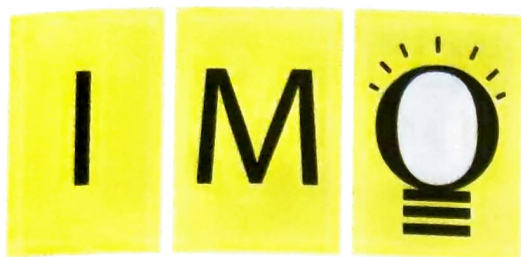




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CLASS **7**
SET-B



**SOF INTERNATIONAL
MATHEMATICS OLYMPIAD
2024-25**

Total Questions : 50 | Time : 1 hr

Guidelines for the Candidate

1. You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
2. Write your **Name, School Code, Class, Section, Roll No.** and **Mobile Number** clearly on the **OMR Sheet** and do not forget to sign it. We will share your marks / result and other information related to SOF exams on your mobile number.
3. The Question Paper comprises four sections:

Logical Reasoning (15 Questions), **Mathematical Reasoning** (20 Questions), **Everyday Mathematics** (10 Questions) and **Achievers Section** (5 Questions)

Each question in Achievers Section carries 3 marks, whereas all other questions carry one mark each.

4. All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
5. There is only ONE correct answer. Choose only ONE option for an answer.
6. To mark your choice of answers by darkening the circles on the OMR Sheet, use **HB Pencil** or **Blue / Black ball point pen** only. E.g.

Q 16: Navya purchased a hand bag for ₹ 345.50, a pair of shoes for ₹ 480.25 and a cap for ₹ 75.50. How much money did she spend in all?

- A. ₹ 901.25 B. ₹ 785.50 C. ₹ 895.75 D. ₹ 920.25

As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.

16. ● (B) (C) (D)

7. Rough work should be done in the blank space provided in the booklet.
8. Return the OMR Sheet to the invigilator at the end of the exam.
9. Please fill in your personal details in the space provided before attempting the paper.

Name:

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LOGICAL REASONING

1. A transparent sheet with a pattern and a dotted line on it is given. Select a figure from the options as to how the pattern would appear when the transparent sheet is folded along the dotted line.



- A.
- B.
- C.
- D.

2. What will be the smallest angle between the minute hand and hour hand of a clock when the time is 3:12?

- A. 36°
B. 14°
C. 24°
D. None of these

3. Seven friends P, Q, R, N, M, A and Z are sitting at equal distances in a row facing North but not necessarily in the same order. A sits at one of the extreme ends and is second to the right of Q. P sits exactly in the middle of the row. Q and M are equidistant from P. N is neither an immediate neighbour of R nor Z. Who among the following are the immediate neighbours of N?

- A. P, Q
B. A, Q
C. Q, M
D. A, M

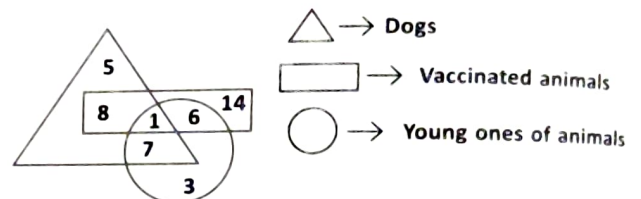
4. Pointing towards a photograph, a girl said, "He is the son of the maternal grandmother of my grandfather's only grandchild." How is the man in the photograph related to that girl?

- A. Maternal Uncle
B. Maternal grandfather
C. Cousin
D. Nephew

5. Select the odd one out.

- A. 7411
B. 9514
C. 3914
D. 4813

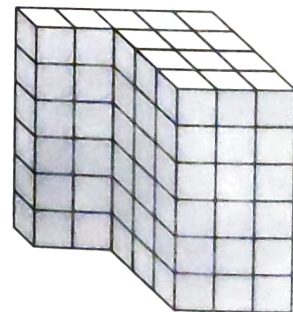
6. Study the given Venn diagram carefully.



Which of the following numbers represents vaccinated puppies?

