SILVER ZONE FOUNDATION
NEW DELHI, INDIA

Do not start attempting the test paper until you are asked to do so.

ENROLLMENT NUMBER:

STUDENT NAME:

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Class 8

Maximum Marks : 100
Duration : 60 Minutes
Total Questions : 50

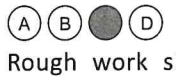
Test Paper Type
B B

Level - 1

iOM 12th INTERNATIONAL OLYMPIAD OF MATHEMATICS 2019-2020

Instructions for the Candidates

1. Write your 12 digit Enrollment Number and your name on top of the Question Paper in the given space.
2. Keep the OMR Sheet in good/neat condition. Do not fold/damage the OMR Sheet.
3. Do not forget to sign the OMR sheet.
4. The Question Paper Booklet consists of 50 questions, divided into three sections.
5. Section-A: Mathematics (30 questions), Section-B: Reasoning and Aptitude (10 questions) and Section-C: Scholar's Zone (10 questions).
6. Each question of Section-A carries 2 marks, Section-B carries 1.5 marks and that of Scholar's Zone carries 2.5 marks.
7. All the questions are compulsory and there is no negative marking.
8. Use of calculator or any other devices in the examination is strictly prohibited.
9. Choose only ONE OPTION as an answer.
10. BLUE/BLACK ball pen is preferred to darken the circle, however, in case of non-availability an HB pencil can be used. Mark your choice of answer in the OMR sheet, by darkening a circle as shown below.



11. Rough work should be done on the blank sheet/space provided in the Question Paper Booklet.

Section-A (Mathematics)

1. Identify the composite number:

   A. 1 B. 199
   C. 2 D. 793

2. Find the number in the units place of $(648)^{349}$.

   A. 2 B. 4
   C. 6 D. 8

3. Number of digits in the cube of a three digit number cannot be _____.

   A. 7 B. 8
   C. 9 D. 10

4. Find the square root of a five digit number 49abc where a, b and c are non-zero digits such that $b = a^3 = 2c$.

   A. 202 B. 122
   C. 222 D. 242

5. Simplify: $\dfrac{\sqrt[3]{(0.027)^2} + \left(\sqrt[3]{0.000512}\right)^2 - \sqrt{(0.3)^4}}{(0.2)^4}$

   A. 1 B. 2
   C. 3 D. 4

6. The LCM of $\frac{1}{8}$ and $\frac{3}{5}$ is _____.

   A. 3 B. $\frac{3}{40}$
   C. $\frac{1}{40}$ D. 1

7. Find the product of $\left\{3x^2y^3z^4 \times \frac{4}{9}(x^2+y)z^3\right\}$ and $\left\{\frac{-3}{2}x^2yz^3(y+z+3x)\right\}$.

   A. $-2x^6y^5z^{10} - 2x^6y^4z^{11} - 6x^7y^4z^{10} - 2x^4y^6z^{10} - 2x^4y^5z^{10} + 6x^5y^5z^{12}$

   B. $-2x^6y^5z^{10} - 2x^6y^4z^{11} - 6x^7y^4z^{10} - 2x^4y^6z^{10} - 2x^4y^5z^{11} - 6x^5y^5z^{10}$

   C. $-2x^6y^5z^{12} - 2x^6y^4z^{10} + 6x^7y^4z^{10} - 2x^4y^6z^{10} - 2x^4y^5z^{11} - 6x^5y^5z^{10}$

   D. None of these

8. Find the quotient of polynomial if $y^3 - 6y^2 + 9y - 2$ is divided by $y - 2$.

   A. $y^2 + 4y + 1$ B. $y^2 - 4y + 1$
   C. $y^2 + 4y - 1$ D. $y^2 - 4y - 1$

9. The remainder when $(a - 3b)^2 - 6a + 18b$ is divided by $(a - 3b + 2)$ is _____.

   A. 16
   B. 20
   C. 12
   D. 24

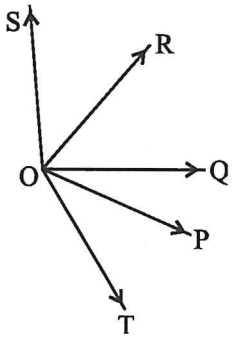
10. Find the solution of the given linear equation $\dfrac{6m+7}{3m+2} = \dfrac{4m+5}{2m+3}$.

    A. $m = -\frac{11}{9}$ B. $m = \frac{11}{9}$
    C. $m = \frac{9}{11}$ D. $m = -\frac{9}{11}$

11. Which of the following statements is not true?

    A. In a convex polygon no internal angle can be more than 180°.
    B. In a concave polygon atleast one of the interior angles is more than 180°.
    C. The maximum number of obtuse angles in a quadrilateral cannot be 3.
    D. Number of diagonals in a pentagon is 5.

