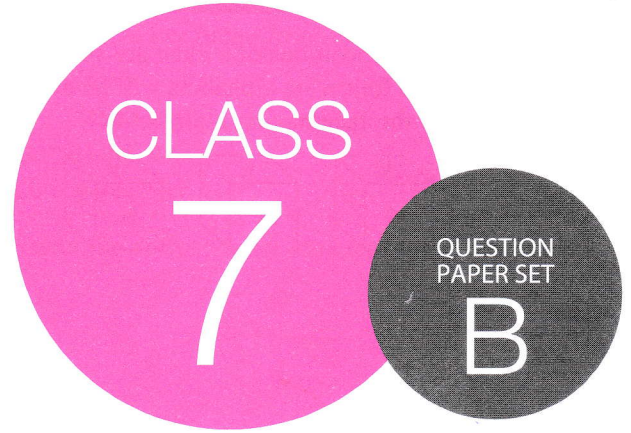


**SOF INTERNATIONAL
MATHEMATICS OLYMPIAD
2023-24**



DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

Total Questions: 50 | Time: 1 hr.

Guidelines for the Candidate

- You will get additional ten minutes to fill up information about yourself on the OMR Sheet, before the start of the exam.
- 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.
- 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.
- All questions are compulsory. There is no negative marking. Use of calculator is not permitted.
- There is only ONE correct answer. Choose only ONE option for an answer.
- 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: Rahul bought 4 kg 90 g of apples, 2 kg 60 g of grapes and 5 kg 300 g of mangoes. The total weight of all the fruits he bought is _____.
 A. 11.450 kg B. 11.000 kg C. 11.350 kg D. 11.250 kg
 As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.
- Rough work should be done in the blank space provided in the booklet.
- Return the OMR Sheet to the invigilator at the end of the exam.
- Please fill in your personal details in the space provided before attempting the paper.



Name:.....

SOF Olympiad Roll No.:..... Contact No.:.....



Inspiring Young Minds Through Knowledge Olympiads



**THE WORLD'S
BIGGEST
OLYMPIADS**

25 Years
of Trust

91,000+
Schools

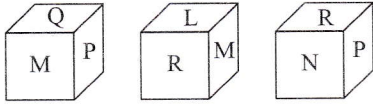
70
Countries

5.6+ Crores
Assessments

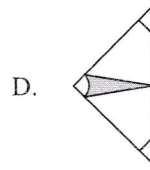
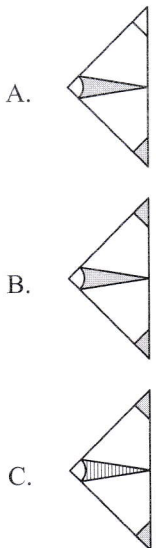
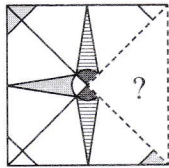
7
Olympiads

LOGICAL REASONING

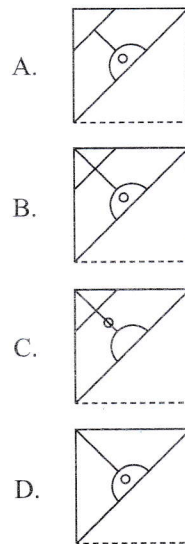
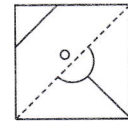
1. Three different positions of a cube are shown below. Which of the following alphabets will be on the face opposite to the face having alphabet M?



- A. L
B. N
C. Q
D. R
-
2. Select the odd one out.
- A. JMPS
B. FILO
C. BEGJ
D. QTWZ
-
3. If '*' denotes '×', '#' denotes '+', '%' denotes '-' and '\$' denotes '÷', then which of the following equations is incorrect?
- A. $5 \# 6 \$ 3 * 4 \% 9 = 4$
B. $5 * 9 \$ 3 \# 4 \% 6 = 13$
C. $5 \# 3 * 6 \$ 2 \% 8 = 10$
D. $5 * 6 \$ 3 \# 4 \% 8 = 6$
-
4. Which of the following options will complete the pattern in the given figure?



