



MATHEMATICS

Grade 9

National Level Examination

NLE 2024

Subject Code:

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Total Questions: 50

Time: 1 hour

DO NOT OPEN THIS BOOKLET UNTIL INSTRUCTED TO DO SO

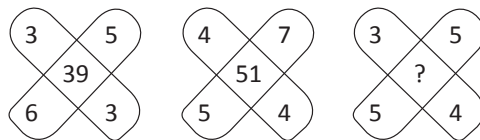
- All questions are compulsory.
- Read the instructions on the **ANSWER SHEET** and fill in your **NAME, CLASS** and **OTHER INFORMATION**.
- To mark your choice of answer by darkening the circles in the **ANSWER SHEET**, use a **BLUE/BLACK BALL PEN** only.
- You **MUST** record your answers on the **ANSWER 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.
- $\frac{1}{2}$ **MARK** will be deducted for every **WRONG ANSWER**.
- 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.



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)

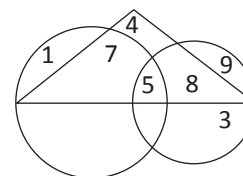
1. Find the number that will take the place of the question mark in the given figure.



- (A) 33 (B) 37
(C) 43 (D) 49
2. The next two numbers in series 28, 25, 7, 21, 18, 7, 14, ..., are _____.
- (A) 10, 8 (B) 10, 7
(C) 11, 8 (D) 11, 7
3. A goldsmith has four metallic articles A, B, C and D, each having a different weight. The description of their weights is as follows:
- (i) A weighs twice as much as B. (ii) B weighs four times as much as C.
(iii) C weighs half as much as D. (iv) D weighs one-fourth of the weight of A.

Which of the following is the heaviest?

- (A) A (B) B
(C) C (D) D
4. In the given Venn diagram, the triangle represents female graduates, small circle represents self-employed females, and the big circle represents self-employed females with bank loan facility.



Which number represents non-graduate self-employed females with bank loan facility?

- (A) 1 (B) 2
(C) 6 (D) 9
5. Observe the given letter series and find how many 'R's are preceded by 'P', but not followed by 'S'?
- S R P R Q R S P R P R P O R P S T P O
- (A) 1 (B) 2
(C) 3 (D) 4
6. Choose the set of numbers from the four alternative sets, that is similar to the given set: (8, 3, 2).
- (A) 10, 6, 5 (B) 63, 8, 3
(C) 95, 24, 5 (D) 168, 15, 4
7. Find the number which will replace the question mark in the given grid.

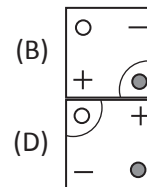
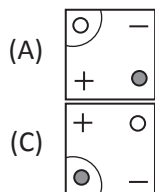
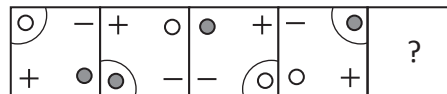
225	64	23
16	1	5
49	81	?

- (A) 256 (B) 64
(C) 32 (D) 16

8. The following information is available regarding the flats allotted to six persons:
- Six flats on a floor in two rows facing North and South are allotted to P, Q, R, S, T and U.
 - Q gets a North facing flat and is not next to S.
 - S and U get diagonally opposite flats.
 - R next to U, gets a South facing flat and T gets a North facing flat.

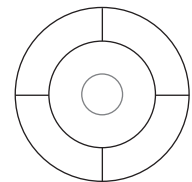
Which of the following combinations gets South facing flat?

- (A) URS (B) STQ
(C) URP (D) Data inadequate
9. Select a figure from the options given below that continues the same series as established by the four problems figures.



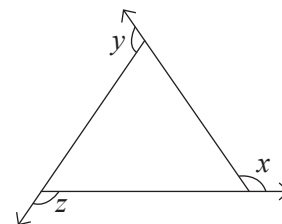
10. What is the minimum number of different colours required to paint the adjoining figure such that no two adjacent regions have the same colour?

