CAPT. ZILE SINGH SCHOOL

Fully Centralized **AC School** for Boys & Girls

OLYMPIAD EXAM : CLASS 10TH

Time Duration : 1 Hours **Max. Marks :** 50

1. Fill in the blank :
   During sunrise and sunset, Sun appears reddish-orange, because _____.
   (a) during that time Sun emits only reddish-orange light
   (b) all other colours are absorbed by the atmosphere
   (c) reddish-orange light is least scattered by the atmosphere
   (d) all other colours apart from reddish-orange are reflected back by the atmosphere
2. Rays from the sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object?
   (a) 15 cm in front of the mirror (b) 30 cm in front of the mirror
   (c) Between 15 cm and 30 cm in front of the mirror (d) More than 30 cm in front of the mirror
3. Identify the oxidising agent in the following equation:
   $HAsO_2$ (aq) + Sn^{2+} (aq) + H^+ (aq) $\rightarrow$ As (s) + Sn^{4+} (aq) + H_2O (I)
   (a) $HAsO_2$ (aq) (b) Sn^{2+} (aq) (c) H^+ (aq) (d) Sn^{4+} (aq)
4. Which of the following is not correct about baking soda?
   (a) It is used in soda-acid fire extinguisher. (b) It is added for faster cooking.
   (c) It is a corrosive base. (d) It neutralises excess acid in the stomach.
5. Identify the correct increasing order of electronegativity among the following elements:
   (a) F < O < N < C (b) O < N < C < F (c) C < N < F < O (d) C < N < O < F
6. Fill in the blank:
   Metals used to make wires for safety fuses must have _____.
   (a) very low resistivity and high melting point (b) high resistivity and low melting point
   (c) low resistivity and low melting point (d) high resistivity and high melting point
7. When H_2S is passed through an ammonical salt solution X, a pink precipitate is obtained. X can be a _____.
   (a) Co^{2+} solution (b) Mn^{2+} solution (c) Ni^{2+} solution (d) Zn^{2+} solution
8. Ordinary gasoline (petrol) that is used as fuel for cars, scooters and automobiles contains many different chemicals that are added in small quantities, each performing an important role. Some of these are mentioned here. Which is the incorrect statement?
   (a) Soaps for removing particles of grease from petrol tanks ensure a free flow of petrol.
   (b) Anti-icing agents for depressing the freezing point of particles of ice.
   (c) Anti-rust agents for protection against corrosion by water.
   (d) Detergents for preventing gums from sticking on the walls of the carburetor.
9. Which of the following statements about sexual reproduction in flowering plants are correct?
   I. Stamen is present in the centre of the flower.
   II. Stamen produces pollen grains in the ovary.
   III. The swollen bottom part of carpel is the ovary.
   IV. The fusion of germ cells gives rise to a zygote.
   (a) III and IV (b) II and IV (c) I and III (d) All of these
10. A convex lens is placed between an object and a screen. The magnification produced due to the lens is 2. If the distance between the object and the screen is 45 cm, then calculate its focal length (in cm) :

(a) 20 (b) 10 (c) 29 (d) 30

11. Identify the reaction (s) that occur during the light phase :
(a) Absorption of light by chlorophyll (b) Photolysis of water
(c) Reduction of NADP (d) All of the above

12. Which of the following steps in cellular respiration is associated with the release of maximum number of ATP molecules?
(a) Glycolysis (b) Kerb's cycle (c) Oxidative phosphorylation (d) Reduction of NADP

13. Identify the process in which roots are grown from the part of the stem that is converged with the soil and a new plant is originated :
(a) Grafting (b) Layering (c) Cutting (d) Both (a) and (b)

14. In the following question, an assertion and a reason are given. Choose the correct option :
Assertion (A): The heart in human beings is present in a fluid-filled pericardial.
Reason (R): Pericardial fluid transports nutrients to the heart.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true, but R is not the correct explanation for A.
(c) A is true and R is false
(d) A is false and R is true

15. In the following question, an assertion and a reason are given. Choose the correct option :
Assertion (A): F1 generation progenies can show an intermediate expression between dominant and recessive characters.
Reason (R): The cross involves the phenomenon of codominance.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true, but R is not the correct explanation for A.
(c) A is true and R is false.
(d) A is false and R is true.

