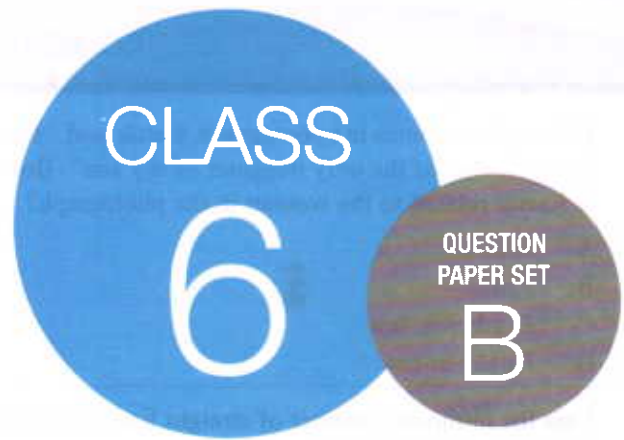


**SOF INTERNATIONAL
MATHEMATICS OLYMPIAD
2019-20**



DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

Total Questions: 50 | Time: 1 hr.

Name:.....

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

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: 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.
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.

16. ● (B) (C) (D)

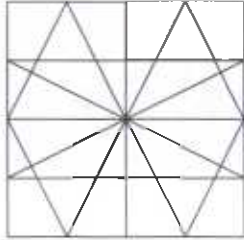


SCIENCE OLYMPIAD FOUNDATION
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LOGICAL REASONING

1. Pointing to a woman in a photograph, Kartik said, "She is the mother of the only daughter of my son". How is Kartik related to the woman in the photograph?
- A. Brother
 B. Father
 C. Brother-in-law
 D. Father-in-law

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

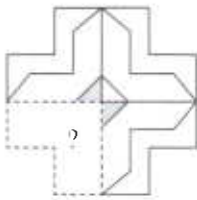


- A. 19
 B. 16
 C. 20
 D. 18
3. Study the set of numbers given below and answer the question that follows :

112 202 325 413 621

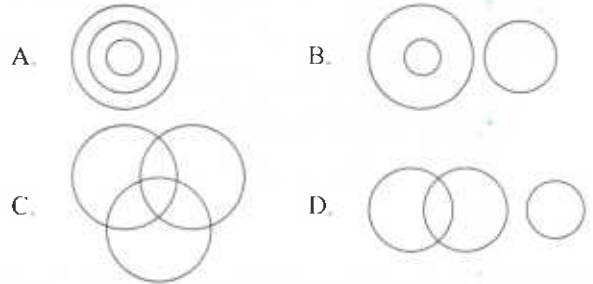
Which of the following numbers will be obtained, if the middle digit of the greatest number is added to the middle digit of the smallest number after adding one to each of the numbers?

- A. 1
 B. 2
 C. 3
 D. 5
4. Which of the following figures would complete the pattern in the given figure?



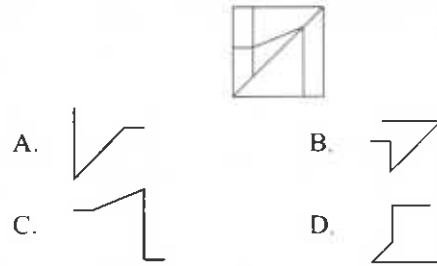
- A. B.
- C. D.

5. Which of the following Venn diagrams best represents the relationship amongst, "Football, Sports person and Men"?



6. If '+' stands for multiplication, '×' stands for division, '-' stands for addition and '÷' stands for subtraction, then find the value of $10 - 18 \times 9 \div 4 + 3$.
- A. 0
 B. 5
 C. 8
 D. 6

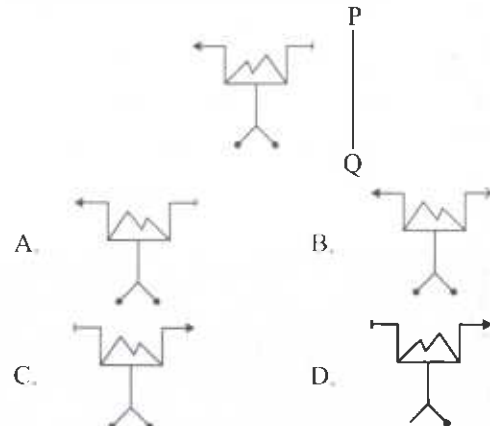
7. Which of the following figures is exactly embedded in the given figure as one of its parts?



