SCIENCE OLYMPIAD FOUNDATION

Inspiring Young Minds
Through Knowledge Olympiads

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

Name: .....

SOF Olympiad Roll No.: .....

Contact No.: .....

Total Questions: 50 Time: 1 hr

CLASS 7

QUESTION PAPER SET
C

IMO

SOF INTERNATIONAL MATHEMATICS OLYMPIAD 2022-23

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, 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.

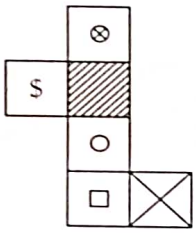
   Q.16: Rahul bought 4 kg 90 g of apples, 2 kg 60 g of grapes and 5 kg 300 g of mangoes. The total weight of all the fruits he bought is _____.

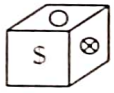
   A. 11.450 kg B. 11.000 kg C. 11.350 kg D. 11.250 kg

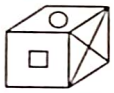
   As the correct answer is option A, you must darken the circle corresponding to option A on the OMR Sheet.

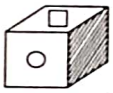
   16. ● Ⓑ Ⓒ Ⓓ
7. Rough work should be done in the blank space provided in the booklet.
8. Return the OMR Sheet to the invigilator at the end of the exam.
9. Please fill in your personal details in the space provided on this page before attempting the paper.

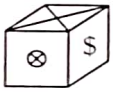
1. The given sheet of paper is folded to form a box. Select a box from the options that is similar to the box formed.



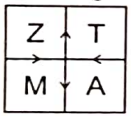
A. 

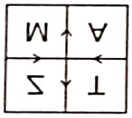
B. 

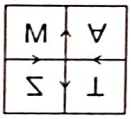
C. 

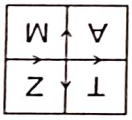
D. 

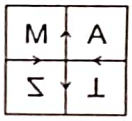
2. Select the correct water image of the given figure.



A. 

B. 

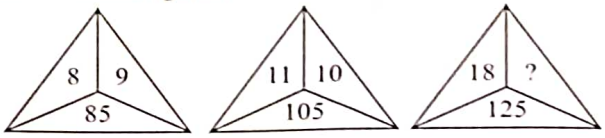
C. 

D. 

3. How many such pairs of letters are there in the word INADEQUATE each of which has the same number of letters between them in the word as in the English alphabets?

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

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



A. 5
B. 9
C. 8
D. 7

5. Select the odd one out.

A. DCE
B. KJL
C. MNO
D. SRT

6. Pointing towards Khushi, Atul said, "She is the mother of my only son's wife's daughter." How is Khushi related to Atul's son?

A. Daughter
B. Daughter-in-law
C. Wife
D. Sister

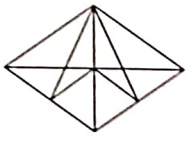
7. If 'P' means '×', 'Q' means '÷', 'R' means '+' and 'S' means '−', then what is the value of 35P180Q9R45S27?

A. 158
B. 718
C. 615
D. None of these

8. In a certain code language, JOURNEY is coded as KNVQODZ. How will BONDING be coded in the same code language?

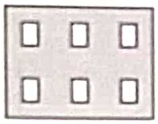
A. OBDNNIG
B. CPOEHMF
C. HOJEOPC
D. CNOCJMH

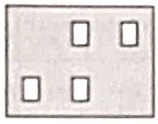
9. Find the minimum number of straight lines required to draw the given figure.

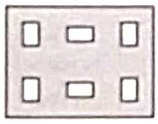


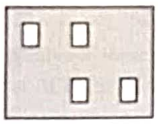
A. 9
B. 10
C. 11
D. 12

10. The given question consists of a set of three figures X, Y and Z showing a sequence of folding of a piece of paper. Fig. Z shows the manner in which the folded paper has been cut. Select a figure from the options which would most closely resemble the unfolded form of fig. Z.

A. 

B. 

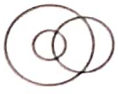
C. 

