CLASS 8

QUESTION PAPER SET A

IMO

SOF INTERNATIONAL MATHEMATICS OLYMPIAD 2022-23

DO NOT OPEN THIS BOOKLET UNTIL ASKED TO DO SO

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, 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.

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16. Find the value of $\sqrt{1053 - \sqrt{860 - \sqrt{378 - \sqrt{289}}}}$.

    A.   36

    B.   38

    C.   34

    D.   32

17. If 45% of a number x is equal to the 27% of an another number y, then x is what percent of y?

    A.   50%

    B.   60%
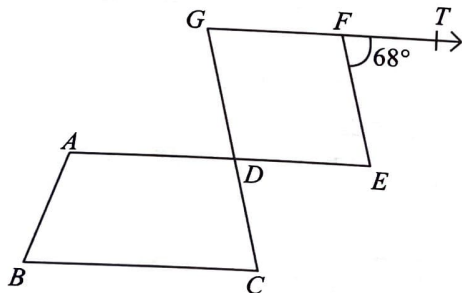
    C.   70%

    D.   40%

18. Factorise : $(7a - 4b)^2 + 9(7a - 4b) + 20$.

    A. $(7a - 4b + 5)(7a - 4b + 4)$

    B. $(7a - 4b)(3a + 2b + 6)$

    C. $(7a + 4b + 5)(7a + 4b + 4)$

    D. $(7a + 4b)(3a - 2b - 6)$

19. A number is selected from the numbers 1 to 50. Find the probability of not getting a perfect square.

    A. $\dfrac{37}{51}$

    B. $\dfrac{43}{51}$

    C. $\dfrac{43}{50}$

    D. $\dfrac{37}{50}$

20. In the given figure (not drawn to scale), $ABCD$ is a trapezium and $DEFG$ is a rhombus. Find the value of $\angle BCD$.

    A. $78°$

    B. $68°$

    C. $64°$

    D. $74°$

21. The sum of the additive inverse and multiplicative inverse of $\dfrac{1}{5}$ is _____ .

    A. $\dfrac{24}{5}$

   B. $-\dfrac{24}{5}$

    C.   25

    D.   –25

22. Two numbers are in the ratio of $2 : 3$. If smaller number is increased by 7 and greater number is decreased by 7, then both numbers become equal. Find the sum of the digits of the smaller number.

    A.   9

    B.   6

    C.   10

    D.   7

23. Which of the following numbers becomes a perfect cube when we divide the number by 5?

    A.   125

    B.   25

    C.   625

    D.   3125

Direction (24-25) : The graph shows the number of medals won by two different countries A and B in five competitions in the Olympics. Read the graph carefully and answer the following questions.
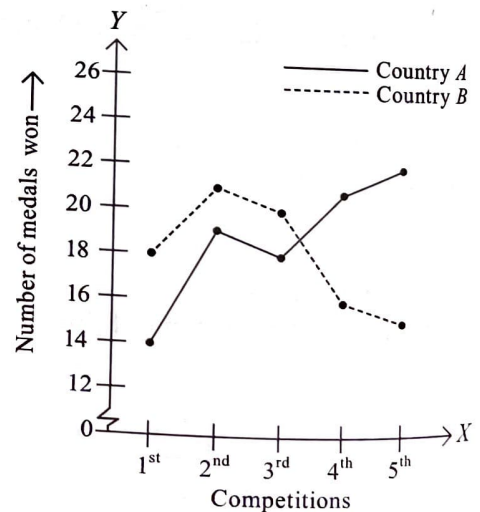
24. Which country has won more medals and by how many more in all five competitions together?

    A.   Country B, 7

    B.   Country B, 5
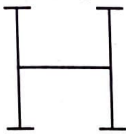
    C.   Country A, 7

    D.   Country A, 4

25. In how many competitions, country B performed better than Country A?

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

26. Subtract the sum of $5x^2 + 7x - 3y + 7$ and $-7y^2 + 3x^2 - 8x + 5$ from $x^2 + 7x - y^2 + 23$.

A. $-7x^2 + 6y^2 + 8x + 3y + 11$
B. $7x^2 - 6y^2 + 8x + 3y + 11$
C. $-5x^2 + 7y^2 + 6x + 5y + 13$
D. $5x^2 - 7y^2 + 6x + 5y + 13$

27. What is the sum of lines of symmetry and order of rotational symmetry of the given figure?

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

28. A student was asked to divide a number by 3.2. But instead of dividing it, he multiplied it by 3.2 and got the answer as 13.44. What was the correct answer?