5. Arrange the given words in the sequence in which they occur in the dictionary and select the correct option.
1. Folder
2. Finger
3. Fountain
4. Figure
5. Flight
- A. 2, 4, 5, 1, 3
B. 4, 2, 1, 5, 3
C. 2, 5, 1, 3, 4
D. 4, 2, 5, 1, 3
-
6. A square 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.

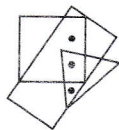


7. Find the missing number, if same rule is followed in all the three figures.

$$\begin{array}{ccc}
 & 4 & 12 & 14 \\
 11 & \textcircled{39} & 8 & 7 & \textcircled{12} & 5 & 10 & \textcircled{?} & 4 \\
 & 10 & & & 12 & & & 9 &
 \end{array}$$

- A. 15
- B. 17
- C. 20
- D. 18

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

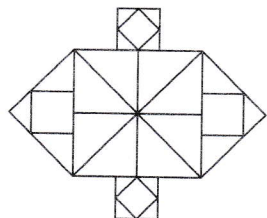


- A.
- B.
- C.
- D.

9. Pointing to a girl in a party, Gopal said, "She is the daughter of my son's wife." How is that girl related to Gopal?

- A. Grandmother
- B. Aunt
- C. Granddaughter
- D. Daughter-in-law

10. Count the number of squares formed in the given figure.



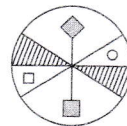
- A. 11
- B. 12
- C. 13
- D. More than 13

11. Anusha comes out of her school and walks 50 m towards East. She then turns right and walks 20 m.

Now, she turns left and walks 20 m. She again turns right and walks 50 m to reach her home. In which direction is her home from the school?

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

12. Select the correct water image of the given figure.



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

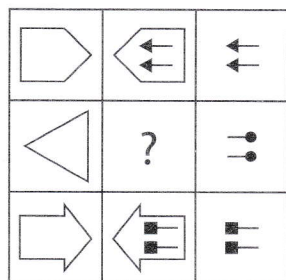
13. If 'METAL' is coded as '72856' and 'MIND' is coded as '7341', then how will 'DILEMMA' be coded in that code language?

- A. 7362115
- B. 1362775
- C. 1328776
- D. 7352775

14. Which of the following Venn diagrams best represents the relationship amongst, 'Mothers, Brothers and Parents'?

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

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



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

MATHEMATICAL REASONING

16. Solve :

$$3\frac{1}{7} + \left(\frac{-5}{14}\right) + \left(\frac{-7}{12}\right) + 2\frac{3}{4}$$

- A. $-7\frac{1}{20}$
- B. $4\frac{20}{21}$
- C. $3\frac{5}{21}$
- D. None of these
17. How many of the following expressions are binomials?
 $5a^2 + 3b$, $2a + 3b$, $8a^2$, $9a^2 + 5a + 3b^2$, $7ab + 3a^2$

- A. 3
- B. 2
- C. 4
- D. 5

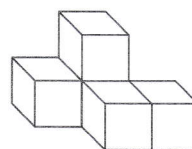
18. Which of the following statements is CORRECT?

- A. All natural numbers are whole numbers and all whole numbers are integers.
- B. All whole numbers are integers and all integers are natural numbers.
- C. All integers are whole numbers and all natural numbers are integers.
- D. All integers are whole numbers and all integers are natural numbers.

19. How many distinct prime factors does the smallest 5-digit number has?

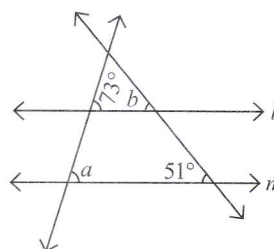
- A. 2
- B. 3
- C. 4
- D. 5

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



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

21. In the given figure (not drawn to scale), if $l \parallel m$, then find the value of $a + b$.



- A. 153°
- B. 59°
- C. 124°
- D. 79°

22. Find the value of $\frac{(-4)^5 \times (-3)^4}{(-4)^3 \times (-4)^2} + \left[\left\{ \left(\frac{3}{4} \right)^2 \right\}^3 \right]^0$.

