



School Level Examination
SLE 2023

GRADE
10

MATHEMATICS

Subject Code:

2	0	1
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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.

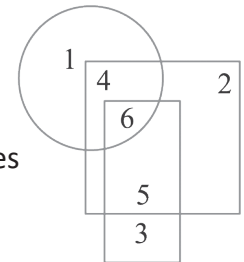
Section A (Logical Reasoning)

1. I went 10 m to the East and turned North to walk another 15 m, then I turned West to cover 12 m. Again I turned to South and covered 15 m. How far am I from my house?

- (A) 1m (B) 2m
(C) 3m (D) 4m

2. In the figure; rectangle, square and circle represent the experienced employees, hard working employees and employees active in trade union respectively. The number 3 represents:

- (A) experienced employees neither hard working nor active with trade union activities
(B) hard working employees
(C) all experienced employees
(D) experienced and hard working employees



3. If 312534 stands for RECORD, then 353 stands for

- (A) ROD (B) COR
(C) ROC (D) ROR

4. The following information is available,

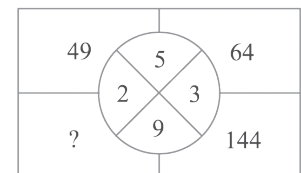
- (i) A, B, C, D and E reside in a five-storey building.
(ii) B and E do not reside on ground floor.
(iii) D resides one storey above A and one storey below C?
(iv) E does not reside on the top floor.

How many of them reside over C?

- (A) 1 (B) 2
(C) 3 (D) Inadequate data

5. The numbers in the circle are according to some order. Identify the missing number.

- (A) 110 (B) 121
(C) 125 (D) 150

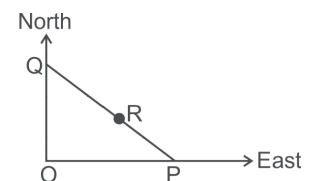


6. Cyclone is related to anticyclone in the same way as flood is related to _____?

- (A) Devastation (B) Havoc
(C) River (D) Drought

7. In the given figure, P is 300 km eastward of O and Q is 400 km north of O. R is exactly in the middle of Q and P. The distance between Q and R is _____.

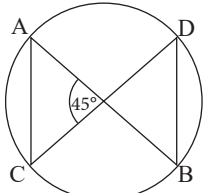
- (A) 250 km (B) $250\sqrt{2}$ km
(C) 300 km (D) 350 km



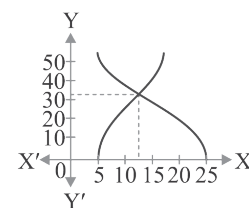
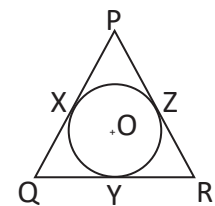
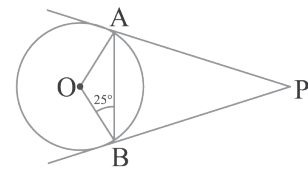
8. Choose the pair in which the words are differently or unusually related.
- (A) Flurry : Blizzard (B) Moisten : Drench
(C) Prick : Stab (D) Scrub : Polish
9. Arrange the given words in the sequence in which they occur in the dictionary and then choose the correct sequence.
1. Liver 2. Long 3. Late
4. Load 5. Luminous 6. Letter
- (A) 3, 1, 6, 2, 4, 5 (B) 3, 1, 6, 2, 5, 4
(C) 3, 6, 1, 2, 4, 5 (D) 3, 6, 1, 4, 2, 5
10. In a queue of children, Kashish is fifth from the left and Mona is sixth from the right. When they interchange their places among themselves, Kashish becomes thirteenth from the left. Then, what will be Mona's position from the right?
- (A) 4th (B) 8th
(C) 14th (D) 15th

Section B (Subject Specific)

11. According to the Fundamental Theorem of Arithmetic, each number can be expressed as a product of _____.
- (A) composite numbers (B) prime numbers
(C) odd numbers (D) even numbers
12. If the zeroes of the quadratic polynomial $ax^2 + bx + c$, where $c \neq 0$, are equal, then _____.
- (A) c and a have opposite signs (B) c and b have opposite signs
(C) c and b have the same sign (D) c and a have the same sign
13. If a pair of linear equations is consistent, then the lines will be _____.
- (A) parallel (B) always coincident
(C) intersecting or coincident (D) always intersecting
14. 4 years back, A's age was 4 times that of B's age. What is A's present age, if after 3 years, B's age will be $\frac{1}{3}$ of A's age?
- (A) 56 years (B) 60 years
(C) 63 years (D) 66 years
15. In which case does the graph of the equation, $y = ax^2 + bx + c$, have shape opening downwards like 'n'?
- (A) $a < 0$ (B) $a > 0$
(C) $a = 0$ (D) $a \leq 0$
16. The area of triangle formed by $x - y + 1 = 0$, $3x + 2y + 5 = 0$ and $x = 0$ is
- (A) 15 sq. units (B) 9 sq. units
(C) 5 sq. units (D) 6 sq. units

