OGO
ORANGE GLOBAL OLYMPIAD

School **L**evel **E**xamination
SLE 2023

GRADE
9

MATHEMATICS

Subject Code: 2 0 1

Total Questions: 50

Time: 1 hour

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO

➢ All questions are compulsory.

➢ Read the instructions on the **ANSWER SHEET** and fill in your **NAME**, **CLASS** and **OTHER INFORMATION**.

➢ To mark your choice of answer by darkening the circles in the **ANSWER SHEET**, use a **BLUE/BLACK BALLPEN** only.

➢ You **MUST** record your answers on the **ANSWER SHEET** only.

➢ There are **50 MULTIPLE CHOICE QUESTIONS**. Use the information provided to choose the **BEST** possible answer among the four options. On your **ANSWER SHEET** fill in the circle that matches your answer.

➢ Marks are **NOT** deducted for incorrect answers.

➢ Return the **ANSWER SHEET** to the invigilator at the end of the examination.

➢ You are **NOT** allowed to use a calculator. You may use a ruler and spare paper for rough work.

MATHEMATICS

This question paper contains a total of 50 questions divided into three sections - A, B and C.

Read the instructions carefully before attempting these questions.

Section A (Logical Reasoning)

1. In the given series one term is wrong. Identify the wrong term.

   $$\frac{a}{0}, \frac{d}{3}, \frac{h}{7}, \frac{m}{12}, \frac{r}{17}$$

   (A) $\frac{d}{3}$ (B) $\frac{h}{7}$

   (C) $\frac{m}{12}$ (D) $\frac{r}{17}$

2. 'A + B', means 'A is the father of B' and 'A − B' means 'A is the mother of B', then which of the following relation is true for P − Q + S?

   (A) P is grandfather of S   (B) S is grandchild of P

   (C) S is granddaughter of P   (D) S is grandson of P

3. Six persons Aman, Beena, Charu, Disha, Esha and Jiya took up a job with an organisation in a week from Monday to Saturday. Each of them joined for different posts on different days. The posts were of clerk, officer, technician, manager, supervisor and sales executive, though not necessarily in the same order.

   Jiya joined as a manager on the first day. Beena joined as a supervisor but neither on Wednesday nor on Friday. Disha joined as a technician on Thursday and Charu joined on Wednesday. Esha joined as a clerk on Tuesday and Aman joined as a sales executive. Which of the following is correctly matched regarding the posts and day of joining?

   (A) Technician - Monday   (B) Officer - Wednesday

   (C) Sales - Tuesday   (D) Clerk - Thursday

4. There is a queue against a railway ticket counter. The passenger A is 9th from the front and passenger B is 6th from the back. If another passenger C is exactly in the middle of A and B, and is 20th from the front. How many passengers are there in all in the queue?

   (A) 50   (B) 42

   (C) 40   (D) 36

5. A set of figures carrying certain characters is given. Assuming that the characters in each figure follow the same pattern, find the missing character.

   (A) 54   (B) 53

   (C) 16   (D) 45
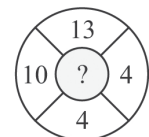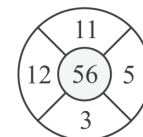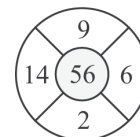
6. 947 is related to 49 16 81 in the same way as 862 is related to

   (A) 04 64 36   (B) 36 64 04

   (C) 64 36 04   (D) 04 36 64

7. A clock is set right at 8 am. The clock uniformly loses 24 min in a day. What will be the right time when the clock indicates 4 pm on the next day?

   (A) 4:22 pm   (B) 4:32 pm

   (C) 4:28 am   (D) 4:38 am

8. Which option figure completes the second pair in the same way as the first pair?
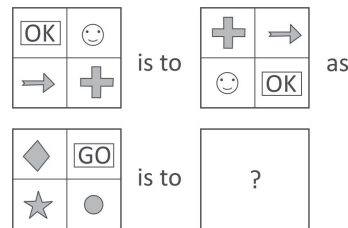
(A)

(B)

(C)

(D)

9. Geeta starts from her house and walks 30 m towards East, she then turns to her left and walks 40 m to reach her friend's house. What is the shortest distance between her house and her friend's house?