D. 

11. Which of the following Venn diagrams best represents the relationship amongst, "Educated people, Doctors and Males"?

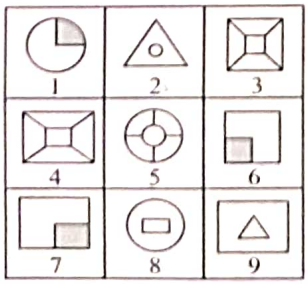
A. 

B. 

C. 

D. 

12. Group the given figures into three classes on the basis of their identical properties using each figure only once.



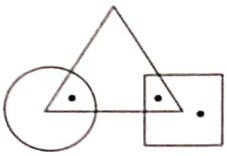
A. 1, 6, 7; 2, 8, 9; 3, 4, 5

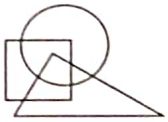
B. 1, 2, 4; 3, 5, 8; 6, 7, 9

C. 1, 3, 7; 2, 8, 9; 4, 5, 6

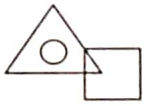
D. 1, 2, 3; 4, 6, 8; 5, 7, 9

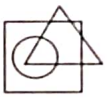
13. Which of the following options does not satisfy the same conditions of placement of the dots as in the given figure?



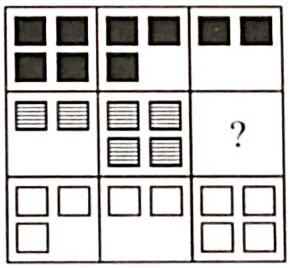
A. 

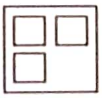
B. 

C. 

D. 

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



A. 

B. 

C. 

D. 

15. Sahil walks 30 m towards North. Then he turns right and walks 50 m. Then he again turns right and walks 60 m. Then he turns left and walks 30 m. Then he again turns left and walks 30 m. In which direction and how far is Sahil now from the starting position?

A. 80 m, West
B. 80 m, East
C. 70 m, West
D. 75 m, East

MATHEMATICAL REASONING

16. Find the value of x in the given equation.

$$\frac{22}{21}(8x-3)+48=54-\frac{5x}{7}$$

A. $2\frac{7}{171}$
B. $1\frac{1}{191}$
C. $3\frac{3}{161}$
D. $5\frac{5}{121}$

17. What is the difference between the mean and mode of given data?

17, 16, 11, 9, 16, 19, 9, 12, 18, 9, 18

A. 4
B. 7
C. 3
D. 5

18. If 40% of a number is added to itself, then the number is increased by 180. Find the number.

A. 630
B. 725
C. 450
D. 575

19. Which of the following set of angles cannot be the angles of a set-square?

A. 30°, 60°, 90°
B. 40°, 50°, 90°
C. 45°, 45°, 90°
D. None of these

20. The value of $[12 \times (2^2 + 2^2) \times (3^2 + 3^2 + 3^2)] \div (6^3)$ is _____.

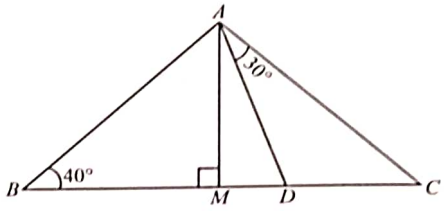
A. $2^2 \times 3^1$
B. 5^0
C. $3^2 \times 2^1$
D. 6^2

21. Find the value of given expression, if $q = r = -1$.

$$5r(7q + 3r^2 - 5qr) - 3q(5r - 7q^2 + 4qr)$$

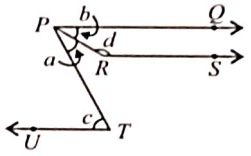
A. 15
B. 18
C. 13
D. 21

22. In the given figure (not drawn to scale), $AM \perp BC$ and $AB = AC$. Find the measure of $\angle DAM$.



A. 25°
B. 30°
C. 20°
D. 35°

23. In the given figure (not drawn to scale), PQ, RS and UT are parallel lines. If $c = 75°$ and $a = (2/5)c$, then find $b + d/2$.