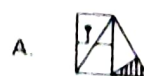
- A. 7
B. 6
C. 1
D. 8

7. Count the number of cubes in the given figure.



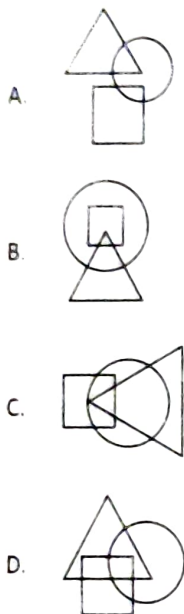
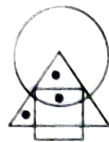
- A. 83
B. 84
C. 85
D. 86

8. Which of the following options will complete the pattern in the given figure?





9. Which of the following options does not satisfy the same conditions of placement of dots as in the given figure?



10. Point A is in the East of point B and West of point F. Point C is in the South of point B and West of point E. If point E is in the South-West of point A, then in which direction does the point F lie with respect to E?

- A. North-East
B. South
C. North-West
D. North

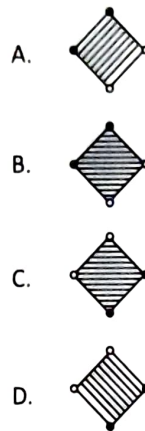
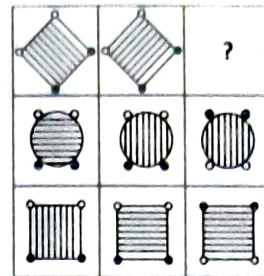
11. Find the number of triangles formed in the given figure.



- A. 11
B. 12

- C. 13
D. 14

12. Select a figure from the options which will complete the given figure matrix.



13. If '+' denotes 'x', 'x' denotes '÷', '÷' denotes '-' and '-' denotes '+', then find the value of $4 - 24 + 2 \times 12 \div 8$.

- A. -17
B. 4
C. -4
D. 0

14. How many such prime odd digits are there in the given sequence, each of which is immediately followed by an even number and immediately preceded by an odd composite number?

4 3 6 2 7 1 5 5 9 7 4 3 2 6 1 9 2 5 3 4

- A. None
B. One
C. Two
D. More than two

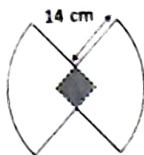
15. In a certain code language, if 'weather is nice' is coded as 'fo pa ke', 'nice to meet' is coded as 'jk nl fo' and 'meet is today' is coded as 'pa br nl', then find the code for 'to' in the same code language.

- A. fo
B. jk
C. nl
D. Can't be determined

16. Find the value of the expression $8x^2y^2 - 9x^2 + 10y^2 - (3x^2y + 5xy)$, when $x = -2$ and $y = 3$.

A. 330
B. 336
C. 236
D. 295

17. The given figure is formed by 2 quarter circles and the area of the shaded square is 49 cm^2 . Find the perimeter of the figure. (Take $\pi = \frac{22}{7}$)

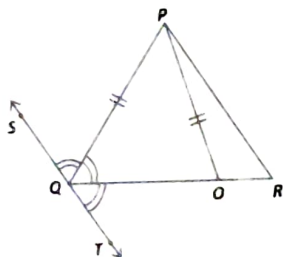


A. 122 cm
B. 108 cm
C. 86 cm
D. 94 cm

18. ☺ represents 4 persons and ☹ represents 2 persons. If each person spends ₹ 50 daily, then the total money spent by ☺☺☺☺☺☹ in two days together is _____.

A. ₹ 2050
B. ₹ 3200
C. ₹ 3150
D. ₹ 2200

19. In the given figure (not drawn to scale), $PR \parallel ST$, $\angle PQS = 60^\circ$ and $\angle ORP = 48^\circ$, then find $\angle OPR$.