   (A)   60 m   (B)   70 m

   (C)   40 m   (D)   50 m

10. An application was received by inward clerk in the afternoon of a weekday. Next day, he forwarded it to the table of the senior clerk, who was on leave that day. The senior clerk on next day evening put the application to the desk officer. Desk officer studied the application and disposed the matter on the same day, i.e. Friday.

   On which day was application received by the inward clerk?

   (A)   Monday   (B)   Tuesday

   (C)   Wednesday   (D)   Earlier week's Saturday

Section B (Subject Specific)

11. The set of whole numbers is the proper subset of a _____.

   (A)   set of natural numbers   (B)   set of integers

   (C)   set of rational numbers   (D)   both b and c

12. Find the value of k, if $(x - 1)$ is a factor of $4x^3 + 3x^2 - 4x + k$.

   (A)   2   (B)   −2

   (C)   3   (D)   −3

13. Name the equation of a line parallel to X-axis.

   (A)   Y= 0   (B)   X=0

   (C)   Y= k   (D)   X=k

14. Which of the following is a possible solution of equation 2X+5Y = 12?

   (A)   (1,2)   (B)   (5,2)

   (C)   (-2,4)   (D)   (-2,3)

15. _____ are statements which are proved using definitions, axioms, previously proved statements and deductive reasoning.

   (A)   Assumptions   (B)   Theorems

   (C)   Principles   (D)   None of these

16. If $(a, b) = (0, 22)$, then the value of b is _____.

   (A)   0   (B)   22

   (C)   a   (D)   None of these

17. The two angles with a common vertex, a common arm and non-common arms are on the different sides of the common arm. What kind of angles are thus formed?

   (A)   Complementary angles   (B)   Supplementary angles

   (C)   Reflex angle   (D)   Adjacent angles

18. Which of the following statements is true?

   (A)   Only one line can pass through a single point.

   (B)   There is an infinite number of lines which pass through two distinct points.

   (C)   A terminated line can be produced indefinitely on both the sides.

   (D)   If two circles are equal, then their radii are unequal.

19. Which of the following is true?

   (A)   Product of two irrational numbers is always irrational.

   (B)   Product of a rational and an irrational is always irrational.

   (C)   Sum of two irrational numbers can never be irrational.

   (D)   Sum of an integer and a rational number can never be an integer.

20. In the figure alongside, x equals _____.

   (A)   110°   (B)   120°

   (C)   130°   (D)   140°

21. If a, b and c are real numbers, then $a^2 + b^2 + c^2 - ab - bc - ca$ _____.

   (A)   is a negative value

   (B)   is always a non-negative value

   (C)   may be positive or may be negative depending on the values of 'a', 'b' and 'c'

   (D)   is always zero

22. In the given figure, O is the centre of the circle in which PQ is the diameter. If $\angle ROS = 40°$, then $\angle RTS$ is _____.

   (A)   50°   (B)   60°

   (C)   70°   (D)   80°

23. Which type of angle do the bisectors of any two consecutive angles of a parallelogram form at the point of intersection?

   (A)   A right angle   (B)   An acute angle

   (C)   An obtuse angle   (D)   A Reflex angle
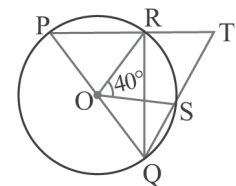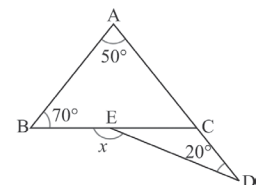
24. O is the centre of the given circle and $\angle DAB = 50°$. Then, _____.