16. In the following question, an assertion and a reason are given. Choose the correct option :
Assertion (A): In grasshopper, the male individual determines the sex of the offspring.
Reason (R): All organisms show male heterogamete.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true, but R is not the correct explanation for A.
(c) A is true and R is false.
(d) A is false and R is true.

17. Fill in the blank :
According to the evolutionary theory, the formation of a new species is generally due to _____.
(a) sudden creation by nature (b) accumulation of variations over several generations
(c) clones formed during asexual reproduction (d) movement of individuals one habitat to another

18. Consider the following statements and choose the correct option :
Statement 1: Solar energy is the universal source of energy. It is converted into chemical energy by green plants.
Statement 2: Glass sheet is the part of the solar cooker which is responsible for the greenhouse effect.
(a) Statement 1 is correct and statement 2 is incorrect.
(b) Statement 1 is incorrect and statement 2 is correct.
(c) Both the statements are correct.
(d) Both the statements are incorrect.

19. Fill in the blank:
Burning of waste products at a high temperature to form ash reduces waste disposal is called _____.
(a) composting (b) sewage treatment (c) recycling (d) incineration

20. Identify the correct statement about renewable natural resource :
(a) It gets exhausted soon. (b) It requires millions of years to replenish.
(c) It reappears at the rate it is used. (d) It cannot be replenished within a short period.

21. In the following question, an assertion and a reason are given. Choose the correct option:
Assertion (A): Sodium hydroxide reacts with zinc to produce hydrogen gas.
Reason (R): Acids reacts with active metals to produce hydrogen gas.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true, but R is not the correct explanation for A.
(c) A is true and R is false.
(d) A is false and R is true.

22. Which one of the following process is a digestive process which occurs in living organisms?
(a) Decomposition of protein in amino acids
(b) Decomposition of glucose into CO_2 and H_2O
(c) Transformation of glucose into glycogen
(d) Transformation of amino acids into protein

23. Choose the correct option and complete the following sentence :
The existence of an element in different allotropic forms is due to the _____.
1. different arrangement of atoms
2. different amounts of energy associated in the formation of each allotrope
3. different methods of formation
(a) 1 only (b) 2 and 3 only (c) 1 and 3 only (d) 1, 2 and 3

24. An element belongs to IIIA group and fourth period in the modern periodic table. What could be the probable atomic number of that element?
(a) 23 (b) 49 (c) 31 (d) 13

25. The ratio of the resistance of two resistors A and B connected in series is 1 : 4 and the current passing through them is 10 A. Calculate the ratio of current that flows through them when connected in parallel:
(a) 4 : 1 (b) 1 : 4 (c) 1 : 2 (d) 2 : 1

26. Which of the following chemical equations is balanced correctly?
(a) $SO_3 + 2H_2O \rightarrow H_2SO_4$
(b) $6NaOH + 12S \rightarrow 2Na_2S_5 + Na_2S_2O_3 + 3H_2O$
(c) $Cu + 2S \rightarrow Cu_2S$
(d) $S + 4HNO_3 \rightarrow H_2SO_4 + 4NO_2 + 2H_2O$

27. Identify the correct order of variation in atomic size :
(a) Be > C > F > Ne (b) Be > C > F < Ne (c) Be < C < F < Ne (d) F < Ne < Be < C

28. Which of the following pair of compounds are functional isomers?
(a) $CH_3CH_2CH_2OH$, $CH_3CH(OH)CH_3$
(b) $CH_3CH_2CH_2CH_2OH$, $(CH_3)_2CHCH_2OH$
(c) $CH_3CH_2CH_2OH$, $CH_3CH_2CH_2Cl$
(d) $CH_3CH_2CH_2OH$, CH_3-O-CH_2CH_3

29. In the following question, an assertion and a reason are given. Choose the correct option:
Assertion (A): When a wire is stretched to two times its length, its resistance becomes 1/4 times.
Reason (R): Resistance is directly proportional to the length of wire and cross-section of the wire.
(a) Both A and R are true and R is the correct explanation for A.
(b) Both A and R are true, but R is not the correct explanation for A.
(c) Both A and R are false.
(d) A is true and R is false.