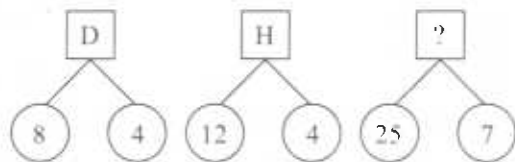
8. Choose the odd one out.

- A. 21
 B. 15
 C. 7
 D. 9

9. Select the correct mirror image of the given figure, if the mirror is placed along PQ.



10. Find the missing character, if same rule is followed in all the three figures.



- A. S
B. P
C. Q
D. R

11. Select a figure from the options which will continue the same series as established by the Problem Figures.

Problem Figures



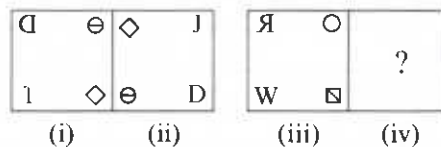
- A.
- B.
- C.
- D.

12. In a certain code language, if COCHIN is written as DPDIJO, then how will LOCATE be written in the same language?

- A. KNBZSD
B. FUBDPM
C. MODBUF
D. MPDBUF

13. There is a certain relationship between figures (i) and (ii). Establish the similar relationship between figures (iii) and (iv) by selecting a suitable figure from the

given options which will replace the (?) in Fig. (iv).



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

14. Two positions of a dice are shown here. Which number will be on the face opposite to the face having number 5?



- A. 1
B. 2
C. 3
D. 6

15. Arrange the given words as they occur in a dictionary and select the correct option.

1. Dissident 2. Dissolve
3. Dissent 4. Dissolute
5. Dissolution
- A. 3, 1, 4, 2, 5
B. 3, 1, 4, 5, 2
C. 3, 2, 4, 5, 1
D. 3, 2, 1, 4, 5

MATHEMATICAL REASONING

16. Mihika constructed an angle of 120° and trisected it. Measure of two angles taken together will be

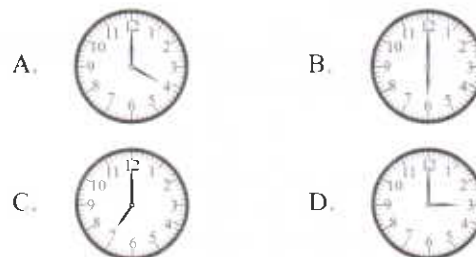
- A. 90°
B. 40°
C. 80°
D. None of these

17. Find the difference between the place value of 4 in 3286.4023 and face value of 2 in 4568234.

- A. 1.6
B. 2.4

- C. 200.4
D. 196

18. Which of the following hands of the clock shows $\frac{1}{2}$ of a revolution?



19. The given table shows the temperature of a place for 6 consecutive hours.

Hour	1	2	3	4	5	6
Temperature (in °C)	-8	12	-1	20	18	5

Calculate the difference between the highest and the lowest temperature of the place over the 6-hour period.

- A. 15 °C
 B. 28 °C
 C. 12 °C
 D. 20 °C
20. The smallest number which when divided by 30, 45, 75 and 60 leaves a remainder of 21, 36, 66 and 51 respectively is
- A. 900
 B. 909
 C. 891
 D. None of these.

21. How many parts should be shaded in Figure Y to make it the same shaded fraction as the unshaded fraction of Figure X?