- (A) 3 (B) 4
(C) 5 (D) 6



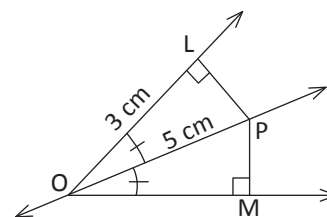
Section B (Subject Specific)

11. When we reverse the order of natural numbers in case of addition and multiplication, then the answer will not be changed. Under which of the following properties does the above-mentioned procedure take place?
- (A) Commutative property (B) Distributive property
(C) Closure property (D) Associative property
12. When 3 times the larger number (x) is divided by the smaller number (y), the quotient and remainder are 2 and 9 respectively, then this can be represented in linear equation as _____.
- (A) $3x = y + 7$ (B) $3x + 2y = 9$
(C) $3x = 2y + 9$ (D) $3x = 2y -$
13. What is the remainder when $3x^4 - 4x^3 - 3x - 1$ is divided by $x - 1$.
- (A) 0 (B) 1
(C) -5 (D) 5
14. In the given figure, $x + y + z$ is equal to _____.
- (A) 200° (B) 180°
(C) 360° (D) 90°
15. What does the line passing through origin $y = -mx$ show?
- (A) Positive slope
(B) Negative slope
(C) Negative slope and lies in the second and fourth quadrant
(D) Negative slope and lies in the first and third quadrant





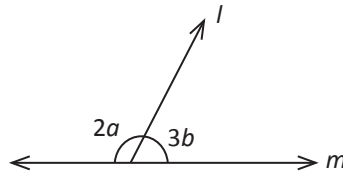
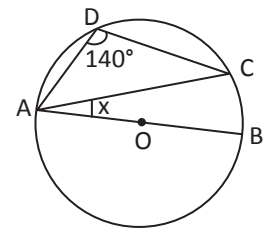
16. Two solid spheres made of the same metal have weights 5920 g and 740 g respectively. Find the radius of the larger sphere, when diameter of the smaller sphere is 5 cm.
 (A) 5 cm (B) 2.5 cm
 (C) 15 cm (D) 10 cm
17. Which of the following coordinates have equal abscissa as well as ordinate?
 (A) (0,0) (B) (-7, -7)
 (C) (5,10) (D) Both A and B
18. A solid cube is cut into two cuboids of equal volume. The ratio of the total surface area of the given cube and that of one of the cuboids is _____.
 (A) 1 : 2 (B) 3 : 2
 (C) 2 : 1 (D) 2 : 3
19. Name the locus of points which is at a same distance from single point.
 (A) Ellipse (B) Rectangle
 (C) Square (D) Circle
20. The product of $\sqrt{24} \cdot \sqrt{3} \cdot \sqrt{2}$ is _____.
 (A) an irrational number (B) a real number
 (C) 144 (D) All of these
21. The two angles which are having a common vertex, a common arm and their non-common arm are on the different sides of the common arm. What are such pairs of angles called?
 (A) Reflex angle (B) Adjacent angles
 (C) Complementary angles (D) Supplementary angles
22. Which of the points A(0, -5), B(4, -3), C(6, 5), D(-4, 3) and E(-2, -5) do not lie in adjacent quadrants?
 (A) A, B, D (B) A, B, C
 (C) A, D, E (D) B, E
23. In the given figure, find the measure of the line segment PM.
 (A) 2 cm (B) 3 cm
 (C) 4 cm (D) 5 cm



24. The taxi fare in the city is as follows: ₹200 for the first eight kilometres and ₹15 for subsequent kilometres. Taking the distance covered as x kilometres and total fare as ₹ y , the linear equation for the above can be represented as _____.
 (A) $y = 200 \times 8 + x$ (B) $y = 200 + 8x$
 (C) $y = 200 + 15x$ (D) $y = 200 + 15(x - 8)$
25. In which of the following cases does the quadrilateral formed by joining the mid-points of the sides of a quadrilateral ABCD taken in order form a square?
 (A) Diagonals of ABCD are perpendicular (B) Diagonals of ABCD are equal and perpendicular
 (C) Diagonals of ABCD are equal (D) ABCD is a rhombus
26. The total number of propositions in “the elements” is _____.
 (A) 465 (B) 460
 (C) 13 (D) 53

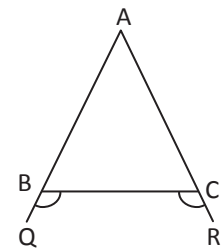


27. In the figure, O is the centre of the circle. If $\angle ADC = 140^\circ$, then find the value of x .
 (A) 50° (B) 55°
 (C) 60° (D) 75°
28. In the given figure, if $a - b = 50^\circ$ then the values of a and b are _____.