17. Which constant must be added and subtracted to solve the quadratic equation $9x^2 + \frac{3}{4}x - \sqrt{2} = 0$ by the method of completing the square?
- (A) $\frac{1}{8}$ (B) $\frac{1}{64}$
(C) $\frac{1}{4}$ (D) $\frac{9}{64}$
18. The first positive term of the AP $-11, -8, -5, \dots$ is
- (A) 5th term (B) 4th term
(C) 3rd term (D) 6th term
19. The value of p for which $(5p + 2), (4p - 1)$ and $(p + 2)$ are in AP is
- (A) 3 (B) 4
(C) 5 (D) 6
20. In the figure, if O is point of intersection of two chords AB and CD such that $OB = OD$, then triangles OAC and ODB are:
- (A) isosceles and similar (B) isosceles but not similar
(C) equilateral and similar (D) equilateral but not similar
- 
21. If the first term of an AP is equal to the common difference and the 2nd term is 10, then find the sum of first 20 terms.
- (A) 1150 (B) 950
(C) 1050 (D) 1000
22. $A(5, 1), B(1, 5)$ and $C(-3, -1)$ are the vertices of $\triangle ABC$. The length of its median AD is
- (A) $\sqrt{34}$ (B) $\sqrt{35}$
(C) $\sqrt{37}$ (D) 6
23. Sides of two similar triangles are in the ratio 1:2. What will be the ratio of the areas of these triangles?
- (A) 1:2 (B) 2:1
(C) 4:1 (D) 1:4
24. The value of $\frac{4\sqrt{3}}{3} \tan 17^\circ \tan 38^\circ \tan 60^\circ \tan 52^\circ \tan 73^\circ$ is
- (A) 4 (B) 2
(C) 8 (D) $4\sqrt{3}$
25. The point $(-3, t)$ divides the line segment joining the points $(-5, -4)$ and $(-2, 3)$ internally in the ratio 2:1. Find the value of ' t '.
- (A) $\frac{1}{3}$ (B) $\frac{2}{3}$
(C) $-\frac{1}{3}$ (D) $-\frac{2}{3}$
26. If $X \sin^3 \theta + Y \cos^3 \theta = \sin \theta \cos \theta$ and $X \sin \theta = Y \cos \theta$, then
- (A) $X^3 + Y^3 = 1$ (B) $X^2 - Y^2 = 1$
(C) $X^2 + Y^2 = 1$ (D) $X^4 + Y^4 = 1$

27. The upper part of a tree, broken by the wind, makes an angle θ with the ground and the distance from the root to the point where the top of the tree meets the ground is y metres. What will be the length of the unbroken part (in metres)?
- (A) $y \tan \theta$ (B) $y \sec \theta$
(C) $y \cos \theta$ (D) $y \cot \theta$
28. If the angles of depression and elevation of the top of a tower of height h from the top and bottom of a second tower are x and y respectively, then the height of the second tower is
- (A) $h (\cot y + \cot x)$ (B) $h (\tan x + \tan y)$
(C) $h (1 + \tan x \cot y)$ (D) $h (\tan y \cot x + 1)$
29. Two tangents are drawn from external point P such that $\angle OBA = 25^\circ$. Then the value of $\angle BPA$ is
- (A) 25° (B) 50°
(C) 75° (D) 130°
30. If a pole $4\sqrt{3}$ m high casts a shadow 12 m long on the ground, then what will be the sun's elevation with respect to the ground?
- (A) 60° (B) 45°
(C) 30° (D) 90°
31. The incircle of $\triangle PQR$ has its centre at point O. If $PX = 3$ cm, $RZ = 4$ cm and its perimeter is 24 cm. Find the length of QY.
- (A) 10 cm (B) 2.5 cm
(C) 6 cm (D) 5 cm
32. A cone, a hemisphere and a cylinder stand on equal bases of radius R and have the same or equal heights H. Their whole surface areas are in the ratio
- (A) $(\sqrt{3} + 1) : 3 : 4$ (B) $(\sqrt{3} + 1) : 7 : 8$
(C) $(\sqrt{2} + 1) : 7 : 8$ (D) $(\sqrt{2} + 1) : 3 : 4$
33. You are provided with the following data: 30, 34, 35, 36, 37, 38, 39, 40. If 35 is removed from the given data, then by how much will the new median be increased?
- (A) 2 (B) 1.5
(C) 1 (D) 0.5
34. In the given graph, the value of median of the data using the graph of less than and more than ogive is
- (A) 12.5 (B) 30
(C) 30.5 (D) 35
35. The probability of guessing the correct answer to a certain test is $\frac{x}{2}$. If the probability of not guessing the correct answer to this question is $\frac{2}{3}$, then find the value of x .
- (A) $\frac{2}{3}$ (B) $\frac{3}{5}$
(C) $\frac{1}{3}$ (D) $\frac{1}{2}$



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. Which of the following real numbers is terminating?