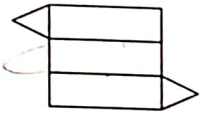


A. 92°
B. 115°
C. 112.5°
D. 135.5°

24. Which of the following rational numbers are arranged in descending order?

A. $\frac{13}{24}, \frac{9}{16}, \frac{7}{12}, \frac{5}{8}$
B. $\frac{9}{16}, \frac{5}{8}, \frac{13}{24}, \frac{7}{12}$
C. $\frac{7}{12}, \frac{13}{24}, \frac{5}{8}, \frac{9}{16}$
D. $\frac{5}{8}, \frac{7}{12}, \frac{9}{16}, \frac{13}{24}$

25. Which of the following solids will be formed by the given net?



A. Triangular pyramid
B. Rectangular pyramid
C. Triangular prism
D. Square pyramid

26. Evaluate : $9 \times 63 \div [3 \times (5 \times 3 - 8)] + (-1) \times [81 \div (15 - 6)]$

A. -15
B. 17
C. 18
D. None of these

27. In how many years, will ₹ 5600 amounts to ₹ 7280 at the rate of 5% p.a.?

A. 5 years
B. 6 years
C. 7 years
D. 4 years

28. If the areas of two circles are in the ratio 25 : 36, then the ratio of their circumferences is _____.

A. 6 : 5
B. 3 : 4
C. 4 : 3
D. 5 : 6

29. Which of the following numbers is not divisible by 6?

A. 20772
B. 49944
C. 14592
D. 32582

30. A number is divided into three parts in the ratio of 7 : 6 : 10. The sum of first and third part is 429 more than the second part. Find the number.

A. 784
B. 697
C. 576
D. 897

31. Number of diagonals in a five sided polygon is _____.

A. 5
B. 7
C. 12
D. 8

32. Which of the following letters has no line of symmetry?

A. M
B. O
C. W
D. Z

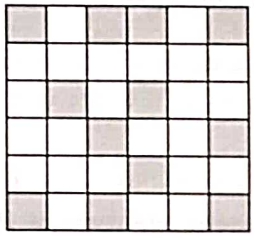
33. If $\left(\frac{2}{5}\right)^{-4} \times \left(\frac{2}{5}\right)^{12} = \left(\frac{25}{4}\right)^{6-2x}$, then x = ?

A. $\frac{-1}{5}$
B. -5
C. 5
D. $\frac{1}{5}$

34. The side of an equilateral triangle measures 72 cm. The perimeter of this triangle is equal to the perimeter of a square. What is the length of the side of the square?

A. 18 cm
B. 36 cm
C. 54 cm
D. 108 cm

35. How many more squares in the figure must be shaded to make the fraction of shaded squares equal to $\frac{4}{9}$?



A. 3
B. 4
C. 5
D. 6

36. A farmer has 192 animals, out of which $\frac{7}{16}$ are cattle. $\frac{2}{3}$ of cattle are cows. How many cows he has?

A. 128
B. 84
C. 56
D. 112

37. In a school, Class-7 is divided into two sections *A* and *B*. The number of students in Section-*B* is 7 more than half the number of students in Section-*A*. If there are 32 students in Section-*B*, then find the number of students in Section-*A*.

A. 40
B. 60
C. 50
D. 45

38. The ratio of red to green balls in a box is 5 : 7. If the number of green balls is 24 more than the red balls, then find the total number of balls in the box.

A. 156
B. 144
C. 132
D. 196

39. Nishant planted some rose plants around his rectangular garden dimensions of which are 12.50 m and 7.50 m. If the distance between two plants is 2.5 m, then how many plants did he plant?

A. 18
B. 14
C. 16
D. None of these

40. The given data shows the attendance of 15 days of Class VII. Study the data carefully and answer the question.

25, 22, 28, 16, 24, 30, 21, 26, 24, 22, 28, 25, 23, 24, 22

Find the average attendance of 15 days.

