ORANGE GLOBAL OLYMPIAD

School Level Examination

SLE 2024

SET: I

GRADE 10

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)

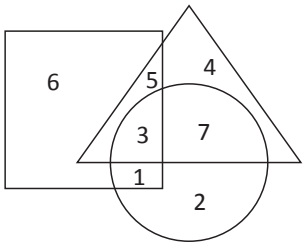
1. The letters L, M, N, O, P, Q, R, S and T are substituted by nine integers 1 to 9 in ascending order but 4 is assigned to P, the difference between P and T is 5 and the difference between N and T is 3. What is the integer assigned to N?
   (A) 4 (B) 5
   (C) 6 (D) 7

2. Select the related word from the given alternatives.
   Planet : Orbit :: Projectile: ?
   (A) Trajectory (B) Track
   (C) Milky way (D) Path

3. For the given series: TFB, QGD, NHG, _____, find the right alternative that can fill in the blank space.
   (A) NIJ (B) KIK
   (C) NJK (D) PJK

4. In a family there are husband, wife, two sons and two daughters. All the men were out to a party. Mother went out for shopping with a daughter. Who was at home?
   (A) Only wife was at home. (B) All ladies were at home.
   (C) All sons were at home. (D) Out of two, one daughter was at home.

5. In the given figure:
   - Triangle shows 'cartoon lovers'.
   - Square shows 'Hollywood lovers'.
   - Circle shows 'adventure lovers'.

   Which number represents the adventurous student(s), who like(s) only Hollywood movies?
   (A) 2 (B) 1
   (C) 3 (D) 5

6. There are five books P, Q, R, S and T placed on a table. If P is placed below Q, R is placed above S and T is placed between P and R, then which of the following books touches the surface of the table?
   (A) S (B) Q
   (C) P (D) T

7. Three among the four are alike in the given set. Which one does not belong to that set?
   Q * 7, R Σ 3, 6 @ M, P # 8
   (A) Q * 7 (B) R Σ 3
   (C) 6 @ M (D) P # 8

8. BLACK is coded as 2121311, then code for WHITE is _____.
   (A) 2398025 (B) 3298205
   (C) 2389205 (D) 2320985

9. If D = 4, and STARS = 77, then PARKS = ?
   (A) 55 (B) 65
   (C) 49 (D) 4

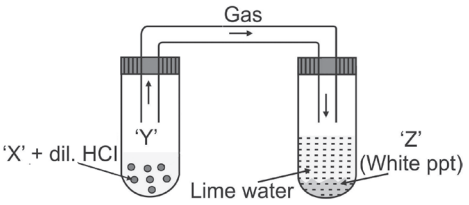
10. Which number can replace the question mark?

5	5	5	5
8	9	3	**?**
6	4	9	7
0	1	2	6

   (A) 1 (B) 0
   (C) 6 (D) 2

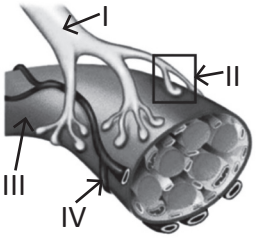
Section B (Subject Specific)

11. Observe the given diagram carefully and identify 'X', 'Y' and 'Z'.



   (A) 'X' is Na_2CO_3, 'Y' is CO, 'Z' is $CaCO_3$
   (B) 'X' is NaCl, 'Y' is Cl_2, 'Z' is Na_2CO_3
   (C) 'X' is K_2CO_3, 'Y' is CO_2, 'Z' is $CaCO_3$
   (D) 'X' is $CaCO_3$, 'Y' is CO_2, 'Z' is $Ca(OH)_2$

12. Identify parts labelled as I, II, III and IV in the given diagram and select the correct option.



   (A) I-Axon, II-Muscle Fibre, III-Capillary, IV-Neuro-muscular Junction
   (B) I-Neuro-muscular Junction, II-Axon, III-Muscle Fibre, IV-Capillary
   (C) I-Axon, II-Neuro-muscular Junction, III-Muscle Fibre, IV-Capillary
   (D) I-Muscle Fibre, II-Axon, III-Capillary, IV-Neuro-muscular Junction

13. Which of the following parameters of light does not change when a ray of light travels from a rarer medium to denser medium?
   (A) Wavelength (B) Speed
   (C) Frequency (D) Both (A) and (C)

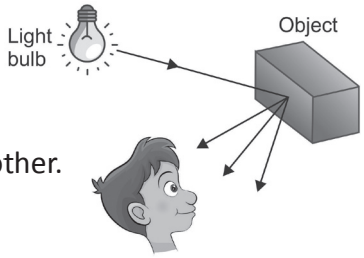
14. A compound contains 75% carbon and remaining hydrogen. It is used as a clean fuel, burns with blue flame and does not decolourise bromine water. The compound is _____.
   (A) C_2H_2 (B) C_2H_6
   (C) CH_4 (D) C_2H_4

15. Which of the following is not a STD (Sexually Transmitted Disease)?
   (A) Gonorrhoea (B) Syphilis
   (C) AIDS (D) Chikungunya

16. Which of the following will not react completely with dilute H_2SO_4 to form a salt and hydrogen gas?
   (A) Lead (B) Sodium
   (C) Calcium (D) Magnesium

17. Which of the following devices uses an electric motor?
   (A) Water pump (B) Washing machine
   (C) Electric mixer (D) All of these

18. Which of the following statements are true?



I. Light is a form of energy.
II. Light travels in a straight line.
III. Reflection occurs when light bounces off the surface of objects.
IV. Reflection occurs when light bends as it passes from one medium to another.

