JEE PAPER 2 ALL INDIA MOCK

INSTRUCTIONS FOR CANDIDATES

1. Fill up the necessary information in the space provided on the cover
2. The total duration of this test (Part 1 Part II and Part III) is 3 hours. There are 25 questions in Part I, 50 questions in Part II and 2 questions in Part III.
3. There is ¼ (25%) Negative Marking for each wrong answer
4. You may attempt the questions in any order you prefer.
5. Please check for the completeness of the Question Booklet
6. Mark all answers in the booklet only. For Section 3, ask for additional papers.
7. Rough work, if any, is to be done on the Question Booklet only. No separate sheet will be provided/used for rough work.
8. Calculator, Mobile or any Electronic Gadgets, etc., are not permitted inside the examination hall.
9. Candidates seeking, receiving and/or giving assistance during the test will be disqualified.
10. The right to exclude any question(s) from final evaluation rests with the Examining authority.

QUESTION BOOKLET

NAME:____

MOBILE NUMBER: ____

DATE:____

Section 1: Mathematics: Questions 1 – 25

1. If the curves $y^2 = 6x$, $9x^2 + by^2 = 16$ intersect each other at right angles, then the value of b is:

A) $\frac{9}{2}$ B) 6

C) $\frac{7}{2}$ C) 4

2. For each $t \in R$, let $[t]$ be the greatest integer less than or equal to t. Then

$\lim_{x \to 0+} x \left(\left[\frac{1}{x}\right] + \left[\frac{2}{x}\right] + \left[\frac{3}{x}\right] \dots + \left[\frac{15}{x}\right] \right)$

A) does not exist (in R) B) is equal to 0

C) is equal to 15 D) is equal to 120

3. If L_1 is the line of intersection of the planes $2x - 2y + 3z - 2 = 0$, $x - y + z + 1 = 0$ and L_2 is the line of intersection of the planes $x + 2y - z - 3 = 0$, $3x - y + 2z - 1 = 0$, then the distance of the origin from the plane, containing the lines L_1 and L_2, is:

A) $\frac{1}{\sqrt{2}}$ B) $\frac{1}{4\sqrt{2}}$

C) $\frac{1}{3\sqrt{2}}$ D) $\frac{1}{2\sqrt{2}}$

4. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \frac{\sin^2 x}{1+2^x}\, dx$ is:

A) $\frac{\pi}{4}$ B) $\frac{\pi}{8}$

C) $\frac{\pi}{2}$ D) 4π

5. Let $g(x) = \cos x^2$, $f(x) = \sqrt{x}$, and α, β $(\alpha < \beta)$ be the roots of the quadratic equation $18x^2 - 9x + \pi^2 = 0$. Then the area (in sq. units) bounded by the curve $y = (gof)(x)$ and the lines $x = \alpha$, $x = \beta$ and $y = 0$, is:

A) $\frac{1}{2} * (\sqrt{2} - 1)$ B) $\frac{1}{2} * (\sqrt{3} - 1)$

C) $\frac{1}{2} * (\sqrt{3} + 1)$ D) $\frac{1}{2} * (\sqrt{3} - \sqrt{2})$

6. If sum of all the solutions of the equation $8\cos x \left(\cos\left(\frac{\pi}{6} + x\right) \cos\left(\frac{\pi}{6} - x\right) - \frac{1}{2}\right) = 1$ x in $[0, \pi]$ is $k\,\pi$, then k is equal to :

A) $20/9$ B) $2/3$

C) $13/9$ D) $8/9$

7. Let $f(x) = x^2 + \frac{1}{x^2}$ and $g(x) = x - \frac{1}{x}$, $x \in R - \{-1, 0, 1\}$. If $h(x) = \frac{f(x)}{g(x)}$, then the local minimum value of h(x) is:

A) $2\sqrt{2}$ B) 3

C) -3 D) $-2\sqrt{2}$

8. The integral $\int \frac{(\sin^2 x * \cos^2 x)\, dx}{(\sin^5 x + \cos^3 x \sin^2 x + \cos^2 x \sin^3 x + \cos^5 x)^2}$ is equal

A) $\frac{-1}{1+\cot^3 x}$ B) $\frac{1}{3+3\tan^3 x}$

C) $\frac{-1}{3+3\tan^3 x}$ D) $\frac{1}{1+\cot^3 x}$

9. A bag contains 4 red and 6 black balls. A ball is drawn at random from the bag, its colour is observed and this ball along with two additional balls of the same colour are returned to the bag. If now a ball is drawn at random from the bag, then the probability that this drawn ball is red, is:

A) ¾ B) $3/10$

C) $2/5$ D) $1/5$

10. Let the orthocentre and centroid of a triangle be A (– 3, 5) and B (3, 3) respectively. If C is the circumcenter of this triangle, then the radius of the circle having line segment AC as diameter, is:

A) $\frac{3\sqrt{5}}{2}$ B) $\sqrt{10}$

C) $2\sqrt{10}$ D) $\sqrt{\frac{45}{2}}$

11. If the tangent at (1, 7) to the curve $x^2 = y - 6$ touches the circle $x^2 + y^2 + 16x + 12y + c = 0$ then the value of c is:

A) 95 B) 195

C) 185 D) 85

12. If $\alpha, \beta \in C$ are the distinct roots, of the equation $x^2 - x + 1 = 0$, then $\alpha^{101} + \beta^{107}$

A) 2 B) –1

C) 0 D) 1

13. PQR is a triangular park with PQ = PR = 200m. A T.V. tower stands at the mid- point of QR. If the angles of elevation of the top of the tower at P, Q and R are respectively 45°, 30° and 30°, then the height of the tower (in m) is:

A) $50\sqrt{2}$ B) 100

C) 50 D) $100\sqrt{3}$

14. Tangents are drawn to the hyperbola $4x^2 - y^2 = 36$ at the points P and Q. If these tangents intersect at the point T (0, 3) then the area (in sq. units) of ΔPTQ is:
A) $36\sqrt{5}$ B) $45\sqrt{5}$
C) $54\sqrt{3}$ D) $60\sqrt{3}$

15. From 6 different novels and 3 different dictionaries, 4 novels and 1 dictionary are to be selected and arranged in a row on a shelf so that the dictionary is always in the middle. The number of such arrangements is:
A) at least 750 but less than 1000 B) at least 1000
C) less than 500 D) at least 500 but less than 750

16. If $\begin{vmatrix} x-4 & 2x & 2x \\ 2x & x-4 & 2x \\ 2x & 2x & x-4 \end{vmatrix} = (A + Bx)(x - A)^2$, then the ordered pair (A, B) is equal to:
A) (4, 5) B) (−4, −5)
C) (−4, 3) D) (−4, 5)

17. Two sets A and B are as under:
$A = \{(a, b) \in R \times R: |a - 5| < 1 \text{ and } |b - 5| < 1\}$;
$B = \{(a, b) \in R \times R: 4(a - 6)^2 + 9(b - 5)^2 \leq 36\}$. Then:
A) neither $A \subset B$ nor $B \subset A$ B) $B \subset A$
C) $A \subset B$ D) $A \subset B = \emptyset$ (an empty set)

18. A straight line through a fixed point (2, 3) intersects the coordinate axes at distinct points P and Q. If O is the origin and the rectangle OPRQ is completed, then the locus of R is:
A) $3x + 2y = 6xy$ B) $3x + 2y = 6$
C) $2x + 3y = xy$ D) $3x + 2y = xy$

19. If y_1, y_2 are the ordinates of two points P and Q on the parabola and y_3 is the ordinate of the point of intersection of tangents at P and Q, then
A) y_1, y_2, y_3 are in A.P. B) y_1, y_3, y_2 are in A.P.
C) y_1, y_2, y_3 are in G.P. D) y_1, y_3, y_2 are in G.P.

20. Let $S = \{x \in R: x \geq 0 \text{ and } 2\left|\sqrt{x} - 3\right| + \sqrt{x}\left(\sqrt{x} - 6\right) + 6 = 0\}$. Then S:
A) contains exactly four elements B) is an empty set
C) contains exactly one element D) contains exactly two elements

Numeric Entry Questions

Direction for question 21- 25: Each of the following questions an answer has to be filled in the box given.

21. Let $a_1, a_2, a_3, \ldots\ldots, a_{49}$ be in A.P. such that $\sum_{k=0}^{12} a\,(4k+1) = 416$ and $a_9 + a_{43} = 66$. If $a_1^2 + a_2^2 + a_3^2 + \ldots a_{17}^2 = 140m$, then m is equal to:

22. Let A be the sum of the first 20 terms and B be the sum of the first 40 terms of the series $1^2 + 2.2^2 + 3^2 + 2.4^2 + 5^2 + 2.6^2 + \ldots.$ If $B - 2A = 100\gamma$, then γ is equal to:

23. The sum of the coefficient of all odd degree terms in the expansion of $\left\{x + \sqrt{x^3 - 1}\right\}^5 + \left\{x - \sqrt{x^3 - 1}\right\}^5$, $(x > 1)$ is:

24. If the system of linear equations
$x + ky + 3z = 0$
$3x + ky - 2z = 0$
$2x + 4y - 3z = 0$ has a non-zero solution (x, y, z), then $\frac{xz}{y^2}$ is equal to:

25. Tangent and normal are drawn at P (16, 16) on the parabola $y^2 = 16x$, which intersect the axis of the parabola at A and B, respectively. If C is the centre of the circle through the points P, A and B and angle CPB = θ, then a value of tan θ is:

Section 2: Aptitude: Questions 1 – 50

1. A small lift for carrying small load only is known as:
   A) A deaf bearer B) A dumb waiter
   C) A jockey boy D) A push upper

2. Nitco Ltd in the Indian Market is known for which of the following products?
   A) Pipes B) Sanitary ware
   C) Wall Tiles D) Wooden Tables

3. Which of the following places is NOT the UNESCO world heritage site?
   A) Hampi B) Kaziranga National Park
   C) Konark Temple D) Ranthambore National Park

4. Which of the following is the most famous temple in the Khajuraho Group of Temples?
   A) Shiva Temple B) Kandariya Mahadev Temple
   C) Ganesh Temple D) Krishna Temple

5. Parquet flooring is usually made of which of the following?
   A) Granite B) Marble
   C) Cement D) Wood

6. Where is Mehrangarh fort located?
   A) Jodhpur B) Udaipur
   C) Jaisalmer D) Jaipur

7. Who designed the Bandra Worli Sealink?
A) William Emmerson
B) Seshadri Srinivasan
C) Tritton
D) Adrian Smith

8. Kumbha Shyam Temple is situated inside which fort?
A) Chhitorgarh Fort
B) Jodhpur Fort
C) Gwalior Fort
D) Golkunda Fort

9. Where is "arc the triomphe" located?
A) Amsterdam
B) Paris
C) Munich
D) London

10. Where is "Hathi Park" located?
A) Bengaluru
B) Kochi
C) Chennai
D) Lucknow

11. Plinth height of a building normally should not be less than?
A) 30 cm
B) 45 cm
C) 60 cm
D) 75 cm

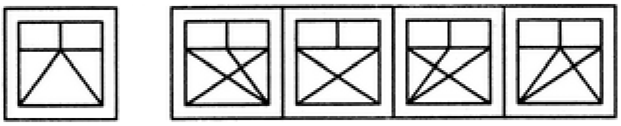
12. Which variety of Glass is heat resistant?
A) Flint Glass
B) Battle Glass
C) Sheet Glass
D) Pyrex Glass

13. The hardest stone is?
A) Sand Stone
B) Marble
C) Kota Stone
D) Granite

14. Walls painted in Dark Colours make the room look?
A) Smaller
B) Larger
C) Darker
D) Narrower

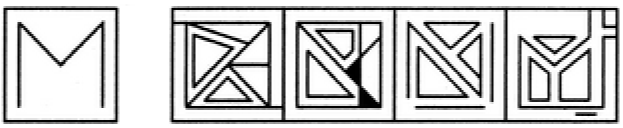
15. Qutub Minar in Delhi was built by?
A) Shahjahan
B) Iltutmuch
C) Qutubuddin Aibak
D) Akbar

Q 16 – 20: Find out the alternative figure which contains figure (X) as its part.

16. 

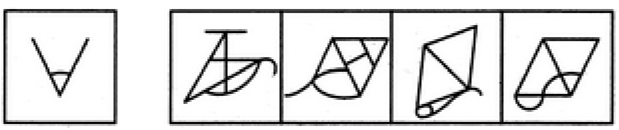
(X) (1) (2) (3) (4)

A) 1 B) 2
C) 3 D) 4

17. 

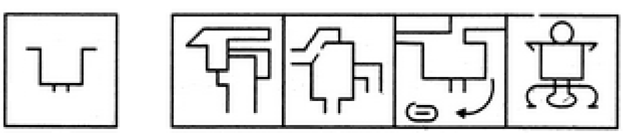
(X) (1) (2) (3) (4)

A) 1 B) 2
C) 3 D) 4

18. 

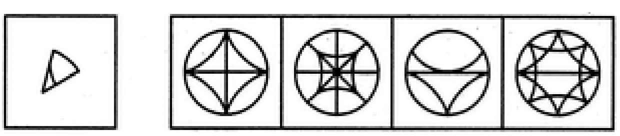
(X) (1) (2) (3) (4)

A) 1 B) 2
C) 3 D) 4

19. 

