OGO
ORANGE GLOBAL OLYMPIAD

School Level Examination
SLE 2024

SET: I

GRADE 9

SCIENCE

Subject Code: 3 0 1

**Total Questions:** 50 **Total Marks:** 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-POINT PEN** only.

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

➢ There are **50 MULTIPLE CHOICE QUESTIONS**. Each question carries one mark. Use the information provided to choose the **BEST** possible answer among the four options. On your **ANSWER SHEET** darken 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.

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 an examination, Ramanna attempted 21 questions correctly and secured 54 marks. If there were two types of questions i.e. of 2 marks and 3 marks, how many questions of 2 marks did he attempt correctly?
   (A) 7
   (B) 11
   (C) 8
   (D) 9

2. Introducing a female, Rohan said, "She is my maternal grandfather's only grandson's wife." How is Rohan related to that female?
   (A) Husband
   (B) Father
   (C) Brother-in-law
   (D) Father-in-law

3. In the following question, find out the alternative which will replace the question mark.
   Flow : River :: Stagnant: ?
   (A) Rain
   (B) Stream
   (C) Pool
   (D) Canal

4. If MATCH is coded as NCWGM and BOX as CQA, then how will NOTEBOOK be coded?
   (A) OQWIGUVS
   (B) OQWICQRO
   (C) OQXJHVWT
   (D) PQWIFTUR

5. In the following question, all the equations have been solved according to a certain rule. You are expected to find the rule and to choose the correct answer out of the given options.
   $4 - 4 = 17, 6 - 6 = 37, 2 - 2 = 5, 5 - 5 = ?$
   (A) 27
   (B) 26
   (C) 20
   (D) 24

6. A man walks 5 m towards South, then 2 m towards East and then 2 m towards South again. He then moves 4 m towards West, and 7 m towards North. Which direction should he take to reach the starting point?
   (A) West
   (B) East
   (C) South
   (D) North

7. In this question, relationship between four different elements is given in the statement. The statement is followed by two conclusions. Analyse the conclusions and select the correct answer.
   Statement: $P \geq Q > R \geq S$ **Conclusion I:** $S \leq P$ **Conclusion II:** $S < Q$
   (A) Both conclusions I and II are true.
   (B) Neither conclusion I nor conclusion II is true.
   (C) Only conclusion II is true.
   (D) Only conclusion I is true.

8. Find the missing terms in the given series.
   aa____b____b____ccdd____
   (A) abbd
   (B) bada
   (C) abcd
   (D) adbc
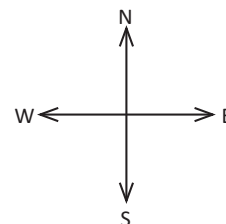
9. If Ankur says, 'Ajay's father, Debu is the only son of my father-in law, Manni', then how is Bina, who is the sister of Ajay, related to Manni?

(A) Niece

(B) Daughter

(C) Wife

(D) Granddaughter

10. Look at this series: 21, 9, 21, 11, 21, 13, 21, ……. What number should come next?

(A) 15

(B) 14

(C) 9

(D) 13

Section B (Subject Specific)

11. Which of the following represents the correct chemical formula?

(A) $CaCl$

(B) Na_2Cl

(C) $NaSO_4$

(D) $AlCl_3$

12. Which of the following parts of the cell regulates the entry and exit of molecules to and from the cell?

(A) Lysosomes

(B) Golgi bodies

(C) Cell membrane

(D) Mitochondria

13. Which of the following is the correct example of circular motion?

(A) Earth and the other planets move around the Sun

(B) Motion of the blades of an electric fan

(C) A stone tied to a strong string is rotated

(D) All of these

14. Which of the following conditions is most favourable for converting gas into liquid?

(A) High pressure, low temperature

(B) Low pressure, low temperature

(C) Low pressure, high temperature

(D) High pressure, high temperature

15. The gravitational force between two objects is F. If masses of both the objects are halved without altering the distance between them, then the gravitational force would become

(A) $\dfrac{F}{4}$

(B) $\dfrac{F}{2}$

(C) F

(D) $2F$

16. Which of the following are components of phloem?

I. Vessels

II. Sieve tube

III. Parenchyma

IV. Companion cells

(A) I and II

(B) II, III and IV

(C) I, III and IV

(D) I, II, III and IV

17. Match the following and select the correct option.

Column I	Column II
a. Intercropping	(i) Growing two or more crops simultaneously on a piece of land
b. Mixed cropping	(ii) Growing different crops in pre-planned succession
c. Crop rotation	(iii) Growing two or more crops in definite row patterns

(A) a-(i), b-(ii), c-(iii)

(B) a-(iii), b-(ii), c-(i)

(C) a-(iii), b-(i), c-(ii)

(D) a-(ii), b-(iii), c-(i)

18. An ion with mass number 37 has one unit negative charge. If the ion has 11.1% more neutrons than electrons, then which ion is it?
    (A) Cl^-
    (B) Br^-
    (C) I^-
    (D) F^-