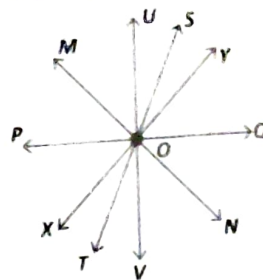
A. 24°
B. 18°
C. 12°
D. 8°

20. Find the sum of largest and smallest 4-digit numbers that are divisible by 8.

A. 11000
B. 10800

C. 10218
D. 10992

21. How many angles are formed above the line PQ?

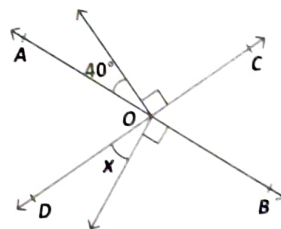


A. 14
B. 12
C. 15
D. None of these

22. If $\frac{4^n \times 2^5 \times (8)^3}{2 \times (16)^4} = 8$, then find the value of n .

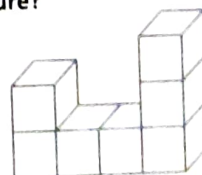
A. 0
B. 1
C. 2
D. 3

23. In the given figure (not drawn to scale), if AB and CD are straight lines, then find the value of x .



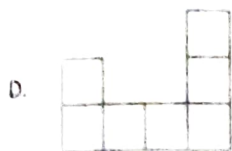
A. 40°
B. 30°
C. 45°
D. 35°

24. Which of the following options shows the top view of the given figure?



A.

B.



25. Select the incorrect step in simplification of

$$3(x + 4) = 4(2x - 1)$$

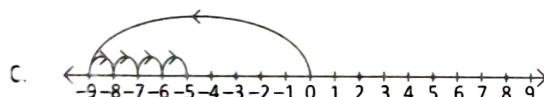
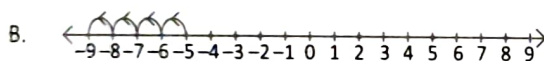
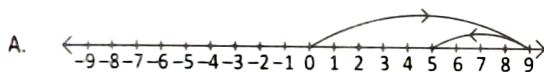
Step-1 : $3x + 12 = 8x - 4$ (open brackets)

Step-2 : $8x - 3x = 12 + 4$ (combining like terms)

Step-3 : $5x = 3$

Step-4 : $x = \frac{16}{5}$ (dividing by 5 on both sides)

- A. Step-2
B. Step-4
C. Step-3
D. Step-1
26. Which of the following number lines represents $P + Q$?
- P. The sum of all the integers between -5 and -1 .
Q. The value of $-8 - (-12)$.



D. None of these

27. Which of the following is same as $\frac{5}{12}$?

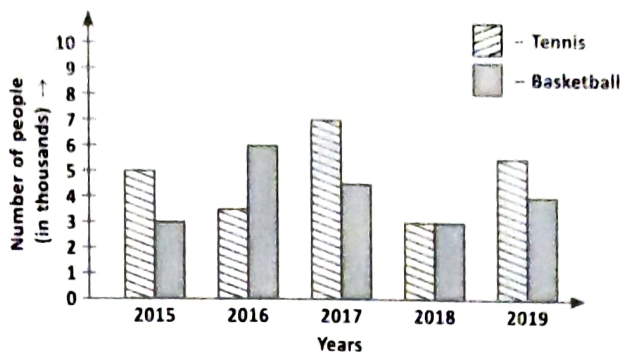
A.
$$\frac{1}{5 + \frac{3}{1 + \frac{3}{4}}}$$

B.
$$\frac{5}{3 + \frac{3}{1 - \frac{1}{3}}}$$

C.
$$\frac{5}{3 + \frac{3}{1 + \frac{2}{3}}}$$

D.
$$\frac{1}{3 + \frac{1}{1 + \frac{1}{12}}}$$

DIRECTIONS (28-29) : The given double bar graph shows the preferences of people (living in a town) playing two different sports for 5 years. Study the given graph carefully and answer the following questions.



28. Find the fraction of total number of people who preferred playing Tennis in years 2016 and 2018 together to the total number of people who preferred playing Basketball in years 2017 and 2019 together.

- A. $1\frac{7}{13}$
B. $\frac{11}{15}$
C. $\frac{11}{13}$
D. $\frac{13}{17}$

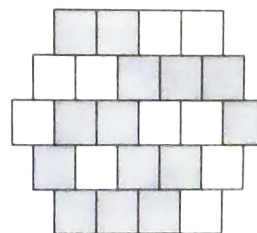
29. What is the average of all the people who preferred playing Tennis in the given five years?