(X) (1) (2) (3) (4)

A) 1 B) 2
C) 3 D) 4

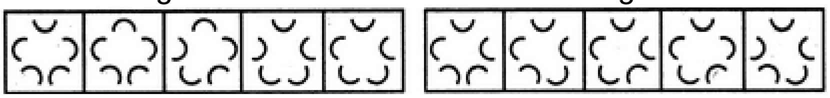
20. 

(X) (1) (2) (3) (4)

A) 1 B) 2
C) 3 D) 4

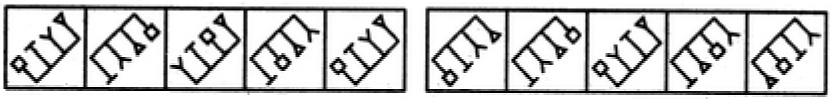
Q21 – 25: Select a figure from amongst the Answer Figures which will continue the same series as established by the five Problem Figures.

21. Problem Figures: Answer Figures:



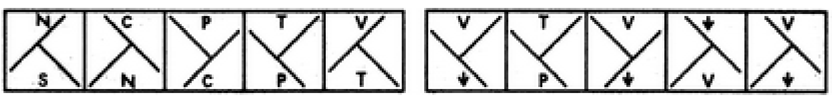
(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

22. Problem Figures: Answer Figures:



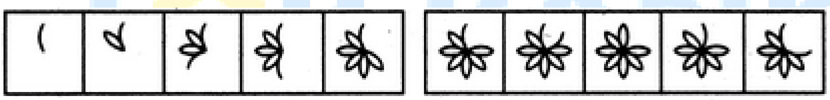
(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

23. Problem Figures: Answer Figures:



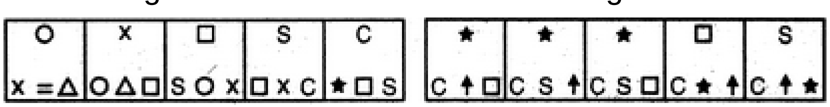
(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

24. Problem Figures: Answer Figures:



(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

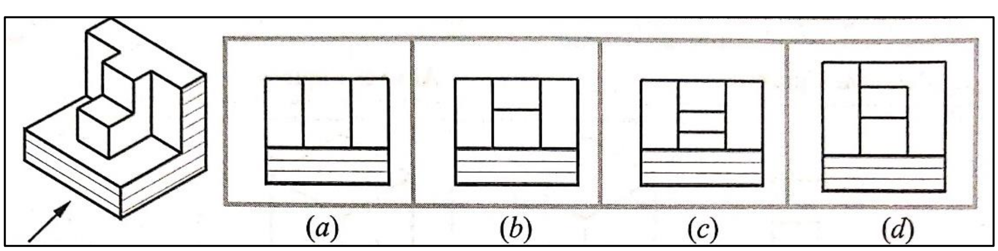
25. Problem Figures: Answer Figures:



(A) (B) (C) (D) (E) (1) (2) (3) (4) (5)

Q26 – 30: Identify the correct elevation amongst the answer figures

26.

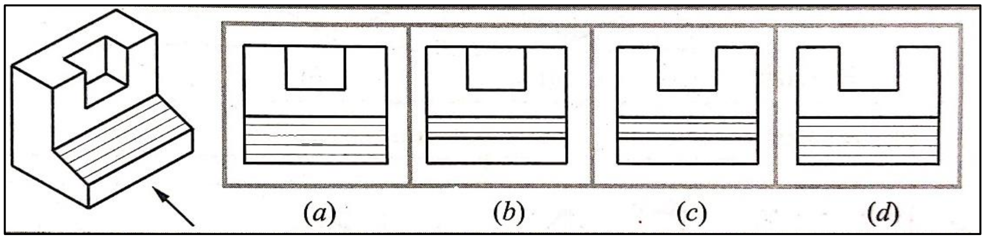


A) a

B) b

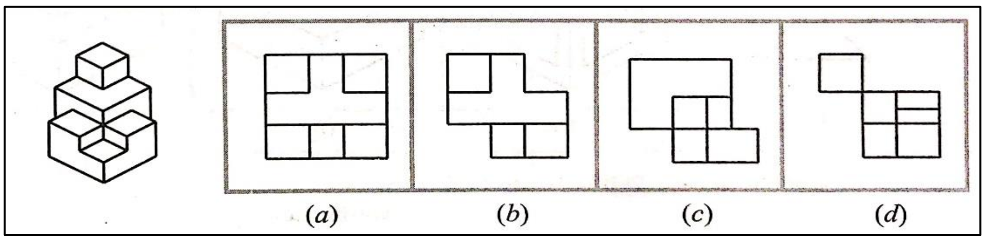
C) c D) d

27.