A. 1.3125
B. 0.51
C. 0.61
D. None of these

29. Two numbers x and y are in the inverse proportion. When the values of x are 8 and 12, then the values of y are 9 and 6 respectively. What will be the value of y when x is 3.6?
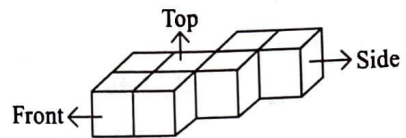
A. 18
B. 20
C. 24
D. 40

30. The volume of a cylinder is 2079 cm^3. If area of base of the cylinder is 346.50 cm^2, then find the height of the cylinder.

A. 9 cm
B. 5 cm
C. 7 cm
D. 6 cm

31. Find the value of x, if $\left(\dfrac{5}{8}\right)^{-7} \times \left(\dfrac{8}{5}\right)^{11} = \left(\dfrac{8}{5}\right)^{2x} \times \left(\dfrac{5}{8}\right)^{-4}$.

A. 11
B. 5
C. 7
D. 9

32. Which of the following is the side view of the given figure?

A.
B.
C.
D.

33. Simple interest on a certain amount is $\dfrac{9}{16}$ of the principal. If the numbers representing the rate of interest (in percent) and time (in years) be equal, then time for which the principal is lent out, is _____.

A. $5\dfrac{1}{2}$ years
B. $6\dfrac{1}{2}$ years
C. 7 years
D. $7\dfrac{1}{2}$ years

34. Find the area of the shaded part of the given figure (not drawn to scale), if E and F are the mid-points of DC and AB respectively.
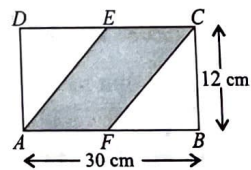
A. 170 cm^2
B. 150 cm^2
C. 120 cm^2
D. 180 cm^2

35. Solve the given equation and find the value of x.

$$3(2x+11) = \left(\frac{5x+4}{3}\right) - 3$$

A. 9
B. −8
C. 4
D. −7

36. A shopkeeper allows a discount of 15% on the marked price of an article. If the selling price of the article is ₹ 765, then find its marked price.

A. ₹ 850
B. ₹ 1000
C. ₹ 900
D. ₹ 1050

37. In a fort, there is sufficient food for 1000 men for 20 days. A few men left and the food lasted for 25 days. How many men left?

A. 100
B. 200
C. 300
D. 250

38. A swimming pool is of dimensions 24 m × 12 m × 4 m. What is the quantity of water in the pool, if water is filled up to a depth of 2.5 m?

A. 720 kL
B. 720 L
C. 1152 kL
D. 110 L

39. A prize of certain amount is distributed among three participants A, B and C. A got $\frac{4}{9}$ and B got $\frac{7}{18}$ of total amount of prize money. If C got ₹ 70701, then find the total amount of prize money.

A. ₹ 575480
B. ₹ 328504
C. ₹ 225560
D. ₹ 424206

40. Age of Rahul is 3 years more than half the age of his father. Five years ago, Rahul was 21 years younger than his father. Find the present age of Rahul.

A. 21 years
B. 27 years
C. 22 years
D. 25 years

41. In a class of 35 students, 7 students got more than 75% marks, 13 students got between 60% and 75% marks and rest students got less than 60% marks. If one student is selected at random from the class, then what is the probability that his marks are below 60%?

A. $\frac{3}{7}$
B. $\frac{22}{35}$
C. $\frac{5}{7}$
D. $\frac{13}{35}$

42. Mohit gave a problem to Samrath.

> Difference of two perfect cubes is 189. If the cube root of the smaller of the two numbers is 3, then find the cube root of the larger number.

