JEE PAPER 2 MOCK TEST 3

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 No Negative Marking.
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 system of linear equations:
x + 3y + 7z = 0 ; – x + 4y + 7z = 0
(sin3θ) x + (cos2 θ)y + 2z = 0, has a non-trivial solution, then the number of values of θ lying in the interval [0,π], is
(A) one (B) two
(C) three (D) more than three

2. If the function f(x): [1, ∞) such that [1, ∞ [is defined by f(x) = 3x(x–1); then f⁻1 (x) is:
(A) $\frac{1}{3}^{x(x-1)}$ (B) $\frac{1}{2}(1-\sqrt{(1+4*\log_3 x)}$
(C) $\frac{1}{2}(1+\sqrt{(1+4*\log_3 x)}$ (D) not defined

3. The number of integral values of m for which the equation,
(1 + m2) x^2 –2(1 + 3m) x + (1 + 8m) = 0, has no real root, is:
(A) 1 (B) 2
(C) 3 (D) infinitely many

4. If for a matrix A, |A| = 6 and adj A = $\begin{bmatrix} 1 & -2 & 4 \\ 4 & 1 & 1 \\ -1 & k & 0 \end{bmatrix}$, then k is equal to:
(A) –1 (B) 0
(C) 1 (D) 2

5. For all values of θ ∀ (0, $\pi/2$) $\begin{bmatrix} -2 & tan\theta - sec^2\theta & 3 \\ -sin\theta & cos\theta & sin\theta \\ -3 & -4 & 3 \end{bmatrix}$, the determinant of the matrix always lies in the interval:
(A) ($\frac{7}{2}$, $\frac{21}{4}$) (B) [3, 5]
(C) (4, 6) (D) ($\frac{5}{19}$, $\frac{2}{41}$)

6. A code word of length 4 consists of two distinct consonants in the English alphabet followed by two digits from 1 to 9, with repetition allowed in digits. If the number of code words so formed ending with an even digit is 432 k, then k is equal to

(A) 7 (B) 5
(C) 49 (D) 35

7. The sum of the series S = $\frac{1}{19!} + \frac{1}{3!*17!} + \frac{1}{5!*15!} +$ …… to 10 terms is equal to:

(A) $\frac{2^{19}}{20!}$ (B) $\frac{2^{20}}{20!}$
(C) $\frac{2^{10}}{20!}$ (D) $\frac{2^{19}}{19!}$

8. Let a, b, c, d and e be distinct positive numbers. If a, b, c and $\frac{1}{c}, \frac{1}{d}, \frac{1}{e}$ both are in A.P. and b, c, d is in G.P. then:

(A) a, c, e are in G.P. (B) a, b, e are in G.P.
(C) a, b ,e are in A.P. (D) a, c, e are in A.P

9. If $\sum_{i=1}^{n} \left(\frac{n\,C\,i-1}{n\,C\,i-1+\,nCi}\right)^3 = \frac{36}{13}$, nCi = ${}^{n}C_{i}$, then n is equal to:

(A) 10 (B) 11
(C) 12 (D) 13

10. $\lim_{x \to 1}((1-x) + [x-1] + |1-x|)$ where [x] denotes the greatest integer less than or equal to x:

(A) is equal to –1 (B) is equal to 0
(C) is equal to 1 (D) does not exist

11. If y(x) = $\begin{vmatrix} \sin x & \cos x & \sin x + \cos x + 1 \\ 23 & 17 & 13 \\ 1 & 1 & 1 \end{vmatrix}$, where x is a real number, then

$\frac{d^2y}{dx^2}$ + y is equal to:

(A) 6 (B) 4
(C) –10 (D) 0

12. Let p(x) be a real polynomial of degree 4 having extreme values at x = 1 and

x = 2. If $\lim_{x \to 0} \frac{p(x)}{x^2} = 1$, then p (4) is equal to:

(A) 8 (B) 16
(C) 32 (D) 64

13. The integral $\int_0^2 [x^2]dx$, (where [t] denotes the greatest integer less than or equal to t) is equal to

(A) $3 - \sqrt{2}$ (B) $5 - \sqrt{2} - \sqrt{3}$
(C) $5 - \sqrt{2} - \sqrt{3}$ (D) $6 - \sqrt{2} - \sqrt{3}$