12. In the figure shown below, OS ⊥ OP, OQ ⊥ OT and OR is bisector of ∠SOQ. If ∠POT = 48°, then find the measure of ∠ROS.



    A. 24° B. 48°
    C. 42° D. 34°

13. Loss percent is equal to _____.

A. $\frac{\text{Loss}}{\text{Cost price}} \times 100$

B. $\frac{\text{Loss}}{\text{Marked price}} \times 100$

C. $\frac{\text{Loss}}{\text{Selling price}} \times 100$

D. None of these

14. 120 persons can dig a well in 60 days. After they have worked for 15 days, how many more persons should be employed so as to complete the work in another 30 days?

A. 60 B. 90
C. 180 D. 210

15. Four numbers are such that x = 8% of y, y = 4% of z, z is 25% of w. Find the value of $\frac{w}{x}$.

A. 25000 B. 2500
C. 12500 D. 1250

16. A shopkeeper allows a discount of 20% to his customers and still gains 25%. Find the marked price of an article which costs ₹ 800 to the shopkeeper.

A. ₹ 1250
B. ₹ 1000
C. ₹ 1200
D. ₹ 1500

17. The successive discounts of 20% and 25% on the marked price of an article will be equivalent to a single discount of _____.

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

18. Find the rate of simple interest per annum at which a sum becomes double in 4 years.

A. 20% B. 25%
C. $33\frac{1}{3}\%$ D. None of these

19. The population of a town increases at a rate of 8% every year. If the present population of the village is 15000, find the population after 2 years.

A. 18420 B. 18240
C. 17496 D. 17624

20. What will be the compound interest (in ₹) on a sum of ₹ 24000 after 3 years at a rate of 10% per annum?

A. 3783 B. 7944
C. 6732 D. 4843

21. A thread goes 140 times around a wheel of radius 14 cm. If the radius of the wheel is increased to 20 cm, then find the number of rounds the same thread will make around the wheel. $\left[\text{Take } \pi = \frac{22}{7}\right]$

A. 94 B. 96
C. 98 D. 57

22. A cuboid whose length is twice the breadth and whose breadth is half of its height. If the length of the cuboid is 12 cm, then find the volume of the cuboid.

A. 864 cm^3 B. 824 cm^3
C. 796 cm^3 D. 756 cm^3

23. The curved surface area of a right circular cylinder of height 14 cm is 88 cm^2. The diameter of its base is_____. $\left[\text{Take } \pi = \frac{22}{7}\right]$

A. 2.0 cm B. 1.0 cm
C. 2.5 cm D. 1.5 cm

Space for Rough Work

24. Two cylinders of same volume have their radii in the ratio $\sqrt{3}:4$. What will be the ratio of their heights?

A. 16 : 3 B. 3 : 4
C. 9 : 16 D. None of these

25. A coin is tossed 12 times and outcomes are recorded as follows:

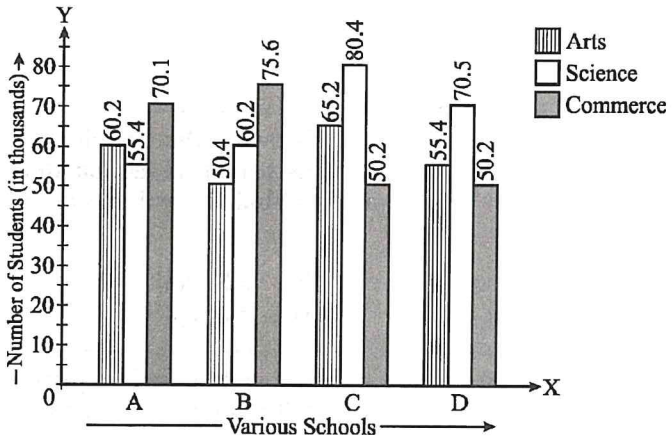
Head, Tail, Tail, Head, Head, Tail, Head, Tail, Tail, Tail, Head, Tail

The chance of occurrence of a Tail is _____.

A. $\frac{5}{12}$ B. $\frac{1}{2}$
C. $\frac{7}{12}$ D. $\frac{2}{3}$

Direction for Q. No. 26 to 28: Study the following graph carefully and answer the questions given below it:

Number of students studying in various schools from various subjects (Number in thousands)



26. What is the difference between the total number of students studying in school B and those studying in school D?

A. 10400
B. 10100
C. 9860
D. 9820

27. What is the respective ratio of the students from the subject Arts from school A and school C together to the students from the same subject from school B and school D together?