- (A) $\frac{2^2 \times 3^2 \times 7^2}{2^5 \times 5^3 \times 3^2 \times 7}$ (B) $\frac{2^2 \times 5 \times 9 \times 13}{216}$
 (C) $\frac{77}{210}$ (D) $\frac{15}{1600}$

37. The zeroes of the quadratic polynomial $x^2 - 2x - 8$ are

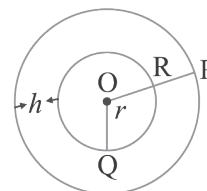
- (A) 2 (B) -2
 (C) 4 (D) -4

38. The two numbers whose sum is 27 and product is 182 are

- (A) 13 (B) -13
 (C) 14 (D) -14

39. The area of a circular path of uniform width 'h' surrounding a circular region of radius 'r' is

- (A) $\pi r(2r + h)$ (B) $\pi h(2r + h)$
 (C) $\pi h(R + h)$ (D) $\pi h(R - r)$



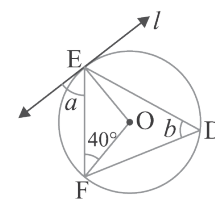
40. If a number is selected at random from the first 100 natural numbers, what will be the probability that the selected number is a perfect cube? Also find the probability of getting a perfect square.

- (A) $\frac{1}{25}$ (B) $\frac{2}{25}$
 (C) $\frac{1}{10}$ (D) $\frac{3}{20}$

Section C (Competency Enhancement)

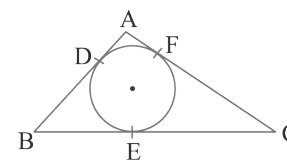
41. Line l is tangent to the circle with centre O at a point E. If $\angle OFE = 40^\circ$, then the value of a is

- (A) 40° (B) 50°
 (C) 60° (D) 80°



42. A circle is inscribed in $\triangle ABC$, having $AB = 10$ cm, $BC = 12$ cm and $CA = 18$ cm touching sides at D, E and F respectively. Then $AD + BE + CF$ is equal to

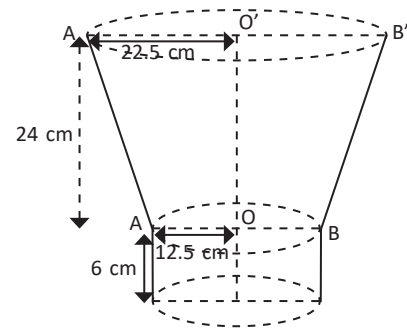
- (A) 16 cm (B) 20 cm
 (C) 22 cm (D) 24 cm



43. If two positive integers p and q can be expressed as $p = ab^2$ and $q = a^3b$; a, b being prime numbers, then LCM (p, q) is

- (A) ab (B) a^2b^2
 (C) a^3b^2 (D) a^3b^3

44. An open metallic bucket in the shape of a frustum of a cone mounted on hollow cylindrical base made of metallic sheet is to be made by a metalsmith. The diameters of two circular ends of the bucket are 45 cm and 25 cm, the total height of the bucket is 30 cm and that of the cylindrical portion is 6 cm. Based on this information, answer the following question:



What is the total surface area of the metallic sheet used to make the bucket?

- (A) 3010 cm^2 (B) 3016.25 cm^2
 (C) 3820.5 cm^2 (D) 3822.5 cm^2
45. This is an Assertion and Reason based question containing STATEMENT-1 (Assertion) and STATEMENT-2 (Reason). Read the following statements and answer accordingly.

Statement-1 (Assertion): The sum of first n even natural numbers is $n(n + 1)$.

Statement-2 (Reason): The sum of first n odd natural numbers is $n(n - 1)$.

- (A) Statement-1 is true, Statement-2 is true; Statement-2 is a correct explanation for Statement-1.
 (B) Statement-1 is true, Statement-2 is true; Statement-2 is not a correct explanation for Statement-1.
 (C) Statement-1 is true, Statement-2 is false.
 (D) Statement-1 is false, Statement-2 is true.
46. The pair of equations $y = 9$ and $y = -7$ has
- (A) one solution (B) two solutions
 (C) infinitely many solutions (D) no solution

Study the text given below and answer the questions from 47 to 50.

A real number ' α ' is called a root of the quadratic equation $ax^2 + bx + c = 0$, $a \neq 0$, if $a\alpha^2 + b\alpha + c = 0$. $x = \alpha$ is a solution of the quadratic equation or that ' α ' satisfies the quadratic equation.

47. The common root of the equation $x^2 - 7x + 10 = 0$ and $x^2 - 10x + 16 = 0$ is
- (A) 2 (B) -2
 (C) 3 (D) 5
48. If the sum and product of the roots of the equation $kx^2 + 6x + 4k = 0$ are equal, then k is
- (A) $\frac{3}{2}$ (B) $\frac{-3}{2}$
 (C) $\frac{2}{3}$ (D) $\frac{-2}{3}$
49. If $\frac{1}{2}$ is a root of the equation $x^2 + kx - \frac{5}{4} = 0$, then the value of k is
- (A) 2 (B) -2
 (C) $\frac{1}{4}$ (D) $\frac{1}{2}$
50. The equation $x^2 - 4x + 1 = 0$ has
- (A) rational roots (B) irrational roots
 (C) natural numbers as roots (D) None of these