   (A) $x = 100°, y = 120°$
   (B) $x = 100°, y = 130°$
   (C) $x = 90°, y = 130°$
   (D) $x = 90°, y = 120°$
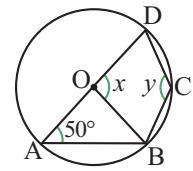
25. In a quadrilateral the angles are in the ratio 2 : 4 : 5 : 7. Which of the following will be the largest angle of such a quadrilateral?
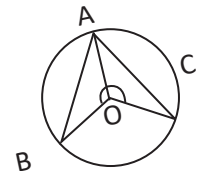
   (A) 120°
   (B) 140°
   (C) 145°
   (D) 150°

26. The sides of a triangle are in the ratio of 3: 5: 7 and its perimeter is 300 cm. Its area will be _____.

   (A) $1000\sqrt{3}$ sq.cm
   (B) $1500\sqrt{3}$ sq.cm
   (C) $1700\sqrt{3}$ sq.cm
   (D) $1900\sqrt{3}$ sq.cm

27. In the given figure, O is the centre of the circle in which $\angle AOB = 110°$ and $\angle AOC = 120°$. Then, $\angle BAC$ equals _____.

   (A) 65°
   (B) 70°
   (C) 72°
   (D) 76°

28. The base of a right triangle is 8 cm and the hypotenuse is 10 cm. Its area will be _____.

   (A) 24 cm^2
   (B) 40 cm^2
   (C) 48 cm^2
   (D) 80 cm^2

29. AB and CD are two parallel chords of a circle such that AB = 10 cm and CD = 24 cm. If the chords are on the opposite sides of the centre and the distance between them is 17 cm, what will be the radius of the circle?

   (A) 9 cm
   (B) 12 cm
   (C) 13 cm
   (D) 16 cm

30. Three cubes each of side 5 cm are joined end to end. The surface area of the resulting cuboid is _____.

   (A) 325 cm^2
   (B) 350 cm^2
   (C) 375 cm^2
   (D) 380 cm^2

31. The perimeter of an equilateral triangle is 300 cm. Find the area of this triangle.

   (A) 1500 cm^2
   (B) 2500√3 cm^2
   (C) 900√3 cm^2
   (D) 2000√3 cm^2

32. A conical tent of base radius 7 m and height 24 m is to be made from a canvas. If the width of canvas is 5 m, then the length required for the canvas roll is _____.

   (A) 110 m
   (B) 120 m
   (C) 125 m
   (D) 130 m

33. Find the volume of the largest right circular cone that can be cut out of a cube of edge 14 cm.

   (A) 690.90 cm^3
   (B) 707.67 cm^3
   (C) 718.67 cm^3
   (D) 749.97 cm^3

34. The temperatures recorded in Delhi in a particular fortnight in a month is given below:

    32.5, 30.5, 33.8, 31.0, 24.0 24.8, 33.4, 32.3, 30.9, 32.5, 37.8, 35.6, 35.7, 36.1, 34.9

    The range of the above data is _____.

    (A) 24.0   (B) 13.8

    (C) 19.3   (D) 17.4

35. The mean of 5 numbers is 21. Find the number that should be added as the 6th number to make the mean 27.

    (A) 48   (B) 50

    (C) 53   (D) 57

Instruction: Q. 36 to 40 are two-key based questions having four options A, B, C and D out of which TWO are correct.

36. If $x = 6 - \sqrt{35}$, then _____.

    (A) $x - \dfrac{1}{x} = -2\sqrt{35}$ (B) $x^2 + \dfrac{1}{x^2} = 142$

    (C) $x + \dfrac{1}{x} = 6$ (D) $x^2 - \dfrac{1}{x^2} = 0$

37. When $x^3 - 2x^2 + ax - b$ is divided by $x^2 - 2x - 3$, the remainder is $x - 6$. The values of a and b respectively are _____.