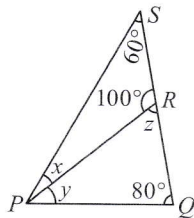
- A. -4
 B. 27
 C. 82
 D. None of these

23. Which of the following equations is correct for the statement given below?

“The sum of one-seventh, one-third and one-fourth of a number m exceeds the same number by 10.”

- A. $\frac{m}{7} + \frac{m}{3} + \frac{m}{4} = 10 - m$
 B. $\frac{m}{7} + \frac{m}{3} + \frac{m}{4} = m + 10$
 C. $\frac{m}{7} + \frac{m}{3} + \frac{m}{4} = 10$
 D. $\frac{m}{7} + \frac{m}{3} + \frac{m}{4} + 10 = m$

24. Find the value of x , y and z in the given figure (not drawn to scale).



- A. $x = 40^\circ, y = 30^\circ, z = 50^\circ$
 B. $x = 20^\circ, y = 30^\circ, z = 80^\circ$
 C. $x = 20^\circ, y = 20^\circ, z = 80^\circ$
 D. $x = 30^\circ, y = 40^\circ, z = 60^\circ$

25. If $11\frac{5}{21}$ is subtracted from $15\frac{3}{14}$ and the difference is multiplied by 504, then what will be the result?

- A. 2024
 B. 2104
 C. 2004
 D. 2014

26. Two numbers are in the ratio 2 : 3. If 2 is subtracted from the smaller number and 6 is subtracted from the greater number, then the ratio becomes 3 : 4. Find the sum of the two numbers.

- A. 50
 B. 38
 C. 45
 D. 25

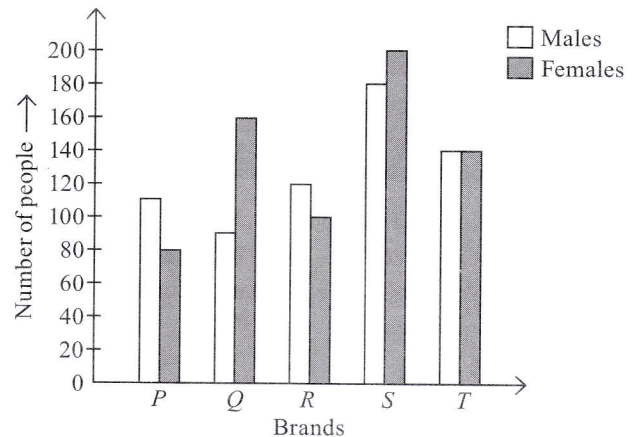
27. The simple interest on a sum of money is $\frac{4}{9}$ of the principal. Find the rate percent and time, if both are numerically equal.

- A. $5\frac{2}{3}\%$, 5 years 8 months
 B. $7\frac{2}{3}\%$, 7 years 8 months
 C. $6\frac{2}{3}\%$, 6 years 8 months
 D. $6\frac{2}{3}\%$, 7 years 8 months

28. What is the least number which when decreased by 4 is exactly divisible by each of the numbers 10, 15, 20 and 25?

- A. 304
 B. 296
 C. 354
 D. 350

Direction (29-30): The given double bar graph shows the number of people who like five different brands. Study the graph carefully and answer the following questions.



29. What percent of total males like brands R and T together?

- A. $45\frac{2}{3}\%$
 B. $40\frac{5}{8}\%$
 C. $31\frac{1}{3}\%$
 D. None of these

30. Find the ratio of number of males who like brands P and Q together to the number of females who like brands S and T together.