- A. 5000
B. 4000
C. 4800
D. 6000

30. For any two rational numbers x and y which of the following is/are correct, if x is positive and y is negative?

- (1) $x < y$
(2) $x = y$
(3) $x > y$
A. Only (1) and (2)
B. Only (2) and (3)
C. Only (3)
D. (1), (2) and (3)

31. How many more squares must be unshaded to show the shaded fraction of given figure as $\frac{1}{6}$?

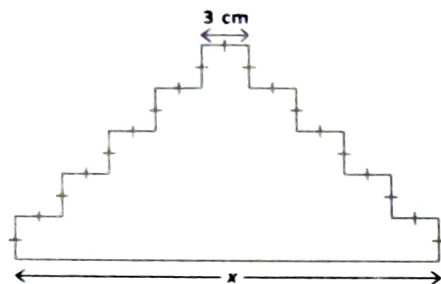


- A. 6
B. 8
C. 10
D. None of these

32. How many of the following letters have at least one line of symmetry?

NATIVE

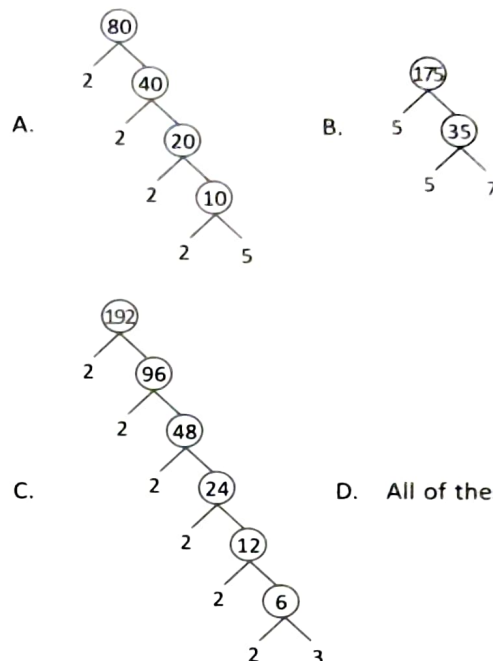
- A. 5
B. 4
C. 3
D. 6
33. In the given figure (not drawn to scale), find the value of x and area of the given figure respectively.



- A. 24 cm and 225 sq. cm
B. 24 cm and 75 sq. cm
C. 27 cm and 225 sq. cm
D. 27 cm and 75 sq. cm
34. A certain sum of money becomes four times of itself in 10 years at simple interest. In how many years, will it become three times of itself at the same rate of interest p.a.?

- A. 10 years
B. $6\frac{2}{3}$ years
C. 30 years
D. $13\frac{1}{3}$ years

35. Which of the following shows the correct prime factorisation?



EVERYDAY MATHEMATICS

36. Out of 10 different coloured shirts, a man wants to wear that coloured shirt which is most liked by the people. Which measure of central tendency would be most appropriate, if the data is provided to him?

- A. Mean
B. Mode
C. Median
D. Can't say

37. Prateek travels 205 km towards East from his house to city X. From city X, on the same road, he travels 178 km towards West. If the distance towards East is represented by positive integer, then which integer will represent his final distance from his house?

- A. 18
B. -27
C. 27
D. -18

38. Avantika bought 80 pears for ₹ 40. Out of them, 25 pears were spoiled and thrown away. She sold the remaining pears at a profit of 10%. Find the selling price of 1 pear.

- A. ₹ 0.25
B. ₹ 0.80
C. ₹ 1.25
D. ₹ 2.50

39. If a rectangular piece of cloth is 400 cm long and 300 cm wide, then the total cost of lacing at the rate of ₹ 60 per 100 cm is _____.

- A. ₹ 840
B. ₹ 720
C. ₹ 420
D. None of these

40. Misha bought 4 kg apples priced ₹ 150.50 per kg, 2 dozen bananas priced ₹ 60.50 per dozen and 3 watermelons each priced ₹ 120.50. How much total amount did she spend?

- A. ₹ 1280.50
 B. ₹ 1048.50
 C. ₹ 1084.50
 D. ₹ 1820.50

41. A rope is $(2x^2 + 3)$ metres long. Another rope of length $(3x^2 - 7)$ metres is attached to it. What is the total length of the two ropes together, if $x = -2$?

- A. 20 m
 B. 16 m
 C. 14 m
 D. 12 m

42. The population of a city is 4,00,000. Out of which, 55% are females and rest are males. Out of total population 90% male and 85% females are literate. How much total population in the city is illiterate?

- A. 51000
 B. 75000
 C. 46000
 D. 35000

43. Kanika opened a cubical box along its edges. She painted blue colour on all inside faces and red colour on all outside faces. If cost of painting is ₹ 5 per sq. cm, then find the total cost of painting the box.