19. The unit of measuring momentum of a moving body is
    (A) m/s
    (B) kg·m/s
    (C) kg·m/s^2
    (D) m^2/kg^2

20. Which technique is used to separate blood cells from plasma?
    (A) Evaporation
    (B) Sublimation
    (C) Centrifugation
    (D) Filtration

21. The dimensions of a metallic cuboid are 30 cm × 20 cm × 10 cm and its mass is 50 kg. If the acceleration due to gravity is 10 m s^{-2}, calculate the pressure exerted by the cuboid when it is resting on the face having sides 20 cm × 10 cm on a table.
    (A) 1×10^4 Pa
    (B) 2×10^4 Pa
    (C) 2.5×10^4 Pa
    (D) 5×10^4 Pa

22. How many oxygen atoms are there in 0.5 mol of calcium carbonate ($CaCO_3$)?
    (Atomic masses: Ca = 40 u, C = 12 u, O = 16 u)
    (A) 1.51×10^{23} atoms
    (B) 3.01×10^{23} atoms
    (C) 6.02×10^{23} atoms
    (D) 9.03×10^{23} atoms

23. Which of the following cell organelles has its own DNA?
    (A) Endoplasmic reticulum
    (B) Golgi apparatus
    (C) Lysosome
    (D) Mitochondria

24. Match the physical quantities with their definitions and select the correct option.

Column I	Column II
(a) Velocity	(i) Energy possessed by a body due to its motion
(b) Acceleration	(ii) Product of mass and velocity
(c) Momentum	(iii) Rate of change of velocity
(d) Kinetic Energy	(iv) Rate of change of displacement

    (A) (a)-(ii), (b)-(i), (c)-(iv), (d)-(iii)
    (B) (a)-(iii), (b)-(iv), (c)-(ii), (d)-(i)
    (C) (a)-(iv), (b)-(i), (c)-(iii), (d)-(ii)
    (D) (a)-(iv), (b)-(iii), (c)-(ii), (d)-(i)

25. A ball weighs 4 kg and its density is 1000 kg m^{-3}. It is completely immersed in water of density 10^3 kg m^{-3}. What is its force of buoyancy? (g = 10 m s^{-2})
    (A) 4 N
    (B) 40 N
    (C) 400 N
    (D) 4000 N

26. Which type of epithelial tissue is shown in the image?
    (A) Squamous
    (B) Stratified squamous
    (C) Cuboidal
    (D) Columnar
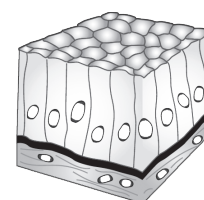
27. Which of the following statements about the electron is incorrect?
    (A) It is a negatively charged particle.
    (B) The mass of the electron is equal to the mass of the neutron.
    (C) It is a basic constituent of all atoms.
    (D) It is a constituent of cathode rays.

28. The distance which a compression or a rarefaction travels per unit of time gives _____.
    (A) The density of sound wave
    (B) Speed of sound
    (C) Wavelength of sound
    (D) Frequency of sound

29. A force of 5 N produces an acceleration of 10 m s^{-2} on mass m_1 kg and acceleration of 30 m s^{-2} on mass m_2 kg. What will be acceleration which would provide the same force if both masses are tied together?
    (A) 6 m s^{-2}
    (B) 7.5 m s^{-2}
    (C) 5 m s^{-2}
    (D) 15 m s^{-2}

30. Which of the following statements indicates that a substance is pure?
    (A) It can be separated into two or more components by physical methods.
    (B) It has a fixed melting point and boiling point.
    (C) It changes colour when mixed with water.
    (D) It is a mixture of substances with different properties.

31. Adipose tissue is specialised for
    (A) Transporting oxygen in the bloodstream
    (B) Transmitting electrical impulses
    (C) Contracting and relaxing to produce movement
    (D) Storing fat and providing insulation.

32. SONAR stands for _____.
    (A) Sound Navigation and Reflection
    (B) Sound Navigation and Ranging
    (C) Sound Navigation and Refraction
    (D) Sound Navigation and Rating

33. A student observed that certain cells in a plant stem contain large, central vacuoles that occupy most of the cell's volume. What is the function of these vacuoles?
    (A) Storage of water and organic substances
    (B) Synthesis of proteins
    (C) Breakdown of cellular waste
    (D) Production of ATP

34. When a bottle of perfume is opened in a room, the smell of its vapours spreads in the entire room. Which property of gases is responsible for this behaviour of perfume vapours?
    (A) Compressibility
    (B) Diffusion
    (C) Low density
    (D) All of these

35. Rahul can run with a speed 8 m s^{-1} against a frictional force of 10 N and Nitin can run with a speed of 5 m s^{-1} against a frictional force of 25 N. Who has more power?
    (A) Rahul
    (B) Nitin
    (C) Both have equal power
    (D) Both have zero power

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 are monoatomic?

