

UNIT TEST - 4
SCIENCE

CLASS X

Time : 1½ hrs.

SET A

Mark : 40

SECTION - A

8 × 1 = 8

1. Which of the following is not a saturated hydrocarbon?
a) cyclohexane b) Benzene c) Butane d) Isobutene
2. Which of the following represents the structure of N₂ molecule?
a) N ≡ N b) N - N c) N = N d) None of these
3. Which of the following statements are usually correct for carbon compounds?
i) good conductors of electricity ii) poor conductors of electricity
iii) have strong forces of attraction between their molecules
iv) do not have strong forces of attraction between their molecules
a) (i) and (iii) b) (ii) and (iii) c) (i) and (iv) d) (ii) and (iv)
4. Which of the following is Heterozygous?
a) TTRR b) ttrr c) TT d) Tt
5. What determines the sex of a child?
a) Chromosome content of the ovum b) Chromosome content of the sperm
c) Number of days between ovulation and fertilisation
d) Number of days between fertilisation and implantation
6. A cross between a tall plant (TT) and short pea plant (tt) resulted in progeny that were all tall plants because
a) tallness is the dominant trait b) shortness is the dominant trait
c) tallness is the recessive trait
d) height of pea plant is not governed by gene 'T' or 't'
7. Magnetic field due to a current through a straight conductor depend upon
a) current b) distance from the wire
c) Both (a) and (b) d) cross sectional area of wire
8. Magnetic lines do not intersect on one another because :
a) They are at a distance b) They are in the same direction
c) They are parallel to another
d) At the point of intersection there will be two direction of the magnetic force which is impossible

In the following questions (No. 9-10) a statement of Assertion followed by a statement of Reason is given. Choose the correct answer out of the following choices. 2 × 1 = 2

- a) If both the assertion and the reason are true and the reason is a correct explanation of the assertion.
- b) If both the assertion and reason are true but the reason is not a correct explanation of the assertion.
- c) Assertion is true but reason is false
- d) Assertion is false but reason is true.
9. Assertion (A) : Isobutane is the isomer of C_4H_{10}
Reason (R) : Isobutane has four - C and ten - H atom.
10. Assertion (A) : Mendel chose a number of varieties of garden pea as plant material for his experiments.
Reason (R) : Garden pea has well defined characters and was bisexual.

SECTION - B

11. What is homologous series? Which of the following organic compounds belong to the same homologous series? **2**
 C_2H_6 , C_2H_6O , $C_2H_6O_2$, CH_4O
12. Why do all the gametes formed in human females have an X-chromosome? **2**
13. On what factors does the force experienced by a current carrying conductor placed in a uniform magnetic field depend? **2**

OR

In the experiment to show that a current carrying conductor when placed in the uniform magnetic field experiences a force, what happens when :

- i) You reverse the terminals of the battery?
- ii) The direction of current is perpendicular to the direction of magnetic field? State your observation.

SECTION - C

14. What are hydrocarbons? Write the general formula of (a) saturated hydrocarbons (b) unsaturated hydrocarbons and draw the structure of one hydrocarbon of each type. **3**
15. Draw the structural formula of all the possible isomers of the compound with the molecular formula C_3H_6O and also give electron dot structures. **3**

OR

Explain giving reasons, why carbon can neither form C^{4+} cation nor C^{4-} anion but forms covalent compounds which are bad conductors of electricity and have low melting and boiling points.

16. Explain how gene expresses itself in a cell? Why are we somewhat similar to our parents yet not identical to them? **3**
17. Define magnetic field. Describe an activity to draw magnetic field lines around a bar magnet from one pole to another pole. **3**
18. Meena draws magnetic field lines of field close to the axis of a current carrying circular loop. As she moves away from the centre of the circular loop she observes that the lines keep on diverging. How will you explain her observation. **3**

SECTION - D

19. How do Mendel's experiment show that traits are inherited independently? **5**

OR

Women are often blamed for bearing daughters. As a student with knowledge in science how will you explain it to your fellow students that the sex of the child is not determined by mother's genetic contribution?

SECTION - E

20. **Read the following and answer the following questions.**

The region around a magnet where magnetism acts is represented by the magnetic field. The force of magnetism is due to moving charge or some magnetic material. Like stationary charges produce an electric field proportional to the magnitude of charge, moving charges produce magnetic fields proportional to the current. In other words, a current carrying conductor produces a magnetic field around it. The sub-atomic particles in the conductor like the electrons moving in atomic orbitals are responsible for the production of magnetic field. The magnetic field lines around a straight conductor (straight wire) carrying current are concentric circles whose centres lie on the wire.