14. Statement-1: The curve $y = \frac{-x^2}{2} + x + 1$ is symmetric with respect to the line x=1. **because**
Statement - 2: A parabola is symmetric about its axis.
(a) Statement-1 is True, Statement-2 is True; Statement-2 is a correct explanation for Statement-1
(b) Statement-1 is True, Statement-2 is True; Statement-2 is not a correct explanation for Statement-1
(c) Statement-1 is True, Statement-2 is False
(d) Statement-1 is False, Statement-2 is True

15. The solution of the differential equation $\frac{ydx + xdy}{ydx - xdy} = \frac{e^{xy} * x^2}{y^4}$ satisfying y (0) = 1, is

(A) $x^3 = 3y^3(-1 + e^{-xy})$ (B) $x^3 = 3^{y^3}(1 - e^{-xy})$
(C) $x^3 = 3^{y^3}(-1 + e^{xy})$ (D) $x^3 = 3y^3(1 - e^{xy})$

16. A line passing through the point P (1, 2) meets the line x + y = 7 at the distance of 3 units from P. Then the slope of this line satisfies the equation

(A) $8x^2 - 9x + 1 = 0$ (B) $7x^2 - 18x + 7 = 0$
(C) $16x^2 - 39x + 16 = 0$ (D) $7x^2 - 6x + 7 = 0$

17. Two vertices of a triangle are (3, – 2) and (–2, 3), and its orthocentre is (–6, 1). Then the third vertex of this triangle can NOT lie on the line:

(A) 6x + y = 0 (B) 4x + y = 2
(C) 5x + y = 2 (D) 3x + y = 3

18. The equation of the latus rectum of the parabola represented by equation $y^2 + 2Ax + 2By + C = 0$ is

(A) $x = \frac{B^2 + A^2 - C}{2A}$ (B) $x = \frac{B^2 - A^2 + C}{2A}$

(C) $x = \frac{B^2 - A^2 - C}{2A}$ (D) $x = \frac{A^2 - B^2 - C}{2A}$

19. The foci of a hyperbola coincide with the foci of the ellipse $\frac{x^2}{25} + \frac{y^2}{9} = 1$. If the eccentricity of the hyperbola is 2, then the equation of the tangent to this hyperbola passing through the point (4, 6) is

(A) $2x - y - 2 = 0$ (B) $3x - 2y = 0$

(C) $2x - 3y + 10 = 0$ (D) $x - 2y + 8 = 0$

20. The equation of the parabola whose vertex and focus lies on the x-axis at distance a and a' from the origin, is

(A) $y^2 = 4(a'-a)(x - a)$ (B) $y^2 = 4(a'-a)(x + a)$

(C) $y^2 = 4(a'+a)(x - a)$ (D) $y^2 = 4(a'+a)(x + a)$

Numeric Entry Questions

21. Let PQ be a focal chord of the parabola $y2 = 4x$. If the centre of a circle having PQ as its diameter lies on the line $5y + 4 = 0$, then the length of the chord PQ is

22. If the line $x = a$ bisects the area under the curve $y = \frac{1}{x^2}$, $1 \le x \le 9$, then 'a' is equal to:

23. If f is a function of real variable x satisfying $f(x + 4) - f(x + 2) + f(x) = 0$, then f is a periodic function with period:

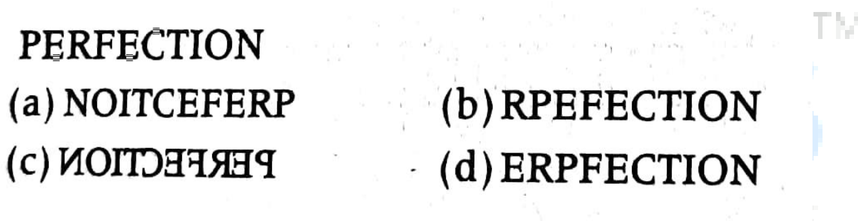
24. For a positive integer n, if the mean of the binomial coefficient in the expansion of $(a + b)^{2n-3}$ is 16, then n is equal to