    (A) Sulphur
    (B) Neon
    (C) Argon
    (D) Chlorine

37. A stone is falling freely through the air. The acceleration of free fall is 9.8 m s^{-2}. Ignoring air resistance, what happens to the stone each second during the fall?

    (A) The acceleration of the stone is constant at 9.8 m s^{-2}.
    (B) The speed of the stone increases by 9.8 m s^{-1}.
    (C) The stone travels distance of 9.8 m.
    (D) The stone moves at a speed of 9.8 m s^{-1}.

38. A student conducted an experiment to study the effect of different solutions on a plant cell. He observed the following results:
    Solution A: The cell swelled up and its size increased.
    Solution B: The cell shrank and it appeared wrinkled.

    Which cellular structures were primarily affected by these solutions?

    (A) Nucleus
    (B) Cell membrane
    (C) Chloroplast
    (D) Vacuole

39. Which of the following statements about velocity and acceleration are correct?

    (A) Velocity is a vector quantity that includes both speed and direction.
    (B) Acceleration is the rate of change of velocity over time.
    (C) Velocity is always positive when an object is moving.
    (D) Acceleration is always positive when an object slows down.

40. Which of the following statements about subatomic particles are correct?

    (A) Protons have a positive charge.
    (B) Neutrons have no charge.
    (C) Electrons are located in the nucleus of the atom.
   (D) Electrons have a positive charge.

Section C (Competency Enhancement)

41. A person falls in forward direction on the sudden stopping of the car if brake is applied. This is due to

    (A) Newton's Second Law of Motion
    (B) Newton's First Law of Motion
    (C) Newton's Third Law of Motion
    (D) Law of Universal Gravitation.

42. Which of the following cells are not found in cartilaginous tissue of the body?

    I. Mast cells
    II. Basophils
    III. Osteocytes
    IV. Chondrocytes

    (A) I, II and IV
    (B) I, II and III
    (C) II, III and IV
    (D) I, III and IV

43. Which of the following best describes the concept of inertia?

    (A) The ability of an object to do work
    (B) The resistance of an object in its state of rest or motion
    (C) The force required to accelerate an object
    (D) None of the above

44. The given diagram represents the arrangement of molecules in a substance at 1 atm pressure and at two different temperatures.
Which of the following best describes the given diagrams?

−160°C   −100°C

	Melting point	Boiling point
(P)	−188°C	−90°C
(Q)	−180°C	−162°C
(R)	−170°C	−108°C
(S)	−118°C	−80°C
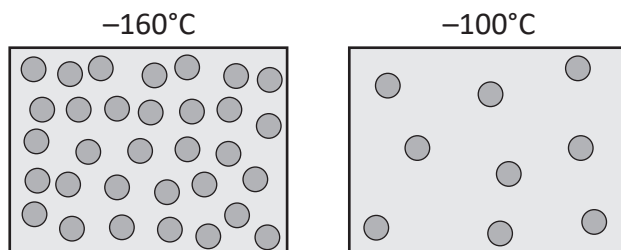
(A) P
(B) Q
(C) R
(D) S

45. Waves of frequency 220 Hz are produced in air. If the speed of sound in air be 330 m s^{-1}, what will be its wavelength?

(A) 1.5 m
(B) 0.375 m
(C) 0.038 m
(D) 0.187 m

46. Two chemical species 'P' and 'Q' combine to produce 'R'. If 'P' and 'Q' cannot be broken down into simple substances, then which of the following statements about 'P', 'Q' and 'R' are correct?
  I. R is a compound.
  II. P and Q are compounds.
  III. R has fixed composition.
  IV. P and Q are elements.

(A) I and II only
(B) I, II and III only
(C) I, III and IV only
(D) None of these

47. In the reaction, $Mg + 2HCl \longrightarrow MgCl_2 + H_2$, the volume of H_2 obtained at STP by treatment of 0.12 g of Mg with excess of dilute HCl is
(Atomic masses: Mg = 24 u, H = 1 u, Cl = 35.5 u)

(A) 56 mL
(B) 224 mL
(C) 112 mL
(D) 448 mL

48. On examining a slide of a transverse section of a plant stem under a microscope, Surabhi observes that the cells are elongated and irregularly thickened at the corners with very little intercellular spaces in between them. Which tissue is Surabhi observing?

(A) Collenchyma
(B) Parenchyma
(C) Sclerenchyma
(D) Xylem

49. A student drops a ball and a feather simultaneously from the same height in a vacuum chamber. What will the student observe about their motion?

(A) The ball falls faster than the feather.
(B) The feather falls faster than the ball.
(C) Both the ball and feather fall with the same speed.
(D) The ball falls and the feather floats.

50. Read the following statements and select the correct option.
Statement 1: The electrons in the outermost shell of an atom are called its valence electrons.
Statement 2: The valence electrons take part in chemical reactions.

(A) Both statements 1 and 2 are correct.
(B) Both statements 1 and 2 are incorrect.
(C) Statement 1 is correct but statement 2 is incorrect.
(D) Statement 1 is incorrect but statement 2 is correct.