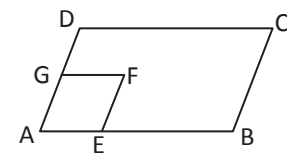
- (A) $a = 110^\circ, b = 60^\circ$ (B) $a = 84^\circ, b = 4^\circ$
 (C) $a = 66^\circ, b = 16^\circ$ (D) $a = 57^\circ, b = 22^\circ$
29. AD is the median of triangle ABC, BE is the median of triangle ABD. BF is the median of triangle ABE. The area of triangle BFE = 9 cm^2 . The area of triangle ABC is _____.
 (A) 18 cm^2 (B) 27 cm^2
 (C) 72 cm^2 (D) 81 cm^2

30. In the given $\triangle ABC$, sides AB and AC are produced to Q and R, such that $\angle QBC > \angle RCB$, then _____.
 (A) $AB > AC$ (B) $AB < AC$
 (C) $AB = AC$ (D) $AB + AC = 5 \text{ cm}$



31. The bisectors of exterior angles at B and C of $\triangle ABC$, meet at O. If $\angle A = x^\circ$, then $\angle BOC =$
 (A) $90 - \frac{x^\circ}{2}$ (B) $90 + \frac{x^\circ}{2}$
 (C) $180 - \frac{x^\circ}{2}$ (D) $180 + \frac{x^\circ}{2}$

32. In the given figure, ABCD and AEFG are two parallelograms. If $\angle C = 55^\circ$, then $\angle AGF$ is _____.
 (A) 55° (B) 35°
 (C) 125° (D) 100°



33. If the mean of $x, x + 3, x + 5, x + 7$ and $x + 10$ is 9 then what is the mean of last three observations?
 (A) $9\frac{4}{5}$ (B) $10\frac{1}{2}$
 (C) $11\frac{1}{3}$ (D) 12

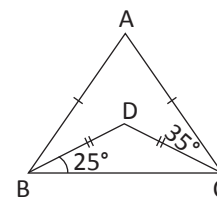
34. Find the semi-perimeter of an isosceles right-angled triangle, whose area is 100 cm^2 .
 (A) $(20 + 20\sqrt{2}) \text{ cm}$ (B) $10(1 + \sqrt{2}) \text{ cm}$
 (C) $(10 + 10\sqrt{2}) \text{ cm}$ (D) $20(1 + \sqrt{2}) \text{ cm}$

35. A well with 10 m inside diameter is dug 14m deep. Earth taken out of it is spread all around it to make an embankment of height $4\frac{2}{3} \text{ m}$. Find the width of the embankment.
 (A) 4 m (B) 4.3 m
 (C) 5 m (D) 6 m



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. Given a polynomial $2x^4 + x^3 - 14x^2 - 19x - 6$, $(x + 1)$ and $(x + 2)$ are its two factors. The other two factors of it are _____.
- (A) $(x + 3)$ (B) $2x + 1$
(C) $(2x - 1)$ (D) $x - 3$
37. When the sum of the all the values of observations is divided by the total number of observations, it is called _____ or _____.
- (A) Mean (B) Median
(C) Mode (D) Average
38. The difference between outside and inside surface areas of a cylindrical metallic pipe 14 cm long is 44 cm^2 . The pipe is made of 99 cm^3 . The inner and outer radii are _____.
- (A) Outer radius 2.5 cm (B) Outer radius 3.00 cm
(C) Inner radius 2.5 cm (D) Inner radius 2.00 cm
39. If the radius of a cone is 7cm and its slant height is 10cm, then which of the following can be the curved surface area of such a cone?
- (A) 0.0022 m^2 (B) 0.022 m^2
(C) 220 cm^2 (D) 220 m^2
40. In the given figure, $\angle ACD = 35^\circ$ and $\angle DBC = 25^\circ$, then _____.
- (A) $\angle ABD = 60^\circ$ (B) $\angle ABD = 35^\circ$
(C) $\angle A = 60^\circ$ (D) $\angle ACD : \angle BCD = 5 : 7$



Section C (Competency Enhancement)

Read the following description and answer the questions 41 and 42:

Beti Bachao, Beti Padhao is a nationwide campaign of the Government of India that focuses on raising awareness and improving the efficiency of welfare services aimed at promoting girls.