25. A box contains 5 black and 4 white balls. A ball is drawn at random and its colour is noted. The ball is then put back in the box along with two additional balls of its opposite colour. If a ball is drawn again from the box, then the probability that the ball drawn now is black, is

Section 2: Aptitude: Questions 1 – 50

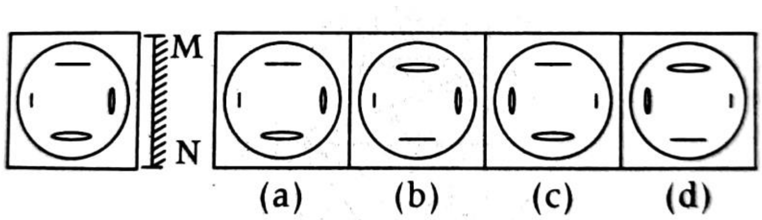
Q1. Choose the alternative which most closely resembles the mirror image of the combination.

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



Q2. Which of the answer figures is the right image of the given figure, if the mirror is placed on the line MN.

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

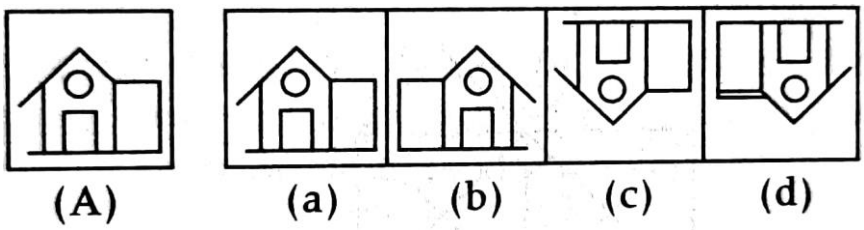


Q3. Choose the alternative which shows the correct water image of the number.

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

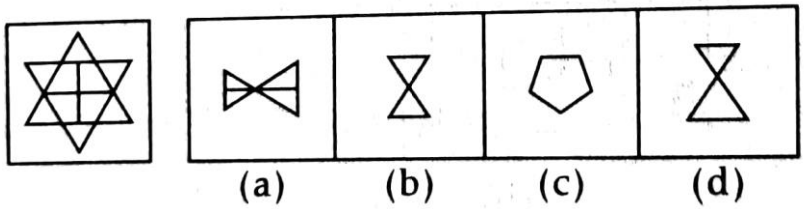
Q4. Find the water image of the object denoted by (A) out of the figures given in the answer figures.

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

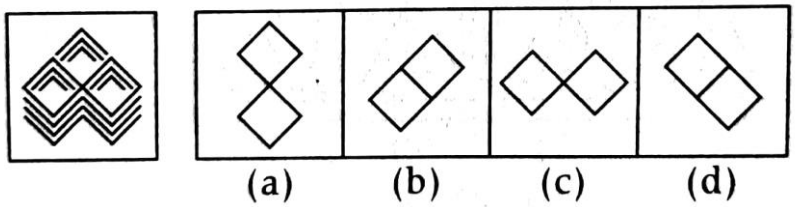


Q5 & 6. In each of the following, choose the answer which is embedded in the problem figure.

Q5. A) a
B) b
C) c
D) d

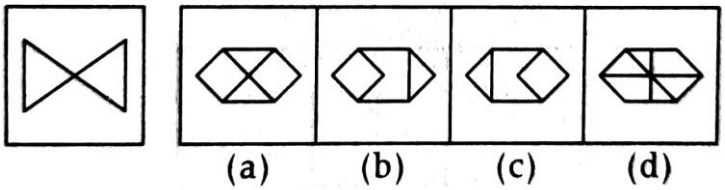


Q6. A) a, b
B) b, c
C) c, d
D) a, e



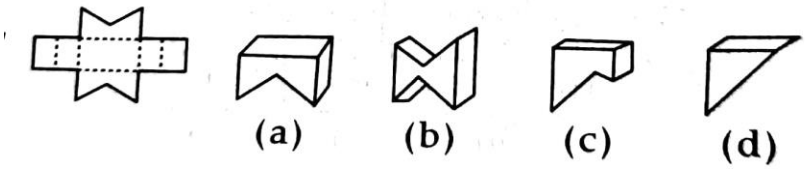
Q7. Choose the alternative figure in which the problem figure is embedded.