A. 627 : 529
B. 727 : 469
C. 621 : 529
D. None of these

28. The number of students from the subject science from school B are approximately what percent of the total number of students studying in that school?

A. 24% B. 28%
C. 32% D. 36%

29. If P = {1, 2, 4, 6, 9, 11, 12} and Q = {6, 9, 12, 15, 18, 21}, then $P \cup Q$ is _____.

A. {1, 2, 4, 6, 9, 11, 12, 15, 18, 21}
B. {6, 9, 12, 15, 18, 21}
C. {1, 2, 4, 6, 9, 12}
D. {6, 9, 12}

30. A is a set of factors of 18, then which one of the following is not an element of A?

A. 15 B. 6
C. 9 D. 2

Space for Rough Work

31. If the code word of 'RUN' is 'QSTVMO', then what will be the code of 'LUV'?

A. 'MKTUVW' B. 'KMTVUW'
C. 'MKTVUW' D. 'KNTVUW'

32. Suresh introduces a man as "He is the son of the woman who is the mother of the husband of my mother". How is Suresh related to the man?

A. Uncle B. Son
C. Cousin D. Grandson

33. In a queue the position of Reeta from left is 15th and the position of Madhu is 18th from right. If there are 4 girls in between these two girls then find the minimum number of girls in the queue?

A. 36 B. 27
C. 26 D. 37

34. Examine the following three figures in which the number follows a specific pattern:

	28	
15	7	16

	19	
17	6	27

	24	
13	?	18

The missing number in the third figure is _____.

A. 6 B. 8
C. 10 D. 12

35. In a certain code FINGER is written as DGLECP, what will be the code for KIDNEY?

A. IGBLCW B. IGCLBW
C. IBCGLE D. IGBKCV

36. N is more intelligent than M, M is not as intelligent as Y, X is more intelligent than Y but not as good as N. Who is the most intelligent of all?

A. N B. X
C. M D. Y

Direction for Q No. 37 to 39: Study the following information carefully and answer the questions:

A, B, C, D, E, F, G and H are sitting around a circle, facing the centre. A sits fourth to the right of H while second to the left of F. C is not the neighbour of F and B. D sits third to the right of C. H never sits next to G.

37. Which of the following pairs sits between H and G?

A. BH B. EF
C. CE D. DB

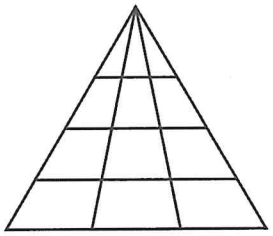
38. Four of the following five are alike in a certain way based on their positions in the seating arrangement and so form a group. Which is the one that does not belong to that group?

A. AE B. HF
C. BD D. GE

39. Who sits second to the right of B?

A. A B. C
C. D D. E

40. Count the number of triangles in the figure given below:



A. 24 B. 25
C. 28 D. None of these

Space for Rough Work

41. How many factors of $2^9 \times 5^2 \times 7^3$ are odd numbers?

A. 10 B. 12
C. 16 D. 18

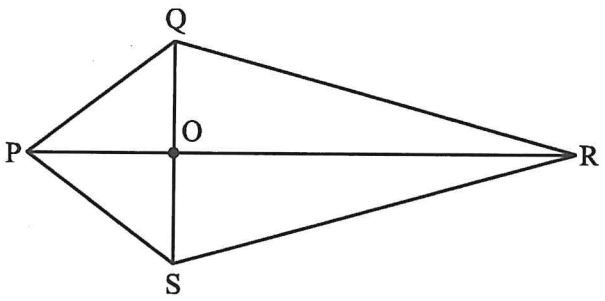
42. Identify the statement which is true:

A. $(343)^{11} + (225)^{12} = (275)^9$
B. $(1024)^{18} + (343)^{18} = (1367)^{18}$
C. $17013 \times 17025 + 36 = (17019)^2$
D. $243 \times 285 - 441 = (264)^2$

43. If $2^{b^a} - 2^{a^b} = 2^{115}\left[2^{2^c} - 2^{10}\right]$, where a, b and c are odd prime numbers less than 10, then find the value of $\frac{a^b}{a^c}$.

