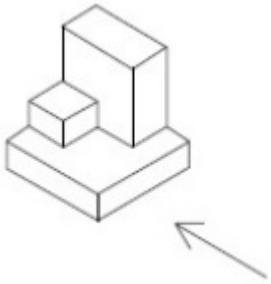
2. 

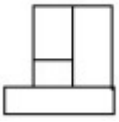
3. 

4. 

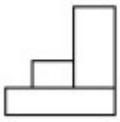
Correct. 3

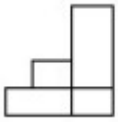
Q49. Directions : The 3D figure shows the view of an object. Identify the correct side view looking in the direction of the arrow, from amongst the answer figures.

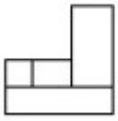


1. 

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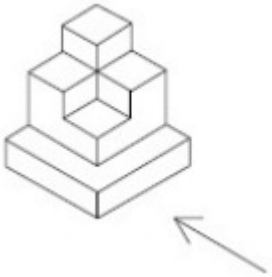
2. 

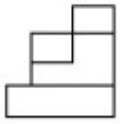
3. 

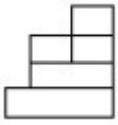
4. 

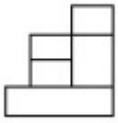
Correct. 2

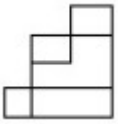
Q50. Directions : The 3D figure shows the view of an object. Identify the correct side view looking in the direction of the arrow, from amongst the answer figures.



1. 

2. 

3. 

4. 

Correct. 3

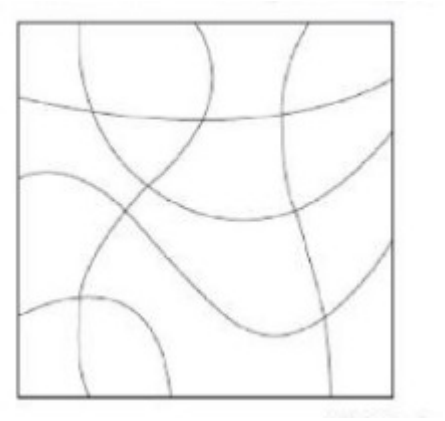
Drawing

1. In the space provided in the answer sheet for this question, draw margin lines to form a frame. In this frame create an aesthetic composition using only curved lines. The shapes created by these curved lines can be of any size, and may be placed separate, overlapping or within each other. The

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idea is to produce an aesthetic and visually exciting composition of these shapes in the frame without making it represent any realistic form like house face etc. The composition should be filled with some colors Of your choice so that the visual quality of the composition is enhanced.

2. Draw the graphic image shown below to double its size in the space provided for the answer of this question. Each component line should be drawn double its length and correctly positioned direction wise as shown in the question figure.



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