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



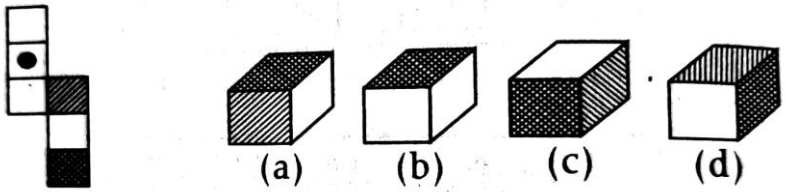
Q8. In the following question at left a drawing is given, which represents a flat piece of a tin sheet. The dotted lines show where the tin is to be bent. On the right drawing of four objects are given. Find out the object that can be made by bending the piece of the tin sheet.

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



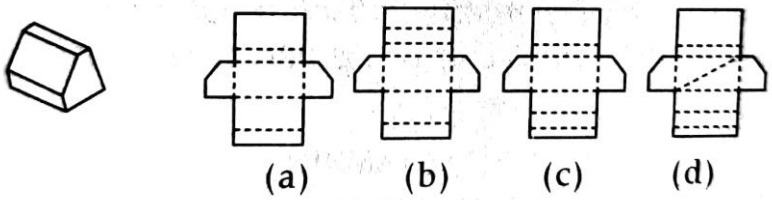
Q9. In the question given below an unfold dice is given on the left side while on the right side, four answer choices are given in the form of complete dices. You are required to select the correct answer choice which is formed by folding the unfolded dice.

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



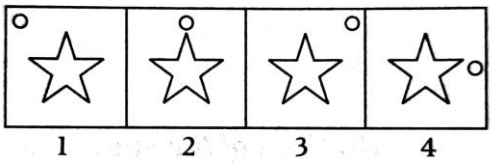
Q10. Which one of the answer figures shows the correct view of the 3-D problem figure after the problem figure is opened up?

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

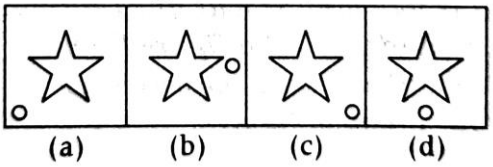


Q(11-13)- Select a figure from the answer figures which will continue the series of the series as established from the four problem figures.