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

19. Which type of organic compounds undergo esterification reactions?

(A) Alkane + Acid
(B) Alkene + Acid
(C) Alcohol + Acid
(D) Aldehyde + Acid

20. Identify the correct terms for the following statements.

I. The process of transfer of pollen grains from anther to stigma.
II. The fusion of male and female gametes to form zygote.
III. The site of fertilisation.
IV. The product of fertilisation.

(A) I-Zygote, II-Fertilisation, III-Pollination, IV-Ovule
(B) I-Pollination, II-Zygote, III-Fertilisation, IV-Ovule
(C) I-Pollination, II-Fertilisation, II-Zygote, IV-Ovule
(D) I-Pollination, II-Fertilisation, III-Ovule, IV-Zygote

21. What happens when magnesium ribbon is burned in the air?

(A) The ribbon becomes softer.
(B) The ribbon loses its metallic lustre and forms a white powder.
(C) The ribbon remains unchanged.
(D) The ribbon turns black.

22. A potential difference of 6 V drives a current of 5 A through a resistor for 10 min. How much electrical energy is converted into heat?

(A) 18 kJ
(B) 18 J
(C) 180 J
(D) 1800 J

23. Which hormone regulates formation of sperms?

(A) Estrogen
(B) Progesterone
(C) Oxytocin
(D) Testosterone

24. Classify the given salts into acidic, basic and neutral.

I. $PbCl_2$, $PbSO_4$, $CaSO_4$, AgCl, $AgNO_3$, $FeCl_3$, $CuSO_4$, NH_4Cl
II. CH_3COONa, Na_2CO_3, K_2CO_3, $NaHCO_3$, $Ca(HCO_3)_2$, $MgCO_3$
III. NaCl, KCl, $NaNO_3$, Na_2SO_4, K_2SO_4, KNO_3

(A) I-Basic, II-Acidic, III-Neutral
(B) I-Acidic, II-Basic, III-Neutral
(C) I-Neutral, II-Acidic, III-Basic
(D) I-Acidic, II-Neutral III-Basic

25. Which of the following statements is correct regarding the propagation of different coloured components of white light in vacuum?

(A) Red light moves fastest
(B) Blue colour moves slowest
(C) All the colours move with same speed
(D) Yellow light moves faster than green light

26. Read the following and select the correct option:
Assertion (A): Metals are good conductors of electricity.
Reason (R): Metals have a large number of free electrons that can move freely.
(A) Both A and R are correct and R is correct explanation of A.
(B) Both A and R are correct but R is incorrect explanation of A.
(C) A is correct but R is incorrect.
(D) Both A and R are incorrect.

27. Two pea plants one with round, green seeds (RRyy) and another with wrinkled, yellow seeds (rrYY) produce F_1 progeny that have round, yellow seeds (RrYy). When F_1 plants are selfed, the F_2 progeny will have new combinations of characters. Choose the new combinations, apart from parental combination from the following.
(i) Round, yellow
(ii) Round, green
(iii) Wrinkled, yellow
(iv) Wrinkled, green
(A) (i) and (ii)
(B) (i) and (iv)
(C) (ii) and (iii)
(D) (i) and (iii)

28. Which of the following statements are correct?
I. Veins carry blood towards the heart.
II. Arteries carry blood away from the heart.
III. White blood cells protects the body from harmful infections.
IV. Platelets cause blood clotting to stop bleeding.
(A) Only I and II
(B) Only II and III
(C) Only I, II and III
(D) I, II, III and IV

29. When a beam of white light passes through a prism, then what happens to the emerging light?
(A) It forms a single colour.
(B) It remains white.
(C) It splits into a spectrum of colours.
(D) It reflects back into the prism.

30. During an experiment, when an unsaturated hydrocarbon was reacted with hydrogen in the presence of a catalyst, production of ethane was observed. Which type of reaction occurred during the experiment?
(A) Substitution reaction
(B) Addition reaction
(C) Polymerisation reaction
(D) Combustion reaction

31. An object is placed at the focus of a convex lens. What will be the nature and size of the image formed by the lens?
(A) Real, inverted and diminished
(B) Virtual, erect and magnified
(C) Real, inverted and magnified
(D) Virtual, erect and diminished

32. In human beings, the statistical probability of getting either a male or female child is 50:50. What could be the most appropriate reason for this?
(A) Human males are heterogametic.
(B) Human females are homogametic.
(C) Human males are homogametic.
(D) Human females are heterogametic.