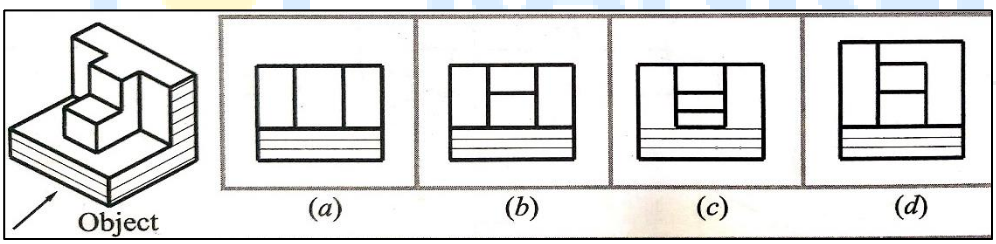
A) a B) b
C) c D) d

28.



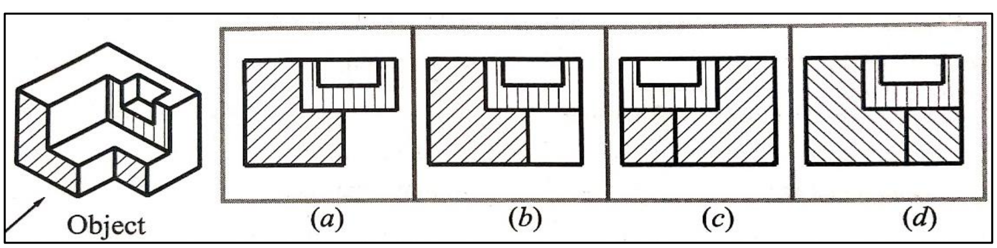
A) a B) b
C) c D) d

29.



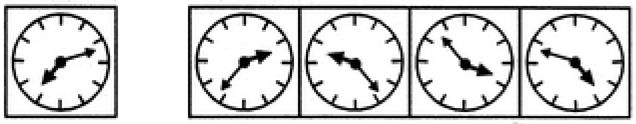
A) a B) b
C) c D) d

30.



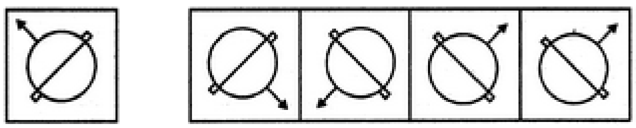
A) a B) b
C) c D) d

Q31 – 35: Choose the correct mirror image of the given figure (X) from amongst the four alternatives.

31. 

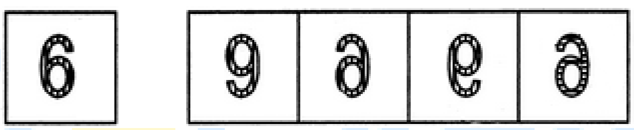
(X) (1) (2) (3) (4)

A) 1
B) 2
C) 3
D) 4

32. 

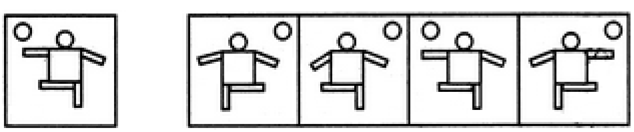
(X) (1) (2) (3) (4)

A) 1
B) 2
C) 3
D) 4

33. 

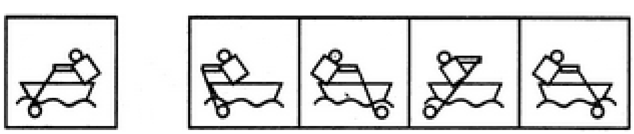
(X) (1) (2) (3) (4)

A) 1
B) 2
C) 3
D) 4

34. 

(X) (1) (2) (3) (4)

A) 1
B) 2
C) 3
D) 4

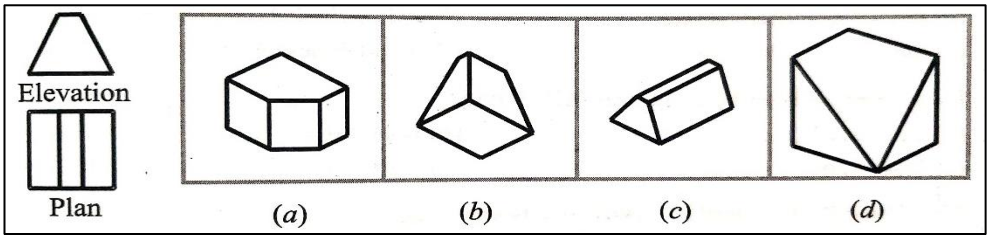
35. 