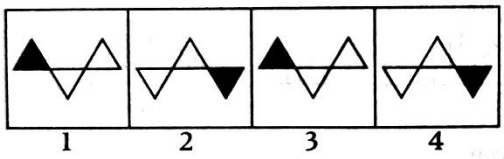
Q11. A) a
B) b
C) c
D) d



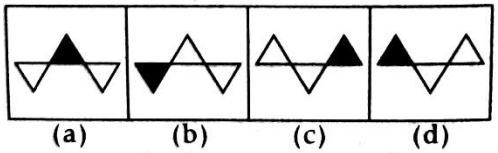
Answer Figures



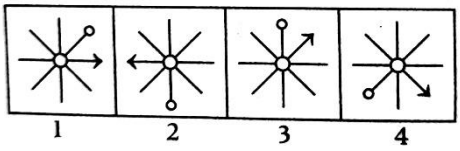
Q12. A) a
B) b
C) c
D) d



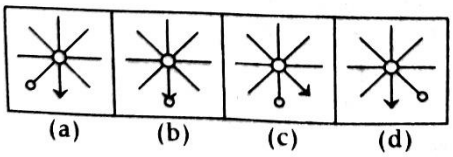
Answer Figures



Q13. A) a
B) b
C) c
D) d

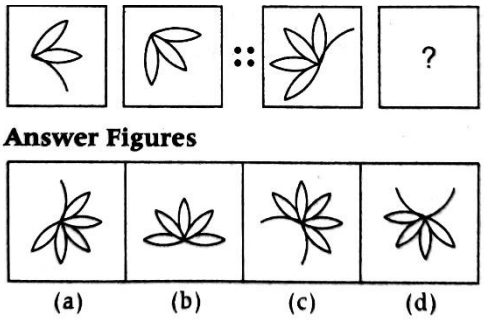


Answer Figures

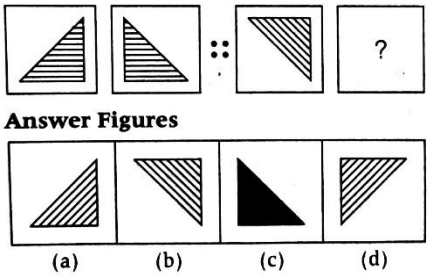


Q(14-16)-The second figure in the first part of the problem figure bears a certain relationship to the first figure. Similarly, one of the figures of answer figures bears the same relationship to the first figure of the second part. You have to select a figure from the set of answer figures which would replace the question mark.

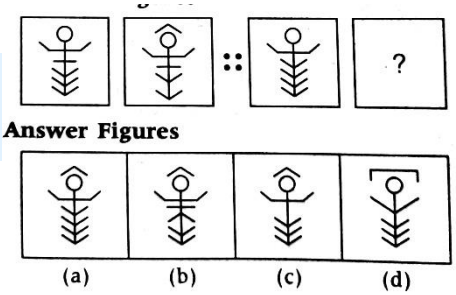
Q14. A) a
B) b
C) c
D) d



Q15. A) a
B) b
C) c
D) d

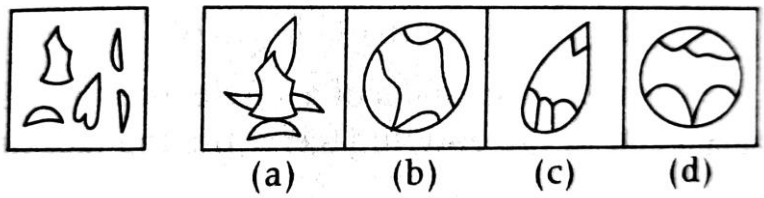


Q16. A) a
B) b
C) c
D) d

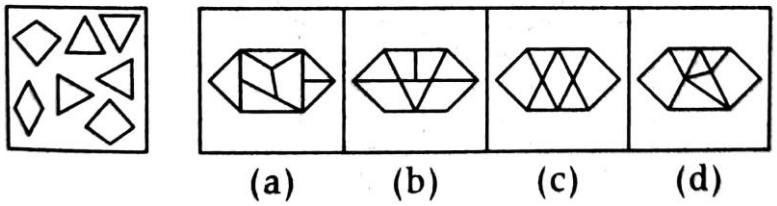


Q(17-18)-Choose the figure that can be formed from the pieces given in the problem figure.

Q17. A) a
B) b
C) c
D) d

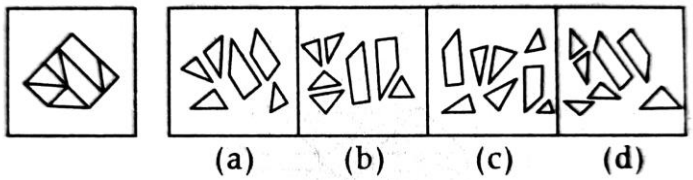


Q18. A) a
B) b
C) c
D) d

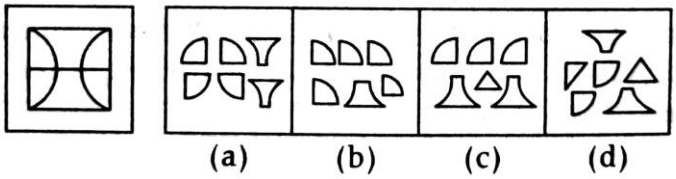


Q(19-20)- Find out which group of pieces when assembled form the figure on left.

Q19. A) a
B) b
C) c
D) d

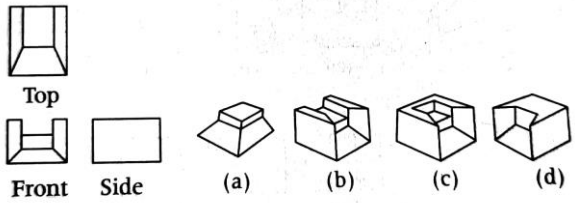


Q20. A) a
B) b
C) c
D) d



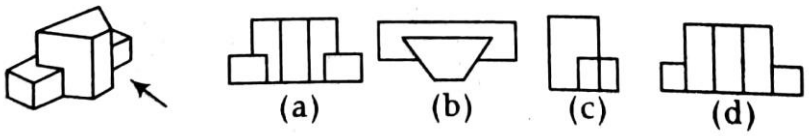
Q21. Identify the correct 3-D figure from the alternatives that have the same top, front and side view as given in the question.