30. Read the following statements and choose the correct option :
Statement 1: The earth wire is connected to the outer casing of the appliance because the earth wire can prevent the fuse from blowing.
Statement 2: Fuse blows because the effective resistance of the circuit is too high.
(a) Statement 1 is correct and statement 2 is incorrect
(b) Statement 1 is incorrect and statement 2 is correct
(c) Both the statements are correct
(d) Both the statements are incorrect

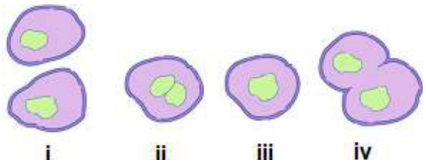
31. The deflection in the galvanometer (G) shown in the figure occurs, when :

(a) the magnet is pushed into the coil (b) the magnet is stationary at some distance from the coil
(c) the magnet is stationary at the centre of the coil (d) the number of turns in the coil is reduced

32. Fill in the blank :
A straight wire of diameter 1 mm carrying a current of 1 A is replaced by another wire of 1.5 mm diameter carrying the same current. The strength of magnetic field far away is _____.
(a) twice the earlier value (b) half of the earlier value (c) quarter of its earlier value (d) unchanged

33. Consider the following statements and choose the correct option:
Statement 1: An electric charge in uniform motion produces magnetic field.
Statement 2: An electric charge in uniform motion produces electric fields.
(a) Statement 1 is correct and statement 2 is incorrect.
(b) Statement 1 is incorrect and statement 2 is correct.
(c) Both the statements are correct.
(d) Both the statements are incorrect.

34. The following pictures were drawn by Rex to show different stages of binary fission.
Choose the correct sequences of these figures :



(a) iii, ii, iv, i (b) iii, iv, ii, i (c) ii, iii, iv, i (d) iv, iii, ii, i

35. Colour blindness is more common in men than in women.
Which of the following is the reason for the above statement?
(a) Dominant genes of such trails are found on 'Y' chromosome.
(b) Dominant genes of such trails are found on 'X' chromosome.
(c) Recessive genes of such trails occur on the 'X' chromosome.
(d) Recessive genes of such trails occur on the 'Y' chromosome.

36. The resistivity of a copper wire is 1.68×10^{-8} Ωm. If the wire has a length of 5 m and a cross-sectional area of 2.5×10^{-6} m^2, calculate its resistance.
(a) 3.36×10^{-2} Ω (b) 1.26×10^{-3} Ω (c) 3.36×10^{-5} Ω (d) 0.336×10^{-6} Ω

37. A copper wire of radius r and length L has a resistance of R. A second copper wire with radius 2r and length L is taken and the two wires are joined in a parallel combination. The resultant resistance of the parallel combination of the two wires will be _____.
(a) 5R (b) 5/4R (c) 4R/5 (d) R/5

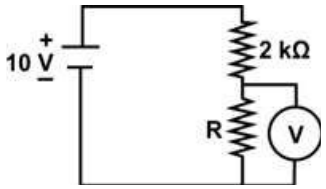
38. Read the following statements and choose the correct option:
Statement 1: Table salt (NaCl) is a product of strong acid and a strong base.
Statement 2: A milkman puts a banana leaf in the milk jar because banana leaf makes the milk acidic and resistant to yeast.
(a) Statement 1 is correct and statement 2 is incorrect.
(b) Statement 1 is incorrect and statement 2 is correct.
(c) Both the statements are correct.
(d) Both the statements are incorrect.

39. X and Y are the two atomic species.
Select the correct statement about X and Y :

	X	Y
Number of Proton	8	8
Number of Neutron	8	10

(a) X and Y isobars.
(b) X and Y have different chemical properties.
(c) X and Y have different physical properties.
(d) X and Y are the atoms of different elements.