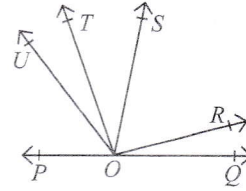
- A. 5 : 12
 B. 17 : 10
 C. 10 : 17
 D. 12 : 5

31. Which of the following statement(s) is/are true?
- (i) Order of rotational symmetry of an equilateral triangle is 3.
- (ii) The number of lines of symmetry of a regular hexagon is 5.
- A. Only (i)
 B. Only (ii)
 C. Both (i) and (ii)
 D. Neither (i) nor (ii)

32. Which of the following is not equal to $24.675 \times 3.489 \times 0.735$?
- A. $2467.5 \times 34.89 \times 0.000735$
 B. $0.24675 \times 3489 \times 0.0735$
 C. $0.24675 \times 0.3489 \times 735$
 D. $2.4675 \times 3.489 \times 73.5$

33. What should be subtracted from the greatest 6-digit number that can be formed by using the digits 5, 3, 6, 8 and 4 (each digit at least once) to get 100000?
- A. 766543
 B. 582614
 C. 786543
 D. None of these

34. How many acute angles are there in the given figure?



- A. 6
 B. 5
 C. 7
 D. More than 7

35. A sum of money invested at simple interest becomes ₹ 306 at the end of 5 years. If the interest is $\frac{9}{25}$ th part of the principal, then what is the rate of interest per annum?
- A. $7\frac{1}{5}\%$
 B. $9\frac{1}{5}\%$
 C. $7\frac{5}{7}\%$
 D. $7\frac{2}{5}\%$

EVERYDAY MATHEMATICS

36. In a game, team P scored $-40, 10, 50, -20, 15$ points and team Q scored $40, -20, -10, 30, 20$ points in five consecutive rounds. Which team scored more points and by how much?
- A. P, 30 points
 B. Q, 40 points
 C. Q, 45 points
 D. P, 25 points
37. A rectangular piece of land is to be sold off in smaller pieces. The total area of the land is 2^{17} sq. miles. Each piece to be cut out is 16^2 sq. miles in size. How many smaller pieces of the land can be sold at the given size?
- A. 2^{15}
 B. 16^4
 C. 2^9
 D. None of these
38. Megha is 20 years younger to her mother. After 10 years, her mother will be twice as old as Megha. Find the present age of Megha.
- A. 15 years
 B. 12 years

- C. 10 years
 D. 18 years

39. The floor of a room 3 m long and 1.5 m wide is to be covered with the tiles each of size 12 cm by 5 cm. Find the cost of covering the floor with tiles at the rate of ₹ 5 per tile.
- A. ₹ 3150
 B. ₹ 2250
 C. ₹ 2950
 D. ₹ 3750
40. Out of 6 types of ice creams, Sneha wants to purchase the chocolate ice cream which is most liked by the children. Which measure of central tendency would be most appropriate, if the data is provided to her?
- A. Mean
 B. Median
 C. Mode
 D. Range
41. Manish starts a journey. After travelling some distance, he finds that $\frac{4}{7}$ of the journey is covered and still he has to cover 150 km. How long was the total journey?

- A. 200 km
- B. 280 km
- C. 350 km
- D. 420 km

42. A fruit seller bought 20 kg apples at ₹ 6 per kg and 30 kg apples at ₹ 7 per kg. At what rate per kg should he sell them to gain 30%?

- A. ₹ 7.50
- B. ₹ 9.25
- C. ₹ 8.58
- D. None of these

43. From his home, Rahul walks $\frac{6}{7}$ km towards school and then returns $\frac{5}{6}$ km on the same way towards his home to reach a landmark. At what distance will he be now from his home?

- A. $\frac{1}{42}$ km
- B. $\frac{1}{43}$ km

C. $\frac{30}{42}$ km

D. $\frac{11}{42}$ km

44. Priyanka's monthly income is ₹ 85000. She pays $7\frac{1}{2}\%$ of it as house rent and 20% of the remaining amount on her child's education. How much total money is left with her?