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



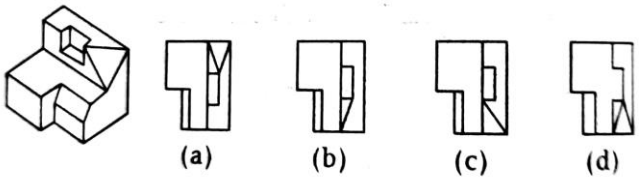
Q22. Identify the correct front view of the 3-D figure, looking in the direction of the arrow.

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



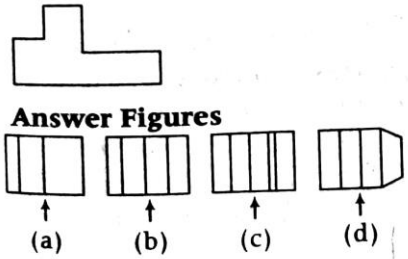
Q23. The 3-D problem figure shows the view of an object. Identify its correct top view.

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



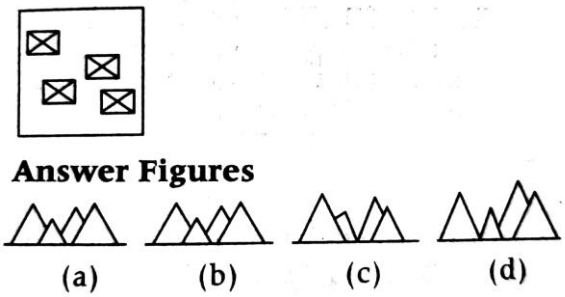
Q24. The problem figure shows the elevation of an object. Identify the correct top view.

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



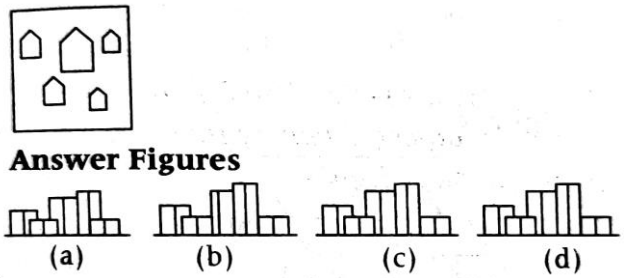
Q**(25 -26)** -The problem figure shows the top view of an object. Identify the correct front view.

Q25 A) a
B) b
C) c
D) d



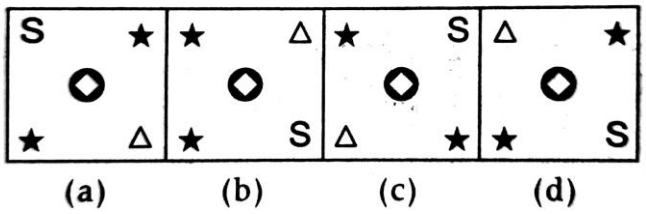
Q26.

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

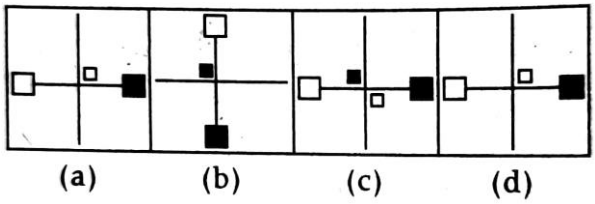


Q(27-28)- Choose the figure which is different from others.