- i) The magnetic field associated with a current carrying straight conductor is in anti-clockwise direction. If the conductor was held horizontally along east west direction, what is the direction of current through it? **1**
- ii) Name and state the rule applied to determine the direction of magnetic field in a straight current carrying conductor. **1**
- iii) Ramus performs an experiment to study the magnetic effect of current around a current carrying straight conductor with the help of a magnetic compass. He reports that
- a) The degree of deflection of magnetic compass increases when the compass is moved away from the conductor.
- b) The degree of deflection of the magnetic compass increases when the current through the conductor is increased

Which of the above observations of the student appears to be wrong and why? **1**

- iv) What type of field is produced by stationary and moving charges respectively? **1**

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SECTION - A

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1. Covalent compounds are generally.
 - a) Soluble in water
 - b) Insoluble in water
 - c) Ionize in water
 - d) Hydrolyse in water
2. Which of the following will contain covalent double bond between its atoms?
 - a) H₂
 - b) O₂
 - c) NaCl
 - d) Cl₂
3. Which of the following is not the property of homologous series?
 - a) They differ by –CH₂ units
 - b) They differ by –14 units by mass
 - c) They all contain double bond
 - d) They can be represented by a general formula
4. A zygote which has an X-Chromosome inherited from the father will develop into a
 - a) boy
 - b) girl
 - c) X Chromosome does not determine the sex of a child
 - d) either boy or girl
5. Which of the following is a Test Cross?
 - a) TT × tt
 - b) Tt × tt
 - c) Tt × TT
 - d) tt × tt
6. Two pink coloured flowers on crossing resulted in 1 red, 2 pink and 1 white flower progeny. The nature of the cross will be
 - a) double fertilization
 - b) self pollination
 - c) cross fertilization
 - d) no fertilization
7. The magnetic field inside a long straight solenoid carrying current is
 - a) zero
 - b) decreases as we move towards its end
 - c) increases as we move towards its end
 - d) same at all points
8. A small magnet is placed perpendicular to a uniform magnetic field. The force acting on the magnet will result in
 - a) Rotational motion
 - b) Translatory motion
 - c) No motion at all
 - d) both (a) and (b)

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- c) Assertion is true but reason is false
- d) Assertion is false but reason is true.
9. Assertion (A) : Carbon shows maximum catenation property in the periodic table.
Reason (R) : Carbon has small size and thus, forms strong C-C bond.
10. Assertion (A) : Mendel selected the pea plant for his experiments.
Reason (R) : Pea plant is cross pollinating and has unisexual flowers.

SECTION - B

11. Explain why cannot we have isomers of first three members of alkane family? **2**
12. The chromosome number of the sexually producing parents and their offspring is the same. Justify this statement. **2**
13. State two ways by which the strength of an electromagnet can be increased? **2**

OR

A current carrying conductor produces a magnetic field around it. Is there a similar magnetic field produced around a thin beam of moving.

- i) electrons ii) neutrons

Justify your answer.

SECTION - C

14. a) Why are most carbon compounds poor conductors of electricity?
b) Write the name and structure of a saturated compound in which carbon atoms are arranged in a ring. Give the number of single bonds present in this compound. **3**
15. An aldehyde as well as ketone can be represented by the same molecular formula say C_3H_6O . Write their structures and name them. State the relationship between them. **3**

OR

Write the molecular formula of benzene and draw its structure. List in tabular form how covalent compounds differ from ionic compounds.

16. "It is a matter of chance whether a couple will have a male or a female child." Justify this statement by drawing a flow chart. **3**
17. What happens to the deflection of the compass needle placed at a point near current carrying straight conductor:
a) if the current is increased?
b) if the direction of current in the conductor is changed (reversed)?
c) if compass is moved away from the conductor? **3**

18. Why does a magnetic compass needle pointing north and south in the absence of a nearby magnet get deflected when a bar magnet or a current carrying loop is brought near it? Describe some salient features of magnetic lines of field concept. **3**

SECTION - D

19. Explain the manner in which sex is determined in human beings? **5**

OR

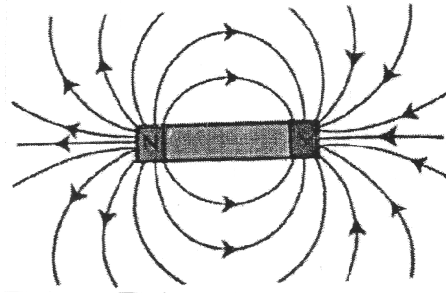
- a) What are monohybrid and dihybrid cross?
 b) How Mendel proved that tallness is the dominant trait and dwarfness is recessive in a pea plant?

Explain with the help of a monohybrid cross.

SECTION - E

20. **Read the following and answer the following questions.** **4 × 1 = 4**

A magnet is a material or object that produces a magnetic field. This magnetic field is invisible but it is responsible for the most notable property of a magnet : A force that pulls on other ferromagnetic materials, such as iron, and attracts or repels other magnets. Some materials, such as chromium showed paramagnetism, being capable of weak induced magnetization when brought near a magnet. This magnetization disappears when the magnet is removed. Only three elements iron, nickel and cobalt, showed the property of ferromagnetism (i.e., the capability of remaining permanently magnetized).



- i) What kind of magnet is shown in image?
 ii) Rajesh observed more magnetic field lines near poles. What does it indicate?
 iii) Shruti was playing with bar magnet and iron nails. She observed that iron nail get attracted towards magnet. She found that iron nail could attract other nails too. Why this happened?
 iv) Will Shruti observe same when she use the following things in place of iron nail.

S. No.	Things in place of iron nail	Will it get magnetized YES/NO
1.	Copper wire	
2.	Silver coin	
3.	Zip of school bag	
4.	Pressure cooker	