(X) (1) (2) (3) (4)

A) 1
B) 2
C) 3
D) 4

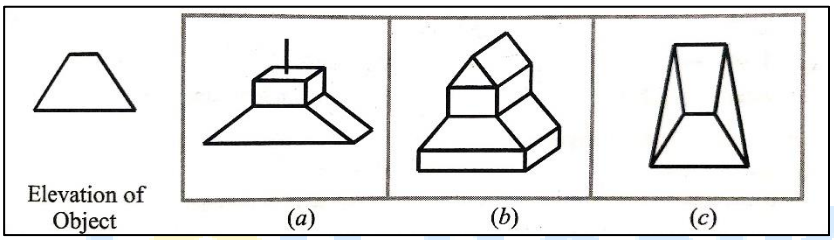
Q36 – 40: Identify the correct 3D view of the objects

36.



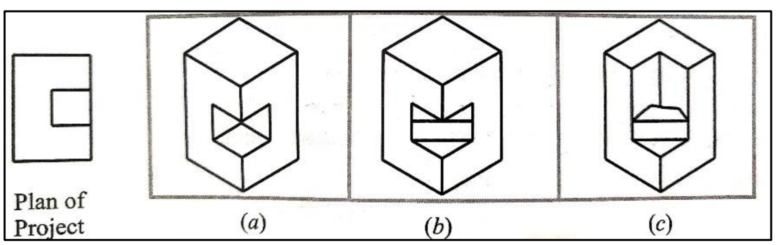
A) a
B) b
C) c
D) d

37.

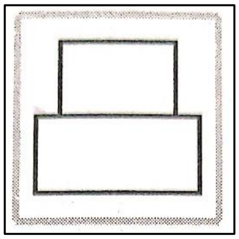


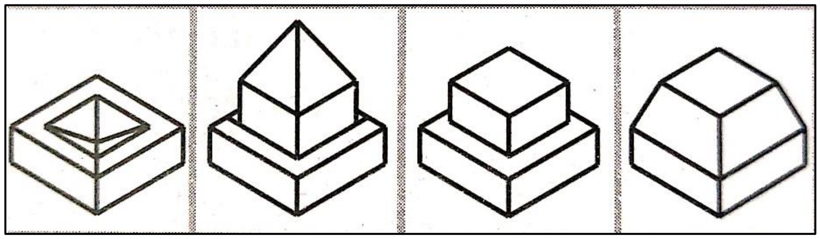
A) a
B) b
C) c
D) NA

38.



A) a
B) b
C) c
D) NA

39. 



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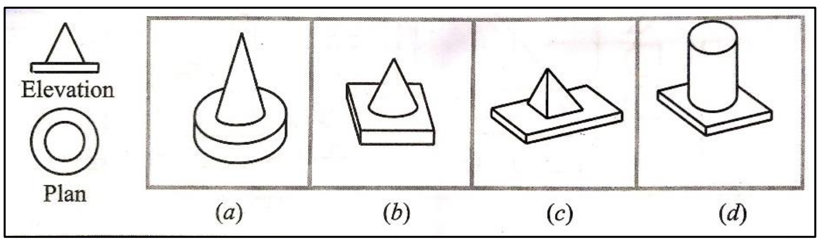
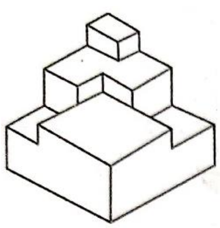
Elevation (a) (b) (c) (d)

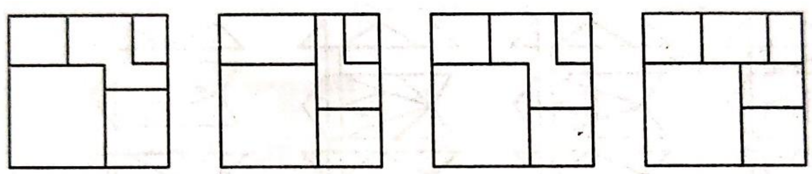
A) a B) b
C) c D) d

40. 

A) a B) b
C) c D) d

Q41 – 45: Identify the correct top view of the object

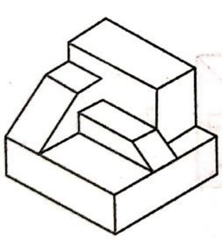
41. 