A. 5^{-4} B. 3^{-2}
C. 7^{-2} D. None of these

44. Consider the figure shown below:



Here PQRS is a kite and PO = OQ = OS and RO = 3 PO. If perimeter of the kite PQRS is 32 units then find the area of ΔPQS [in unit^2]

A. $32 - 16\sqrt{5}$
B. $48 - 16\sqrt{5}$
C. $32 - 8\sqrt{5}$
D. $48 - 8\sqrt{5}$

45. If $M = \frac{6ab}{2a+3b}$, then find the value of $\frac{M+2a}{M-2a} - \frac{M+3b}{M-3b}$.

A. $\frac{2a^2-3b^2}{3ab}$
B. $\frac{4a^2-9b^2}{6ab}$
C. $\frac{2a^2-3b^2}{6ab}$
D. $\frac{4a^2-9b^2}{3ab}$

46. Natural numbers starting from 1 are written in a row as given below:
1 2 3 4 5 6 7 8 9 10 11 12 .....
What will be the 3032nd digit in the sequence?

A. 1 B. 2
C. 3 D. 4

Space for Rough Work

47. Which one among the following is representing interior angle of a regular polygon whose respective ratio of the number of side to the number of diagonals is P : 1?

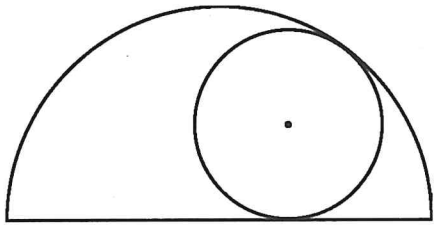
A. $\left(\frac{1+3P}{1+P}\right)\times 180°$

B. $\left(\frac{2+P}{2+3P}\right)\times 180°$

C. $\left(\frac{1+P}{2+3P}\right)\times 180°$

D. None of these

48. A circle is inscribed in the semicircle as per the figure given below?



If the perimeter of the semicircle is $2(\pi+2)$cm, which of the following is the radius of the circle?

A. $\left(\frac{2\sqrt{2}-1}{2}\right)$cm

B. $\left(\frac{3\sqrt{2}-1}{2}\right)$cm

C. $\left(\frac{3+\sqrt{2}}{3}\right)$cm

D. $\left(\frac{2\sqrt{2}+1}{2}\right)$cm

49. The sum of the all sides of a rhombus is $32\sqrt{3}$ cm. If one of the interior angles of the rhombus is 120°, then find the area of the rhombus.

A. $48\sqrt{3}\,cm^2$

B. $96\sqrt{3}\,cm^2$

C. $64\sqrt{3}\,cm^2$

D. Cannot be determined

50. Let N = 1011 × 1013 × 1015, what is the remainder when N is divided by 11?

A. 2 B. 3

C. 5 D. 8

Space for Rough Work

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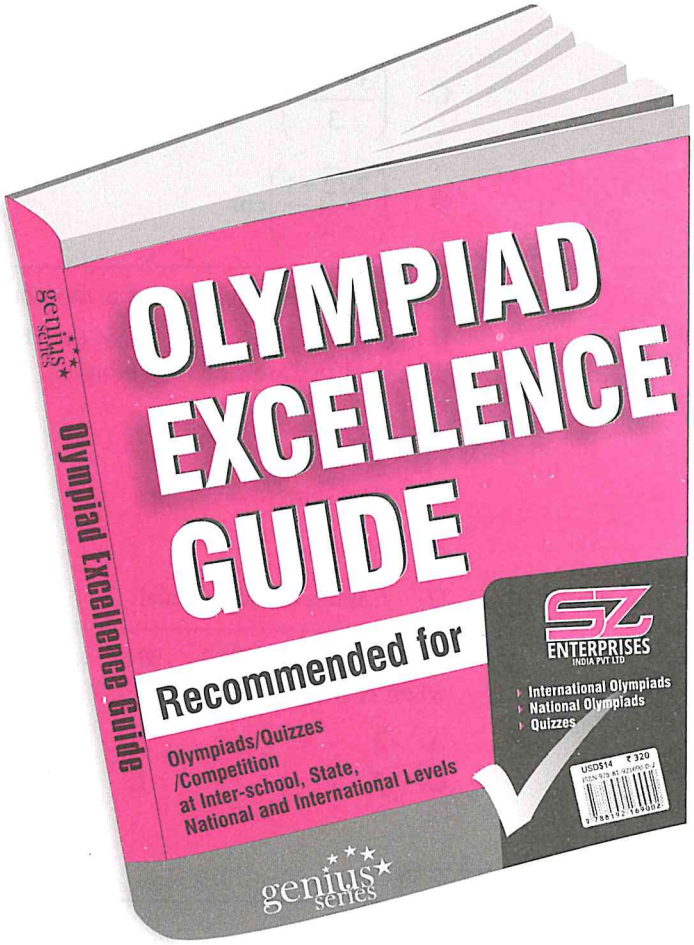

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