Figure X

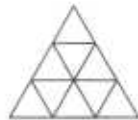


Figure Y

- A. 3
 B. 5
 C. 8
 D. 6
22. Find the value of MCXXI + CMLXXXI - DLIV + XII.
- A. DLX
 B. MLXI
 C. MDLX
 D. MCD
23. Which of the following equations has $x = 3$ as a solution?
- A. $3x + 2(x + 5) = 40$
 B. $8x + 2(x - 2) = 35 - 3x$
 C. $3x + 9 = 33$
 D. None of these
24. If P, Q and R represent the prime digits, then find the value of P and Q respectively.

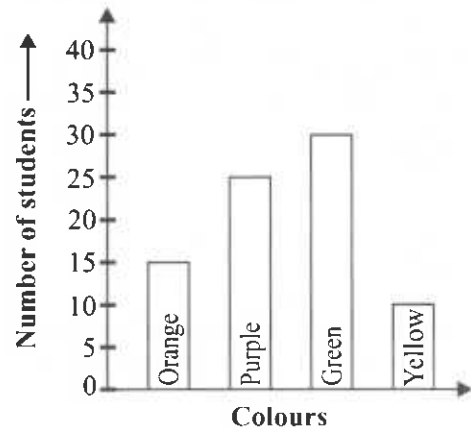
$$\begin{array}{r}
 \begin{array}{r}
 P \quad P \quad 3 \\
 \times \quad Q \quad Q \\
 \hline
 1 \quad R \quad 6 \quad 1 \\
 + 1 \quad R \quad 6 \quad 1 \quad 0 \\
 \hline
 1 \quad 7 \quad 1 \quad 7 \quad 1
 \end{array}
 \end{array}$$

- A. 3, 5
 B. 7, 2
 C. 1, 7
 D. 2, 7

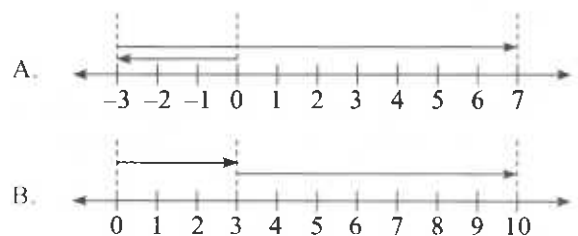
25. $72.432 \times 461.2 \times 0.0034$ is same as _____.

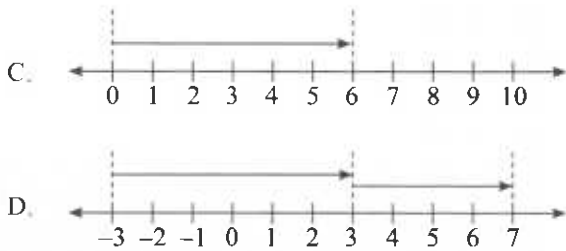
- A. $7.2432 \times 4.612 \times 3.4$
 B. $7.2432 \times 4.612 \times 0.34$
 C. $7.2432 \times 4612 \times 0.0000034$
 D. $7243.2 \times 4.612 \times 0.000034$

Direction (26-27) : Kanika surveyed the students of her class to determine their favourite colours. The results are shown in the given bar graph. Study it carefully and answer the following questions.

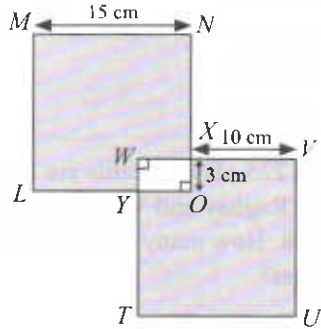


26. How many more students like green colour than orange colour?
- A. 45
 B. 30
 C. 15
 D. 40
27. Find the ratio of number of students who like purple colour to the total number of students.
- A. 4 : 5
 B. 5 : 16
 C. 16 : 5
 D. 5 : 4
28. Which of the following number lines represents the expression $0 + (-3) + 10$?