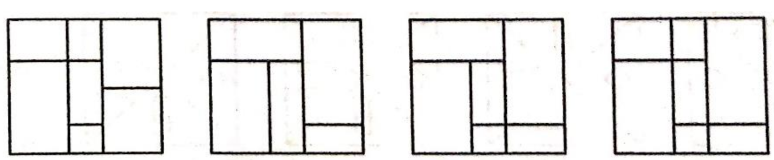


(a) (b) (c) (d)

Problem Figure **Answer Figure**

A) a B) b
C) c D) d

42. 

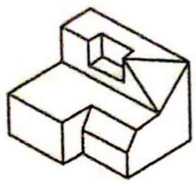


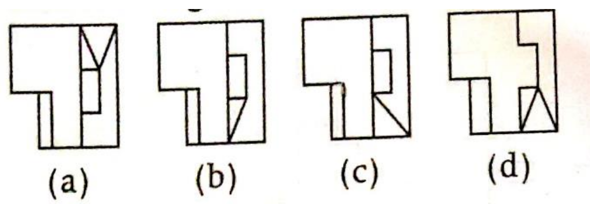
(a) (b) (c) (d)

Problem Figure **Answer Figure**

A) a B) b
C) c D) d

43.

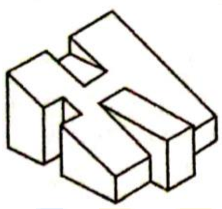


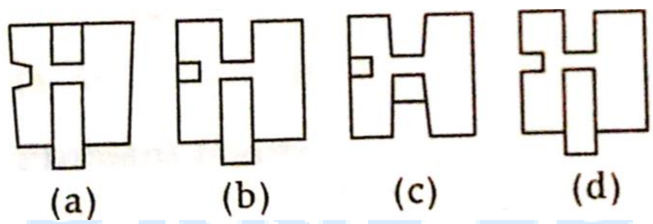


Problem Figure **Answer Figure**

A) a B) b
C) c D) d

44.

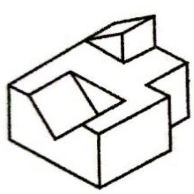


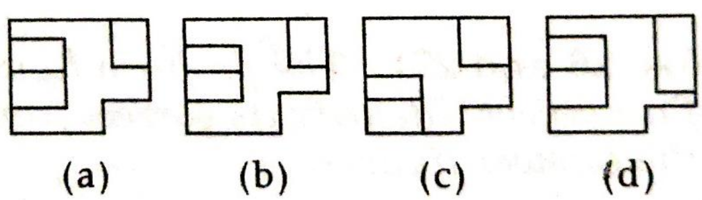


Problem Figure **Answer Figure**

A) a B) b
C) c D) d

45.

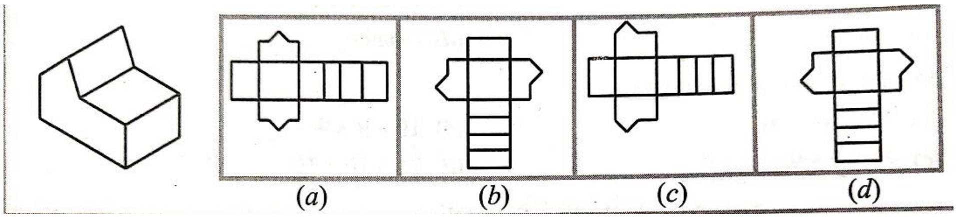




Problem Figure **Answer Figure**

A) a B) b
C) c D) d

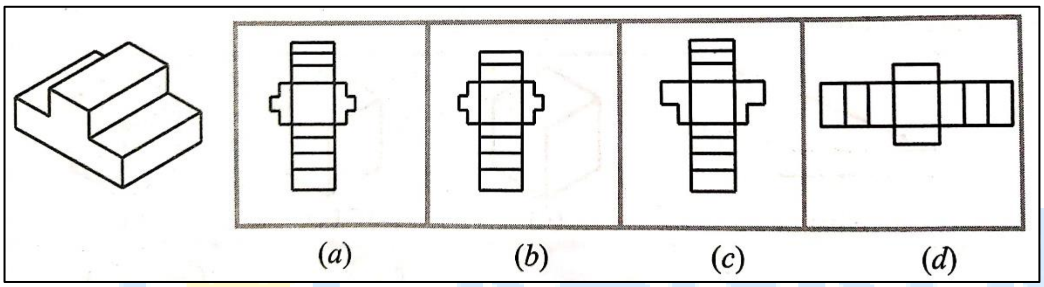
46. Identify the correct folding pattern