Q27. A) a
B) b
C) c
D) d

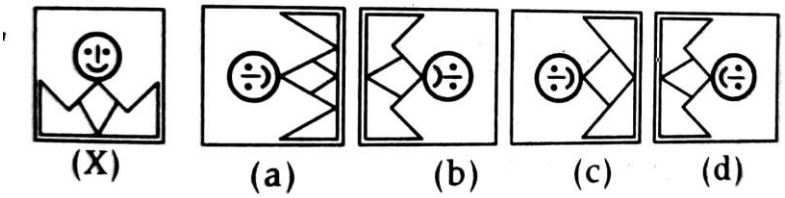


Q28.
A) a
B) b
C) c
D) d

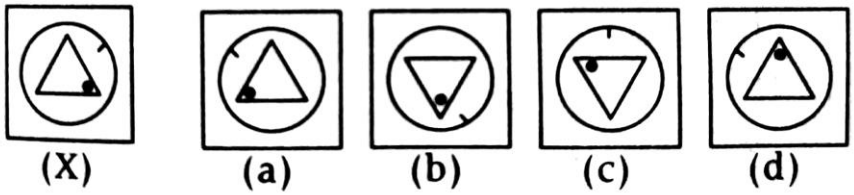


Q(29-30)- Which of the answer figures are the same as figure (X) when it is rotated?

Q29. A) a
B) b
C) c
D) d

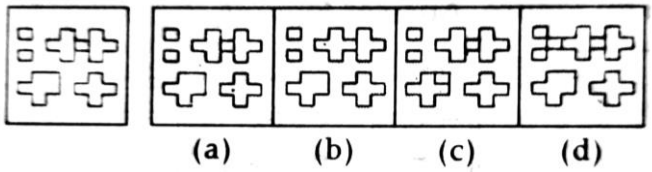


Q30. A) a
B) b
C) c
D) d

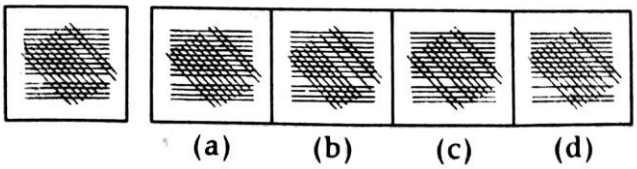


Q(31-32)- Find the one figure which is an identical figure to the problem figure.

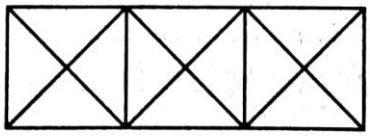
Q31. A) a
B) b
C) c
D) d



Q32. A) a
B) b
C) c
D) d

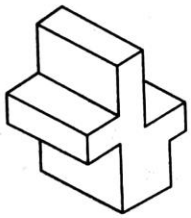


Q33. How many triangles and squares are there in the figure given below?



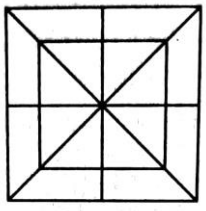
(a) 28 triangles, 5 squares
(b) 24 triangles, 4 squares
(c) 28 triangles, 4 squares
(d) 24 triangles, 5 squares

Q34. Find out the total number of surfaces of the 3-D figure given below.



(a) 13 (b) 12 (c) 14 (d) 15

Q35. How many squares are there in the following figure?



a) 4 b) 8 c) 10 d) 12

Q36. Which of the following types of rocks is formed due to the action of intense heat and pressure?

A) Igneous Rock B) Sedimentary Rocks
C) Metamorphic Rocks D) Kota Stone

Q37. Which one is the primary colour?
A) Black B) Yellow
C) Orange D) Violet

Q38. Which one of the following is not a warm colour?
A) Orange B) Blue
C) Yellow D) Red

Q39. Indus valley people had trade relationships with?
A) Mesopotamia B) Greece
C) Turkistan D) Egypt

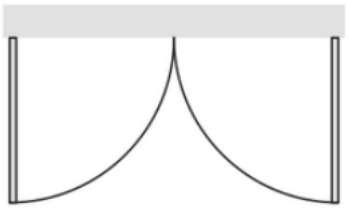
Q40. Which US president was an Architect?
A) Thomas Jefferson B) George Washington
C) Abraham Lincoln D) Richard

Q41. Who designed Rashtrapati Bhawan?
A) H. Baker B) E. Lutyens
C) Russeill D) William Enerson