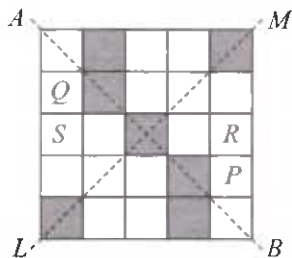




29. In the given figure (not drawn to scale), if $LMNO$ and $TUVW$ are two identical squares, then find the area of the shaded region.



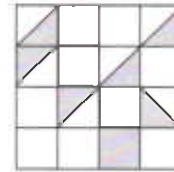
- A. 350 cm^2
 B. 225 cm^2
 C. 450 cm^2
 D. 420 cm^2
30. Which of the following square(s) must be shaded so that the given figure is symmetric along both lines LM and AB ?



- A. R and S
 B. P only
 C. Q and P
 D. Q only
31. Find the sum of 185.32 (round off to nearest tenths), 64.698 (round off to nearest hundredths) and 36.952 (round off to nearest tenths).

- A. 287
 B. 197
 C. 185
 D. 280

32. Which of the following options is incorrect?
 A. A regular pentagon has only five lines of symmetry.
 B. A square has four lines of symmetry.
 C. A pentagonal prism has 10 edges.
 D. A tetrahedron has 4 faces.
33. In the given figure, the ratio of shaded part to unshaded part is _____.



- A. 1 : 4
 B. 1 : 3
 C. 1 : 2
 D. 2 : 3
34. Simplify : $8\frac{3}{4} - 3\frac{7}{8} - 4\frac{1}{16} - \frac{3}{4}$
- A. $\frac{9}{16}$
 B. $\frac{3}{4}$
 C. $\frac{1}{16}$
 D. $\frac{3}{8}$
35. In International System of numeration, the sum of 35486526 and 29637779 can be written as
- A. Sixty five crore one lakh forty three thousand five
 B. Six crore fifty twelve lakh four thousand three hundred five
 C. Sixty five million one hundred twenty four thousand three hundred five
 D. Six million five thousand one hundred twenty four thousand three hundred five.

EVERYDAY MATHEMATICS

36. Ashima, Jiya and Meera distributed 9.780 kg of sugar equally among themselves. Ashima used all her sugar equally to make 20 chocolate shakes. How much sugar did she use to make each shake?
- A. 320 g
 B. 250 g
 C. 163 g
 D. 170 g