A. 26
B. 24
C. 22
D. 25

41. All the planets revolve around the Sun in elliptical orbits. Uranus' farthest distance from the Sun is approximately 3.004×10^9 km and its closest distance is approximately 2.749×10^9 km. What is the average distance of Uranus from the Sun?

A. (2.476×10^9) km
B. (2.8765×10^9) km
C. (2.876×10^8) km
D. None of these

42. The length of the boundary of a semicircular field is 54 cm. Find the area of the rectangular field breadth of which is equal to the diameter of the semicircular field and length is 40 cm.

A. 784 cm^2
B. 882 cm^2
C. 840 cm^2
D. 798 cm^2

43. Mohit purchased 3 packets of sugar and 5 packets of pulses. If the weight of each packet of sugar and pulses is 4.75 kg and 2.85 kg respectively, then find the total weight bought by him.

A. 28.50 kg
B. 32.75 kg
C. 36.25 kg
D. 24.45 kg

44. A person reached a city on Monday at 11 p.m., the temperature of the city at that time was 12°C. On next day, at 6 a.m. the temperature was –5°C. How much temperature fall during that time of interval?

A. 9°C
B. 7°C
C. 17°C
D. 19°C

45. Saurabh bought certain number of kites to sell on Makar Sakranti. He sold 87% of total kites and 195 kites left unsold. How many total kites did he buy?

A. 2000
B. 1500
C. 2500
D. 3000

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

Statement-I : If the difference between the simple interest received from two different sources on ₹ 1500 for 3 years is ₹ 13.50, then the difference between their rate of interests is 3%.

Statement-II : Suman bought $12\frac{1}{2}$ dozen eggs at ₹ 975. To gain a profit of 20%, she should sell the eggs at ₹ 97.5 per dozen.

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.

47. The given data shows the ages of 15 members of parliament. Study the data carefully and answer the following questions.

67, 53, 32, 63, 57, 73, 54, 56, 71, 64, 51, 35, 45, 66, 38

(i) What is the average age of members of parliament?
(ii) Find the median of the given data.

	(i)	(ii)
A.	42	56
B.	45	58
C.	53	59
D.	55	56

48. Match the following and select the correct option.

	Column-I	Column-II
(P)	If $17(5m + 7) = 13(7m + 8)$, then $m =$ _____.	(i) 2
(Q)	If $2+\frac{3n-7}{2}=\frac{5n-4}{3}-1$, then $n =$ _____.	(ii) $\frac{5}{2}$
(R)	If $3x - (5 - 2x) = (7 - x)$, then $x =$ _____.	(iii) 11
(S)	If $y-\frac{3}{2}=15-\frac{y}{2}$, then $y =$ _____.	(iv) 5

A. (P)–(ii), (Q)–(iv), (R)–(i), (S)–(iii)
B. (P)–(iii), (Q)–(iv), (R)–(i), (S)–(ii)
C. (P)–(ii), (Q)–(i), (R)–(iv), (S)–(iii)
D. (P)–(i), (Q)–(ii), (R)–(iii), (S)–(iv)

49. Read the given statements carefully and state 'T' for true and 'F' for false.

(i) Integers are closed under subtraction and multiplication.
(ii) Integers are commutative for addition and subtraction.
(iii) The additive inverse of (–115) + 710 – 640 + 78 is –33.
(iv) The value of |18| – |– 40| + 50 is –28.

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

50. Read the given paragraph carefully and answer the following questions.

A conference hall has a sitting capacity of x number of people. For a seminar, $\frac{4}{9}$ of total seats were booked by females, $\frac{1}{3}$ of total seats were booked by males and rest 94 seats were not booked.

(i) Find the total sitting capacity of the conference hall.
(ii) If each ticket costs ₹ 105.50, then how much total amount is earned by the sold tickets?

	(i)	(ii)
A.	540	₹ 34709.50
B.	484	₹ 36810
C.	564	₹ 29510.50
D.	423	₹ 34709.50

SPACE FOR ROUGH WORK

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