Problem Figure **Answer Figure**

A) a B) b
C) c D) d

47. Identify the correct folding pattern

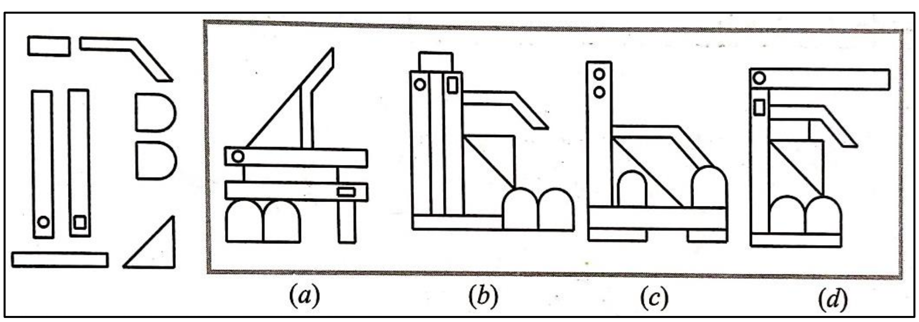


Problem Figure **Answer Figure**

A) a B) b
C) c D) d

Q 48 & 49: Some pieces of paper are given in the problem figure. If they are assembled which one of the compositions from the answer figure will match

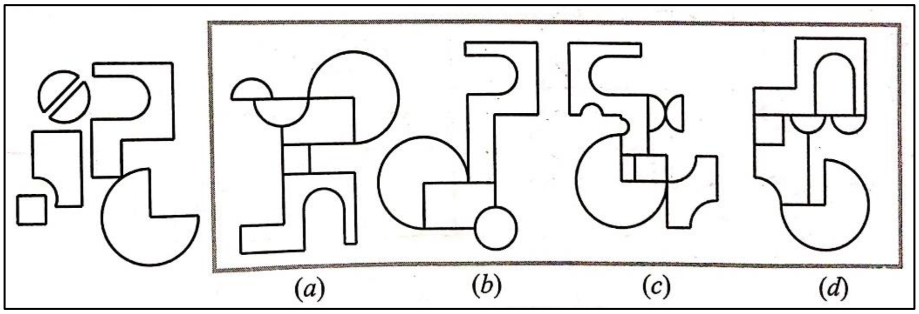
48.



Problem Figure **Answer Figure**

A) a B) b
C) c D) d

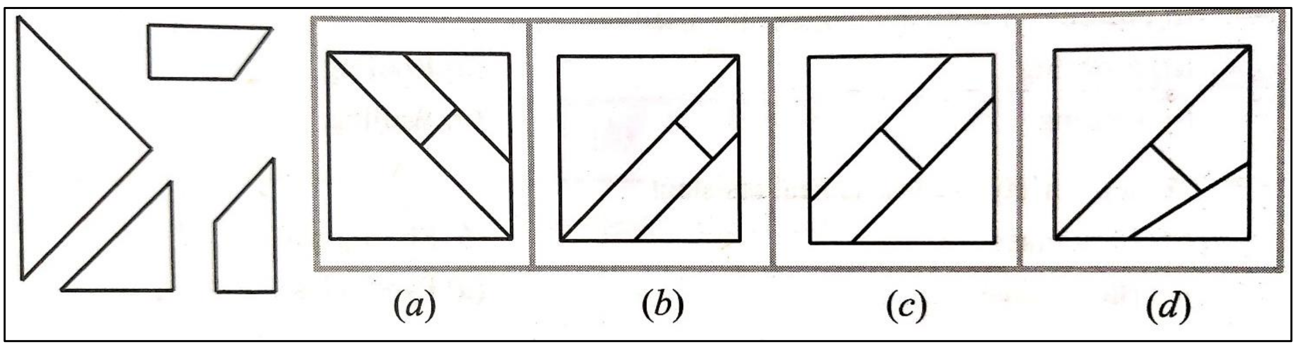
49.



Problem Figure **Answer Figure**

A) a
B) b
C) c
D) d

50. if four pieces of paper shown are assembled, which one of the compositions it will match.



Problem Figure **Answer Figure**

A) a
B) b
C) c
D) d

Section 3: Drawing : Questions 1 & 2
General Instructions:

Question 1 & 2- Bond paper A-4 only pencil Sketches
Attach sheets for Answers

Q1. Remember when you were in class 1 (6 years) playing in a garden along with your friends?
Your mother is overviewing your activity. Create a scene from top of a slide.
50marks

Q2. In an NCC parade you are right guide in the March-Past.
Your mother is sitting in the second row of the guests on your right.
Draw what she might have seen. **50marks**

---End of Question Paper---

Space for Rough Work

Space for Rough Work