Help Samrath to answer the question.

A. 4
B. 6
C. 8
D. 10

43. 45% population of a village is below 18 years and rest are adults. From the adults, the ratio of number of men to number of women is 3 : 2. If total population of the village is 18700, then find the number of men.

A. 6171
B. 5842
C. 7254
D. 8468

44. Sonali purchased two types of wires. If she purchased 7 m of first type of wire at ₹ 45.50 and 5 m of second type of wire at ₹ 43.75, then what is the total cost of 1 m wire of first type and 1 m wire of second type?

A. ₹ 18.75
B. ₹ 14.45
C. ₹ 15.25
D. ₹ 19.55

45. The average weight of 12 boys is 46 kg. If a boy of 79 kg weight is excluded, then what will be the average weight of remaining boys?

A. 41 kg
B. 38 kg
C. 39 kg
D. 43 kg

46. The given pie chart shows the distribution of seats of sports complex among the students of five different schools A, B, C, D and E. Study the pie chart carefully and answer the following questions.

Total number of seats of sports complex = 936
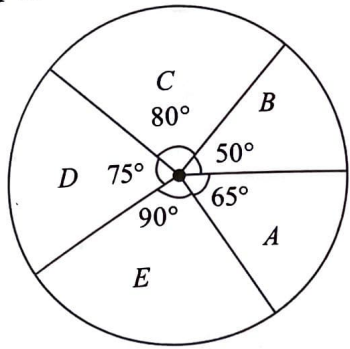
(i) What percent of total seats occupied by students of school D?

(ii) What fraction of total seats is allotted to students of school A?

(iii) How many more seats are allotted to students of school E than students of school B?

	(i)	(ii)	(iii)
A.	$15\frac{5}{6}\%$	$\frac{7}{36}$	84
B.	$18\frac{3}{7}\%$	$\frac{19}{72}$	112
C.	$17\frac{2}{3}\%$	$\frac{11}{36}$	92
D.	$20\frac{5}{6}\%$	$\frac{13}{72}$	104

47. Answer the following questions and select the correct option.

(i) Abhinav borrowed ₹ 6000 from bank for 2 years. If rate of interest was 10% per annum, then what will be the compound interest if interest is compounded annually?

(ii) Sushant bought a cell phone for ₹ x. If the cost of cell phone in 2 years is depreciated to ₹ 12000 at 20% per annum, then find the value of x.

	(i)	(ii)
A.	₹ 1300	₹ 16000
B.	₹ 960	₹ 17500
C.	₹ 1260	₹ 18750
D.	₹ 1050	₹ 18000

48. Match the expression given in Column - I to one of their factors given in Column - II and select the correct option.

Column - I		Column - II	
(P)	$16x^2 - 9$	(i)	$(7 + 5x)$
(Q)	$5x^2 + 32x + 35$	(ii)	$(3x + 2)$
(R)	$7x^2 + 6x - 16$	(iii)	$(4x - 3)$
(S)	$9x^2 + 12x + 4$	(iv)	$(-8 + 7x)$

A. (P) → (iii); (Q) → (i); (R) → (iv); (S) → (ii)
B. (P) → (ii); (Q) → (i); (R) → (iv); (S) → (iii)
C. (P) → (iii); (Q) → (iv); (R) → (i); (S) → (ii)
D. (P) → (iii); (Q) → (iv); (R) → (ii); (S) → (i)

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

Statement - I : If $\frac{3(x-5)}{2} = 7 - \frac{x}{2}$, then the value of x is $\frac{-1}{3}$.

Statement - II : If $0.75\,(2t - 6) = 0.25(t - 8)$, then the value of t is 2.

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

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

(i) __P__ is the least number that should be multiplied by 576 to make it a perfect cube number.

(ii) The unit digit of the cube of 7683 is __Q__.

(iii) The sum of the digits of cube root of 2744 is __R__.

	P	Q	R
A.	4	9	9
B.	3	7	5
C.	5	8	4
D.	7	6	6

SPACE FOR ROUGH WORK

Level 1 | SOF