33. A student pours equal volumes of sodium hydroxide (NaOH) solution and hydrochloric acid (HCl) solution in a beaker. What type of reaction will occur after mixing them thoroughly?
(A) Exothermic reaction
(B) Endothermic reaction
(C) Decomposition reacion
(D) No reaction will occur

34. A light bulb operates at 120 V and draws a current of 0.5 A. What is the power consumed by the bulb?
(A) 60 W (B) 40 W
(C) 240 W (D) 80 W

35. From the following select the biotic factors.
I. Sunlight II. Temperature
III. Autotroph IV. Decomposer
V. Soil VI. pH level
(A) I and II only (B) III and VI only
(C) IV, V and VI only (D) III and IV only

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 statement about myopia (near-sightedness) is correct?
(A) It is corrected by using a convex lens. (B) The image of objects forms behind the retina.
(C) It is caused by the elongation of the eyeball. (D) It is corrected by using a concave lens.

37. Select the correct options.
(A) Ethanol is colourless, volatile liquid and is a good solvent.
(B) Boiling point of ethanol is 351 K.
(C) Ethanol changes red litmus blue.
(D) Ethanol on combustion produces hydrogen gas.

38. Which of the following are the functions of the large intestine?
(A) Absorption of water (B) Production of digestive enzymes
(C) Formation of feces (D) Digestion of proteins

39. When light travels from air into water, which of the following will occur?
(A) The light will bend towards the normal. (B) The light will bend away from the normal.
(C) The speed of light will decrease. (D) The wavelength of light will increase.

40. Which of the following are correctly matched?
(A) Quicklime reacts with water – Combination reaction
(B) Marble is heated – Decomposition reaction
(C) Ammonia reacts with HCl – Displacement reaction
(D) Burning of magnesium ribbon – Double-displacement reaction

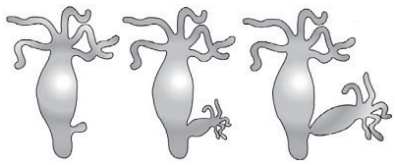
Section C (Competency Enhancement)

41. Match the acids given in column I with their correct sources given in column II.

Column I	Column II
(a) Lactic acid	(i) Tomato
(b) Formic acid	(ii) Curd
(c) Acetic acid	(iii) Red ants
(d) Oxalic acid	(iv) Vinegar

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

42. Identify the type of reproduction shown in the given diagram, its advantage and the species that exhibits the same type of reproduction.



(A) Asexual reproduction by budding, Rapid multiplication, Yeast
(B) Binary fission, Occurs during favourable conditions, *Plasmodium*
(C) Regeneration, Involves one parent, *Planaria*
(D) Fragmentaion, Gametes not required, *Spirogyra*

43. What is the function of pupil?
(A) To provide an individual with eye colour
(B) To control the amount of light entering the eye
(C) To hold lens on position
(D) To focus the image of the object

44. 'X' is a white compound that combines with water and sets as a hard mass. It is also used in hospitals to keep fractured bones in fixed position. Identify 'X'.
(A) Plaster of Paris (B) Washing soda
(C) Bleaching powder (D) Caustic soda

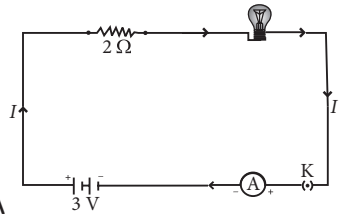
45. What role does the sensory neuron play during reflex action?
(A) It carries impulses from the brain to the muscle.
(B) It carries impulses from the muscle to the brain.
(C) It carries impulses from the sensory receptor to the central nervous system.
(D) It carries impulses from the spinal cord to the effector.

46. There is an apparent shift in the position of the Sun at sunrise compared to its actual position. What causes this apparent shift?
(A) Diffraction of sunlight (B) Reflection of sunlight
(C) Dispersion of sunlight (D) Refraction of sunlight

47. A student observes that after electrolytic refining of copper, the impurities from the anode have settled at the bottom of the electrolyte solution. What does this observation indicate?
(A) Impurities remain unchanged (B) Impurities float on the surface
(C) Impurities dissolve in the solution (D) Impurities are removed from the anode

48. How many chromosomes are present respectively in each of the following cells in a human?
I. Brain cell II. Sperm cell
III. Skin cell IV. A fertilised egg
(A) 46, 46, 23, 23 (B) 46, 23, 46, 46
(C) 46, 23, 46, 23 (D) 46, 46, 23, 46

49. A bulb having a resistance of 10 Ω and a conductor of resistance of 2 Ω are connected to a 3 V battery. The total resistance of the circuit and the current through the circuit is



(A) R = 10 Ω, I = 0.50 A (B) R = 2 Ω, I = 0.75 A
(C) R = 12 Ω, I = 0.25 A (D) R = 12 Ω, I = 0.75 A

50. If both parents have detached earlobes (recessive trait), what is the probability that their child will have attached earlobes?
(A) 0% (B) 25%
(C) 50% (D) 75%