Q42. Ajanta Caves situated in Maharashtra were built during the period of?
A) Guptas B) Mauryas
C) Chalukyans D) Kushans

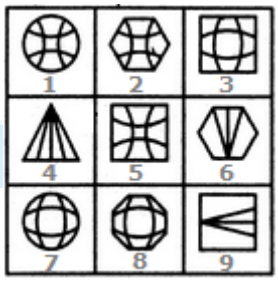
Q43. India's largest Indore Stadium in Delhi is?
A) Jawahar Lal Nehru Stadium B) Indira Gandhi Stadium
C) Tal Katora Stadium D) National Stadium

Q44. Identify the object given below in the plan?



A) Door
B) Window
C) Ward robe
D) Double Door

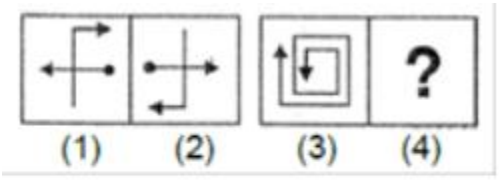
Q45. Group the given figures into three classes using each figure only once.

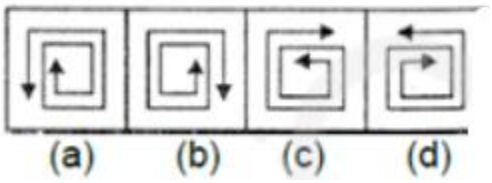


A) 5,6,9 ; 3,4,1 ; 2,7,8
B) 1,2,5 ; 3,7,8 ; 4,6,9
C) 1,7,2 ; 3,9,6 ; 4,5,8
D) 2,3,8 ; 4,6,9 ; 1,5,7

Q46. Each of the following questions consists of two sets of figures. Figures 1, 2, 3 and 4 constitute the Problem Set while figures (a), (b), (c) and (d) constitute the Answer Set. There is a definite relationship between figures (1) and (2). Establish a similar relationship between figures (3) and (4) by selecting a suitable figure from the Answer Set that would replace the question mark (?) in fig.(4).

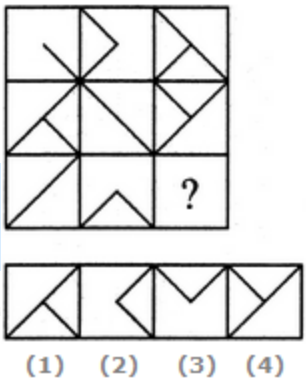
A) a B) b
C) c D) d





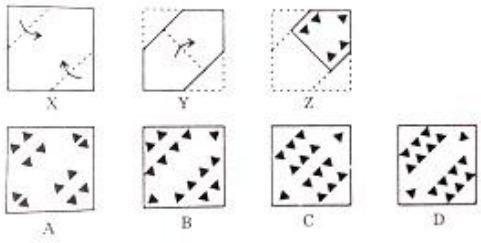
Q47. Select a suitable figure from the four alternatives that would complete the figure matrix?

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



Q48. Choose a figure which would most closely resemble the unfolded form of Figure (Z).

A) A B) B
C) C D) D



Q49. In a certain code, MONKEY is written as XDJMNL. How is TIGER written in that code?

A) SHFDQ B) HFDSQ
C) RSAFD D) QDFHS

Q50. In a certain code language,

'134' means 'good and tasty';

'478' means 'see good pictures' and
'729' means 'pictures are faint'.
Which of the following digits stands for 'see'?

A) 9 B) 2
C) 1 D) 8

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

Question 1 & 2- Bond paper A-4 only pencil Sketches

Attach sheets for Answers

Q1. Scene. (**50 marks)**
You are at a small-town railway station sitting on a bench.
1.A train stops at the platform with people trying to get out of the train
2.A soft drink stall to your right
3.Train indicator in your frame of view
4.At least 5 people doing different activities.

Q2. Scene. (**50 marks)**
You are a cricket umpire for an inter-club match.

1.At this moment you are a leg umpire

2.Fielding team has broken the stumps and appealed for run out

3.The batsman has dived to the crease with bat extended to touch base.

----------End of Question Paper----------

Space for Rough Work

Space for Rough Work

Space for Rough Work