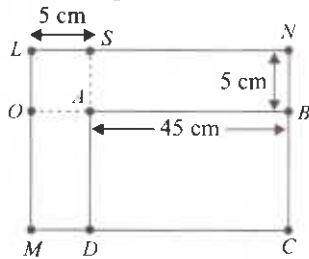
37. Saumya had 9 two thousand rupee notes in her purse. She spent ₹ 12850 on buying clothes, ₹ 1315 on buying fruits and vegetables, ₹ 840 on buying sweets and ₹ 180 on transport. How much money is left with her?
- A. ₹ 2140
B. ₹ 120
C. ₹ 1230
D. ₹ 2815
-
38. A piece of cloth 8 m in width and 12 m in length has to be covered by square block prints. If each side of the square block is 0.5 m in length, then how many such square blocks can be printed on the cloth?
- A. 217
B. 384
C. 312
D. 420
-
39. Three big drums contains 44 litres, 55 litres and 99 litres of diesel. What is the largest measure that can measure all the different quantities exactly?
- A. 9 litres
B. 120 litres
C. 11 litres
D. 70 litres
-
40. Preeti travelled $3x$ km distance by walk, $9y$ km by cycle and 5 km by bus. The total distance travelled by Preeti is _____.
- A. $(3x - 9y + 5)$ km
B. $(3x + 9y + 5)$ km
C. $(3x - 9y - 5)$ km
D. $(9x + 3y - 5)$ km
-
41. There are $\frac{3}{5}$ as many men as women in the hall. $\frac{2}{3}$ of the men and $\frac{1}{5}$ of the women wear formal dress. What is the ratio of the people in the hall who do not wear formal dress to the total number of people in the hall?
- A. 8 : 5
B. 3 : 5
C. 5 : 8
D. 4 : 5
-
42. A stadium has a capacity of 1800 seats. There are 300 seats each allotted for ₹ 300 tickets, 400 seats each for ₹ 450 tickets, 400 seats each for ₹ 500 tickets and the rest for ₹ 1000 tickets each. If all the tickets are sold, then how much money would be collected?
- A. ₹ 870000
B. ₹ 990000
C. ₹ 1050000
D. ₹ 1170000
-
43. A total of 225 playing cards are to be divided among Niharika, Raghav and Varun respectively in the ratio of 2 : 5 : 8. How many number of playing cards will Raghav get?
- A. 75
B. 85
C. 120
D. 45
-
44. There are 222 red balls in a basket. A boy takes out 6 red balls from it and replaces them by 12 white balls. If he continues to do so till all red balls are replaced by white balls, then the total number of white balls put in the basket is _____.
- A. 333
B. 444
C. 345
D. 400
-
45. A postman covers 50 m distance to deliver a parcel to the customer. He travels 0.017 km by bicycle and the rest on foot. What distance does he cover on foot?
- A. 33 m
B. 28 m
C. 23 m
D. 22 m

ACHIEVERS SECTION

46. Read the statements carefully and state 'T' for true and 'F' for false.
- (i) A right angle is one fourth of a revolution.
(ii) Place value and face value are always equal at ones place.
(iii) The sum of two negative integers and a positive integer is always a negative integer.
(iv) The successor of every whole number is a natural number.
- | | (i) | (ii) | (iii) | (iv) |
|----|-----|------|-------|------|
| A. | T | F | T | F |
| B. | T | T | F | T |
| C. | F | F | T | T |
| D. | F | T | T | F |

47. $ABCD$ is a rectangle. When the length and breadth of the rectangle are increased, the rectangle gets enlarged to $LNCM$. If the length of rectangle $ABCD$ is thrice its breadth, then find the

- (a) sum of perimeter of rectangle $ABCD$ and $SNBA$.
 (b) area of rectangle $LNCM$.



- (a) (b)
 A. 225 cm 840 cm²
 B. 220 cm 1000 cm²
 C. 220 cm 900 cm²
 D. 235 cm 750 cm²

48. The total number of students who applied for government jobs in the five years in a state are given below.

Year	2013	2014	2015	2016	2017
No. of students	4500	6000	7500	3500	5500

Using the symbol \oplus to represent 500 students, answer the following questions.

- (i) How many symbols are needed to represent the number of students who applied in 2014?
 (ii) How many less symbols are needed to represent the number of students who applied in 2017 than those in 2015?

- (i) (ii)
 A. 12 4
 B. 5 8
 C. 8 4
 D. 12 6

49. In a quiz, there are 50 questions. If all questions are answered correctly, a student's score will be 100; if all questions are answered incorrectly, a student's score will be -50 . Part way through this quiz Rashi has a score of -5 . What will her new score be, if she

- (a) answers 3 of the next 7 questions correctly and 4 of them incorrectly?
 (b) answers 2 of the next 8 questions incorrectly and 6 of them correctly?

- (a) (b)
 A. 3 5
 B. -3 5
 C. -3 -7
 D. 1 5

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

Statement-1 : A chord of a circle is a line segment joining any two points on the circle.

Statement-2 : Two intersecting lines are perpendicular, if the angle between them is 180° .

- A. Both Statement-1 and Statement-2 are true.
 B. Both Statement-1 and Statement-2 are false.
 C. Statement-1 is true but Statement-2 is false.
 D. Statement-1 is false but Statement-2 is true.

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