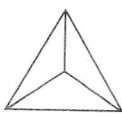
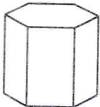

- A. ₹ 51500
- B. ₹ 62900
- C. ₹ 47400
- D. None of these

45. A shopkeeper sold 3152.50 kg, 2905.75 kg and 1554.18 kg of wheat on three consecutive days. How much total quantity of wheat he sold in the given three days?

- A. 7612.43 kg
- B. 7928.62 kg
- C. 5418.18 kg
- D. 6719.48 kg

ACHIEVERS SECTION

46. Fill the table and find the value of $Q - 2P - R$.

	Number of edges	Number of faces	Number of vertices
	6	P	4
	Q	8	12
	10	6	R

- A. 4
- B. 5
- C. 18
- D. None of these

47. Read the given statements carefully and state T for true and F for false.

(i) The value of $(-71 - (-45)) \times (70 - 50) + 400$ is -120.

(ii) -78 should be subtracted from the product of 15 and -8 to get -198.

(iii) The value of $a + (b + c) - (a + b) + c$ for $a = 5$, $b = -2$ and $c = 3$, is 0.

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

48. Read the given statements carefully and select the correct option.

Statement-I : If the median of the observations 15, 17, 20, 20, 24, $a + 5$, 29, 31, 31, 33, 34 (arranged in ascending order) is 27, then the mean of the above data is 20.

Statement-II : The median and mode of the given data, 70, 52, 47, 64, 47, 71, 58 are 58 and 47 respectively.

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

49. Solve the following :

- (i) An article passing through two hands is sold at a profit of 38% at the original cost price. If the first dealer makes a profit of 20%, then find the profit percent made by the second dealer.
- (ii) In an office of 125 employees, 15 are absent, 10% of the remaining have failed to achieve the target. Find the number of employees who achieve their target.

- | | (i) | (ii) |
|----|---------------|------|
| A. | 15% | 90 |
| B. | 10% | 88 |
| C. | 15% | 99 |
| D. | None of these | |

- (ii) If $x = \frac{3}{2} + \frac{9}{8}$ and $y = \left(\frac{-9}{16}\right) \times \left(\frac{-5}{18}\right) \times 4\frac{4}{5}$, then the value of $\frac{x+y}{x-y}$ is Q.

- (iii) On subtracting the quotient of $\left(\left(\frac{-5}{9}\right) \div \frac{1}{18}\right)$ from the quotient of $\left(\frac{9}{5} \div \left(\frac{-3}{5}\right)\right)$, we get R.

- | | P | Q | R |
|----|------------------|----------------|----------------|
| A. | $\frac{-1}{17}$ | $\frac{-5}{9}$ | $\frac{-1}{7}$ |
| B. | $\frac{-17}{12}$ | $\frac{9}{5}$ | 7 |
| C. | $\frac{3}{19}$ | $\frac{4}{5}$ | $\frac{-1}{8}$ |
| D. | $\frac{-17}{12}$ | $\frac{4}{5}$ | 8 |

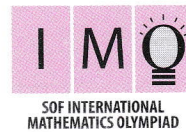
50. Fill in the blanks and select the correct option.

- (i) The value of $\left(\frac{-28}{81} \div \frac{14}{27}\right) + \left(\frac{-3}{4}\right)$ is P.

SPACE FOR ROUGH WORK

Techfest™
IIT Bombay
Asia's Largest Science & Technology Festival

CSI
THE INSTITUTE OF
Company Secretaries of India
भारतीय कम्पनी सचिव संस्थान
AN INSTITUTE OF PROFESSIONALS REGULATED BY
Statutory body under an Act of Parliament
PRESENTS



For latest updates & information, please like our Facebook page (www.facebook.com/sofworld) or register on

www.sofworld.org/subscribe-updates.html

For Level 1 and Level 2 preparation material / free sample papers, please log on to www.mtg.in



National Office: Plot 99, Sector 44 Institutional area, Gurugram -122 003 (HR) India
Email: info@sofworld.org | Website: www.sofworld.org