- A. ₹ 1500
 B. ₹ 6250
 C. ₹ 2500
 D. ₹ 5000

44. A pole is broken at a height of 15 m from the ground and its top touches the ground at a distance of 8 m from the base of the pole. Find the original height of the pole.

- A. 19 m
 B. 17 m
 C. 25 m
 D. 32 m

45. A certain amount of money is distributed amongst P, Q and R. P get $\frac{5}{18}$ and Q get $\frac{5}{9}$ of the whole amount. If R get ₹ 600, then money P and Q get is _____ respectively.

- A. ₹ 1000 and ₹ 2000
 B. ₹ 1500 and ₹ 2000
 C. ₹ 1200 and ₹ 1800
 D. ₹ 1800 and ₹ 1200

ACHIEVERS SECTION

46. Match the following and select the CORRECT option.

Column-I

Column-II

(p) If $3^{2x+1} = 9^{3x-1}$, then $x =$ (i) 225

(q) The value of $\frac{(125)^3 \times (81)^4}{3^3} =$ (ii) $\frac{9}{16}$

(r) The value of $[(4096)^3]^2 =$ (iii) $\frac{3}{4}$

(s) The value of (iv) 1024

$$\left[\left(\frac{27}{64} \right)^2 \times \left(\frac{27}{64} \right)^5 \right] \div \left[\frac{3}{4} \right]^5 =$$

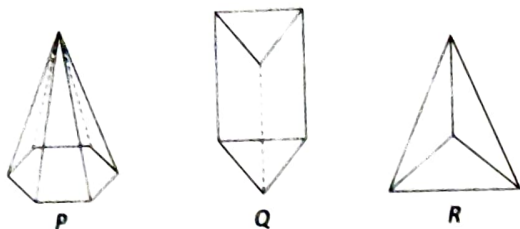
- A. (p) → (iv); (q) → (iii); (r) → (i); (s) → (ii)
 B. (p) → (iii); (q) → (i); (r) → (iv); (s) → (ii)
 C. (p) → (ii); (q) → (iii); (r) → (iv); (s) → (i)
 D. (p) → (iii); (q) → (ii); (r) → (iv); (s) → (i)

47. State T for true and F for false and select the CORRECT option.

- (i) A circle and a rectangle have the same perimeter. If the sides of the rectangle are 56 cm and 32 cm, then the area of the circle is 2464 cm^2 .
 (ii) If in two triangles, the ratio of the areas is 8 : 5 and the ratio of their heights is 3 : 4, then the ratio of their bases is 7 : 9.
 (iii) If the height of a triangle is decreased by 40% and its base is increased by 20%, then the new area will be $\frac{18}{25}$ times the old area of the triangle.

- | | | | |
|----|-----|------|-------|
| | (i) | (ii) | (iii) |
| A. | T | F | T |
| B. | T | T | F |
| C. | F | F | T |
| D. | F | T | F |

48. Observe the given figures carefully and select the CORRECT option.



- A. The number of edges, vertices and faces in figure P are 10, 5 and 6 respectively.
 B. The difference between the number of edges of figure Q and R is 3.
 C. Among the given figures, figure Q has maximum number of vertices.
 D. All of these
49. Read the given statements carefully and select the CORRECT option.

Statement-I : The product of 7 negative integers and 18 positive integers is always positive.

Statement-II : If we add the largest negative integer to its additive inverse, then we get 2.

- A. Both Statement I and Statement-II are true.
 B. Both Statement-I and Statement-II are false.
 C. Statement-I is true but Statement-II is false.
 D. Statement-I is false but Statement-II is true.

50. Mohit had a rope of length 20 m. He cut 4 pieces of rope each of length $\frac{2}{5}$ m to pitch a tent. He then cut the remaining rope into some pieces, each of length $\frac{3}{5}$ m.

(p) How many pieces of rope, each $\frac{3}{5}$ m in length did Mohit have?

(q) The length of rope left was _____.

- | (p) | (q) |
|-------|-----------------|
| A. 28 | $\frac{1}{3}$ m |
| B. 30 | $\frac{3}{5}$ m |
| C. 25 | $\frac{1}{5}$ m |
| D. 30 | $\frac{2}{5}$ m |

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