40. In the given circuit voltmeter shows a reading of 4V, then calculate the power developed across R resistance :



(a) 15 mV (b) 14 mV (c) 12 mV (d) 10 mV

41. 200 J of work is done in moving a 10 C charged particle between two points in a uniform electric field of 64 V/m along the direction of the electric field. Find the distance between the two points :
(a) 7/17 m (b) 9/17 m (c) 7/15 m (d) 5/16 m

42. Fill in the blank :
Cl_2 is used in the preparation of poisonous gas, one of them is mustard gas, which can be represented by the formula _____.
(a) $CHCl_3$ (b) $COCl_2$ (c) CCl_3NO_3 (d) $ClCH_2CH_2SCH_2CH_2Cl$

43. In the following question, an assertion and a reason are given. Choose the correct option :
Assertion (A): Acetic acid is a monobasic acid.
Reason (R): Acetic acid is a strong acid and produces high concentration of H^+ ions.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true and R is false.
(d) A is false and R is true.

44. In the following question, an assertion and a reason are given. Choose the correct option :
Assertion (A): HCl produces hydronium ions (H_3O^+) and chloride ions (Cl^-) in aqueous solution.
Reason (R): In the presence of water, basic give H^+ ions.
(a) Both A and R are true and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true and R is false.
(d) A is false and R is true.

45. The empirical formula of a compound is CH_2. The mass of 1 litre of this gas is exactly equal to that of 1 litre of nitrogen under similar conditions. What is the molecular formula of the gas?
(a) C_2H_4 (b) C_3H_6 (c) C_6H_{12} (d) C_4H_8

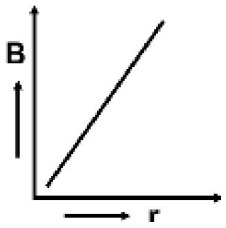
46. 40 mL of hydrocarbon on combustion gave 120 mL CO2 and 80 mL water vapour. What is the molecular formula of hydrocarbon?
(a) C_2H_6 (b) C_3H_6 (c) C_3H_8 (d) C_3H_4

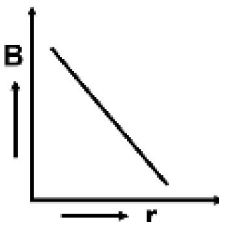
47. Answer the following questions and choose the correct option :
1. A glass slab of thickness 18 cm and refractive index 3/2 is placed on a printed matter. What is the normal shift of the printed matter?
2. What is the frequency that corresponds to a light ray of wavelength 450 nm, when travelling through a glass of refractive index 3/2?
(a) 1-3 cm, 2-3.4 × 10^{13} Hz (b) 1-6 cm, 2-6.6 × 10^{14} Hz

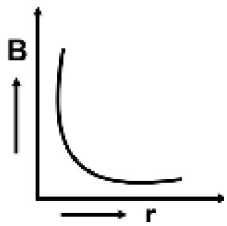
(c) 1-3 cm, 2-1.2 × 10^8 Hz (d) 1-6 cm, 2-6.8 × 10^7 Hz

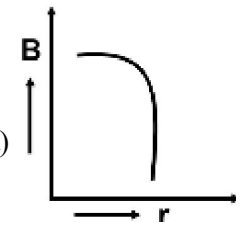
48. A lens of focal length 'f' produces an image of an object located 15 cm on one side of it at a distance of 30 cm on the other side. If the lens is replaced by another lens of focal length f/2, where would the image form?
(a) 7.5 cm on the same side of the lens (b) 7.5 cm on the other side of the lens
(c) 15 cm on the same side of the lens (d) 15 cm on the other side of the lens

49. Which of the following graphs shows the variation of magnetic induction B with distance 'r' from a long wire carrying a current?

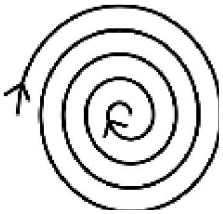
(a) 

(b) 

(c) 

(d) 

50. A uniform magnetic field is directed into the page. A charged particle, moving in the plane of the page, follows a clockwise spiral of decreasing radius as shown in the given figure. Which of the following statements is correct?



(a) The charge is positive and slowing down. (b) The charge is negative and slowing down.
(c) The charge is positive and speeding up. (d) The charge is negative and speeding up.