    (A) 2   (B) −2

    (C) −6   (D) 6

38. If $x = 1$ and $y = 6$ is a solution of the equation $8x - ay + a^2 = 0$, then a equals _____.

    (A) 0   (B) 2

    (C) 4   (D) 6

39. Given three distinct points in a plane, the number of lines that can be drawn by joining them is _____.

    (A) one   (B) two

    (C) three   (D) infinitely many

40. ABCD is a parallelogram in which DP and BQ are perpendiculars on diagonal AC. Then, _____.

    (A) DP = BQ   (B) DP + BQ = AC

   (C) DP + BQ = $\dfrac{3}{2}$AC   (D) ar(ΔAQB) = ar(ΔCPD)
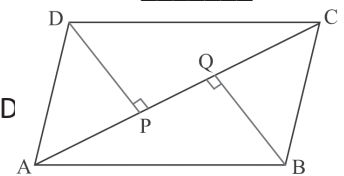
Section C (Competency Enhancement)

Read the story given below and answer Q. No. 41 and 42 based on your reading of the following case study:

Three friends planned a trip to Rishikesh. They couldn't not find a suitable accommodation at reasonable rates due to peak season and huge rush. The weather was fine so they decided to make a conical tent at a park. They had 135 m² cloth with them, so they decided to make the tent with height 3.5m and diameter 7m out of the available cloth.

41. Find the surface area of the tent excluding the base area.

    (A) 54.45 m²   (B) 57.75 m²

    (C) 62.75 m²   (D) 108.90 m²

42. How much cloth was left after being used in the tent?

    (A) 189.45 m²   (B) 101.55m²

    (C) 96.45 m²   (D) 80.55 m²

43. If $x = \sqrt{5} + 2$, then $x^2 - \dfrac{1}{x^2}$ equals _____.

    (A) $6\sqrt{5}$ (B) $7\sqrt{5}$

    (C) $8\sqrt{5}$ (D) $9\sqrt{5}$

44. In the given figure, $\angle$BAD = 78°. Then, x and y equals _____.

    (A) 78°, 102°   (B) 102°, 78°

    (C) 80°, 100°   (D) 100°, 80°
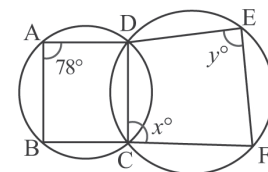
Read the given text and answer question No. 45.

A linear equation in two variables represents a straight line in the plane of variables.

45. Lines which are parallel to the line, $x + y = 0$ are _____.

    (A) $x + y = 2$ (B) $x - y = 2$

    (C) $-x - y = -2$ (D) $-x + y = 2$

46. Area of the shaded region in the given figure is _____.

    (A) 350 sq units   (B) 374 sq units

    (C) 384 sq units   (D) 390 sq units
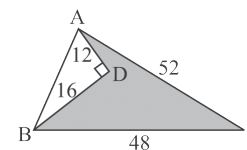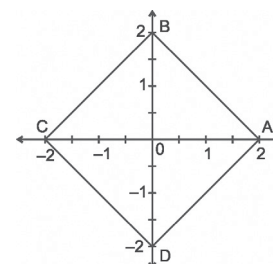
47. ABCD is a quadrilateral with AB = 42 cm, BC = 21 cm, CD = 29 cm, DA = 34 cm and diagonal BD = 20 cm. It's area is _____.

    (A) 546 cm²   (B) 548 cm²

    (C) 550 cm²   (D) 560 cm²

48. In the given figure, which is the longest side?

    (A) BC   (B) AB

    (C) CA   (D) Cannot be found
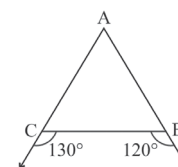
Observe the figure and read the description given below and answer the following questions:

Four children Ansh, Divya, Karan and Rashmi are playing in a square park. They start walking from the centre O of the park in the direction of XOY, X'OY, X'OY' and XOY' and are found at the marked points in the figure.

49. At what coordinates has Ansh stopped?

    (A) (4, 3)   (B) (3, 3)

    (C) (4, 4)   (D) (3, 4)

50. Find the coordinates where Rashmi is standing.

    (A) (2, 3)   (B) (2, 2)

    (C) (2, -3)   (D) (3, 2)