41. In a school, group of $(a + b)$ teachers, $(a^2 + b^2)$ girls and $(a^3 + b^3)$ boys organised a campaign on Beti Bachao, Beti Padhao. If in the group, there are 10 teachers and 58 girls, then, find the number of boys.
- (A) 370 (B) 350
(C) 330 (D) 310
42. Use the above information to find the value of $a^2 - b^2$, if $a - b = 2$.
- (A) 100 (B) 58
(C) 20 (D) 10

Read the following description and answer the questions 43 to 45:

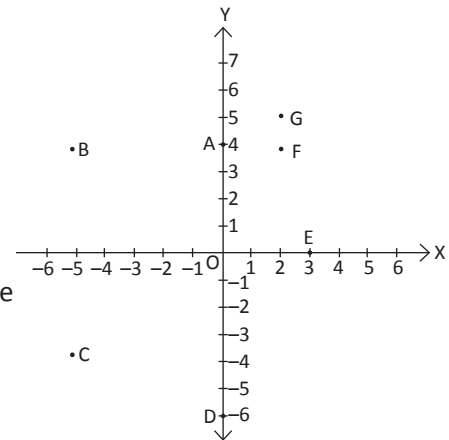
Divya bought 3 frocks and 2 skirts for ₹1300. Her friend Garima guessed the price of each frock to be ₹250. Then three frocks would cost ₹750, the two skirts would cost ₹550 and each skirt could be bought for ₹275. Another friend Priya felt that ₹250 for one frock was too little. It should be at least ₹300. Then the price of each skirt would be ₹200 each. Sneha also bought the same types of frocks and skirts as Divya. She paid ₹1825 for 4 frocks and 3 skirts. Later, Tanvi guessed the cost of one skirt to be ₹225 and Shruti guessed the cost of one frock to be ₹300. But only one of these girls has guessed the correct price.

43. Form the pair of linear equations in two variables from this situation by taking cost of one frock as ₹ x and cost of one skirt as ₹ y .
- (A) $3x + 2y = 1300$ and $4x + 3y = 1825$ (B) $2x + 3y = 1300$ and $4x + 3y = 1825$
(C) $x + y = 800$ and $x + y = 525$ (D) $3x + 2y = 110$ and $4x + 3y = 80$

44. Which of the following is the solution satisfying both the equations formed in Q. 43?
 (A) $x = 300, y = 200$ (B) $x = 250, y = 275$
 (C) $x = 250, y = 350$ (D) $x = 200, y = 300$
45. Find the total cost if they all together purchase the same type of 15 frocks and 12 skirts.
 (A) ₹5825 (B) ₹6075
 (C) ₹6750 (D) ₹7050

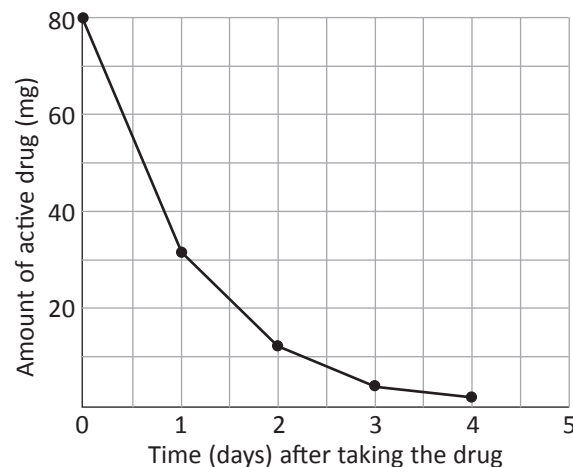
Refer to the given figure to answer the questions from 46 to 48.

46. Ordinate of point B is _____.
 (A) -5 (B) 5
 (C) -4 (D) 4
47. Point identified by (5, 1) is _____.
 (A) C (B) E
 (C) G (D) None of these
48. (Abscissa of F) - 2 (ordinate of B) is equal to _____.
 (A) -1 (B) -6
 (C) -8 (D) 1



Read the following paragraph and answer the PISA based Q. 49 and Q. 50.

Peter has to take 80 mg of a drug to control his blood pressure. The following graph shows the initial amount of the drug, and the amount that remains active in Peter's blood after one, two, three and four days.



49. How much of the drug remains active at the end of the first day?
 (A) 6 mg (B) 12 mg
 (C) 26 mg (D) 32 mg
50. From the graph for the previous question it can be seen that each day, about the same proportion of the previous day's drug remains active in Peter's blood.
 Which of the following is the approximate percentage of the previous day's drug that remains active?
 (A) 10% (B) 20%
 (C) 40% (D) 80%

