TEST YOUR METTLE IN
FIELDS OF SCIENCE

SECTION-A

Q1. Consider the following chemical equations:

\[ \text{NaOH} + \text{HCl} \rightarrow \text{NaCl} + \text{H}_2\text{O} \]

\[ \text{CaCO}_3 + \text{2HCl} \rightarrow \text{CaCl}_2 + \text{H}_2\text{O} + \text{CO}_2 \]

\[ \text{Cu} + \text{2HCl} \rightarrow \text{CuCl}_2 + \text{H}_2 \]

\[ \text{Zn} + \text{2HCl} \rightarrow \text{ZnCl}_2 + \text{H}_2 \]

Which one of the following statements is incorrect?

(a) The reaction is a single displacement reaction.
(b) The reaction is a double replacement reaction.
(c) The reaction is an acid-base reaction.
(d) The reaction is a redox reaction.

Q2. A student writes a few statements about the following diagram:

- The diagram shows the flow of energy through an ecosystem.
- Ecosystem includes the interactions between living and non-living objects.
- Energy is transferred from one trophic level to the next.
- The decomposers in an ecosystem do not breakdown organic compounds.

Which one of the following statements is incorrect?

(a) The diagram shows the flow of energy through an ecosystem.
(b) Ecosystem includes the interactions between living and non-living objects.
(c) Energy is transferred from one trophic level to the next.
(d) The decomposers in an ecosystem do not breakdown organic compounds.

Q3. While diluting an acid, why is it recommended not to mix the acid in water all at once?

(a) To avoid the release of heat.
(b) To avoid the release of hydrogen gas.
(c) To avoid the formation of a solution.
(d) To avoid the increase in pH.

Q4. An object, 4.0 cm in size, is placed at a distance of 10.0 cm from a convex lens. Where will be the focal length of the lens?

(a) 10.0 cm
(b) 20.0 cm
(c) 40.0 cm
(d) 80.0 cm

Q5. What will be the location of a point source of light, which is 4.5 cm from a spherical mirror, as shown in the figure?

(a) In front of the mirror
(b) Behind the mirror
(c) On the axis of the mirror
(d) Outside the mirror

Q6. Which of the following is not a characteristic of magnetic materials?

(a) They are magnetic.
(b) They have high magnetic permeability.
(c) They are non-conducting.
(d) They have a high temperature coefficient of magnetic susceptibility.

Q7. Um A to medium B enters from medium A, passes through a medium C and leaves medium D. The relationship between the angle of incidence (i) and the angle of refraction (r) is given by Snell’s law, which states that

\[ \frac{\sin i}{\sin r} = n \]

Where n is the ratio of the indices of refraction of the two media. Which one of the following options correctly states the condition for total internal reflection?

(a) \( \sin i < \sin r \)
(b) \( \sin i > \sin r \)
(c) \( \sin i = \sin r \)
(d) \( \sin i \leq \sin r \)

Q8. The optical phenomena in an image of a convex mirror is paraxial. The focal length of the convex mirror is 25.0 cm. Where will be the image of an object placed 9.0 cm from the mirror?

(a) 25.0 cm
(b) 30.0 cm
(c) 35.0 cm
(d) 40.0 cm

Q9. The fundamental property of an atom is

(a) Proton number
(b) Neutron number
(c) Electron number
(d) Charge number

Q10. The final length of the current line

\[ \text{is} \quad \text{(I)} \]

\[ \text{is} \quad \text{(II)} \]

\[ \text{is} \quad \text{(III)} \]

\[ \text{is} \quad \text{(IV)} \]

Which one of the following statements is incorrect?

(a) The final length of the current line is determined by the direction of the current.
(b) The final length of the current line is determined by the path of the current.
(c) The final length of the current line is determined by the magnetic field.
(d) The final length of the current line is determined by the charge of the particles.

Paper Set By Science Department, Delhi Public School, Whitefield, Bengaluru

SECTION-B

Q11. True or False: The statement is True.

(a) True
(b) False

Q12. A couple with a new born baby suspects that the baby might be affected with some genetic disorder. Being a first-time parent, the couple wants you to guide them through the process of checking the genetic disorder. Complete the process by filling in the blanks.

(a) Collect DNA from the baby
(b) Conduct a genetic test
(c) Interpret the test results
(d) Take necessary action

Q13. The magnitude of magnetic field is straight line. The magnitude of magnetic field is the same at every point along the line. They interact with the right hand rule. The magnitude of magnetic field is a constant vector quantity. They interact with the left hand rule. Which one of the following statements is incorrect?

(a) The magnitude of magnetic field is straight line.
(b) The magnitude of magnetic field is a constant vector quantity.
(c) They interact with the right hand rule.
(d) They interact with the left hand rule.

Q14. The elements become less metallic with increasing atomic number. Which one of the following statements is incorrect?

(a) The elements become less metallic with increasing atomic number.
(b) The oxides become more acidic with increasing atomic number.
(c) The elements become more reactive with increasing atomic number.
(d) The elements become more electronegative with increasing atomic number.

Q15. The atomic number of an element determines its position in the periodic table. Which one of the following elements has an atomic number of 10?

(a) Ne
(b) Na
(c) Mg
(d) Al

Q16. Which one of the following statements is incorrect?

(a) A vector is a quantity that has both magnitude and direction.
(b) A scalar is a quantity that has only magnitude.
(c) A vector can be added to a scalar without any change in the result.
(d) A vector can be subtracted from another vector only if both have the same magnitude and direction.

Q17. The length and complexity of a DNA sequence can be determined by

(a) Sequencing
(b) Polymerase chain reaction
(c) Gel electrophoresis
(d) Nucleic acid probing

Q18. Which of the following is not a characteristic of magnetic materials?

(a) They are magnetic.
(b) They have high magnetic permeability.
(c) They are non-conducting.
(d) They have a high temperature coefficient of magnetic susceptibility.

Q19. An ecosystem includes

(a) Only living organisms
(b) Only non-living organisms
(c) Both living and non-living organisms
(d) One species of living organism

Q20. A student writes a few statements about the following diagram:

- The diagram shows the flow of energy through an ecosystem.
- Ecosystem includes the interactions between living and non-living objects.
- Energy is transferred from one trophic level to the next.
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Which one of the following statements is incorrect?

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(d) The decomposers in an ecosystem do not breakdown organic compounds.

Q21. The boundary of a sphere is

(a) A plane
(b) A circle
(c) A line
(d) A point

Q22. The fundamental property of an atom is

(a) Proton number
(b) Neutron number
(c) Electron number
(d) Charge number

Q23. The final length of the current line

\[ \text{is} \quad \text{(I)} \]

\[ \text{is} \quad \text{(II)} \]

\[ \text{is} \quad \text{(III)} \]

\[ \text{is} \quad \text{(IV)} \]

Which one of the following statements is incorrect?

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(d) The final length of the current line is determined by the charge of the particles.

Q24. The final length of the current line

\[ \text{is} \quad \text{(I)} \]

\[ \text{is} \quad \text{(II)} \]

\[ \text{is} \quad \text{(III)} \]

\[ \text{is} \quad \text{(IV)} \]

Which one of the following statements is incorrect?

(a) The final length of the current line is determined by the direction of the current.
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(d) The final length of the current line is determined by the charge of the particles.