

CBSE Class 10 Science
Sample Paper 10 (2019-20)

Maximum Marks: 80

Time Allowed: 3 hours

General Instructions:

- i. The question paper comprises three sections – A, B and C. Attempt all the sections.
- ii. All questions are compulsory.
- iii. Internal choice is given in each section.
- iv. All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- v. All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50 - 60 words each.
- vi. All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80 – 90 words each.
- vii. This question paper consists of a total of 30 questions.

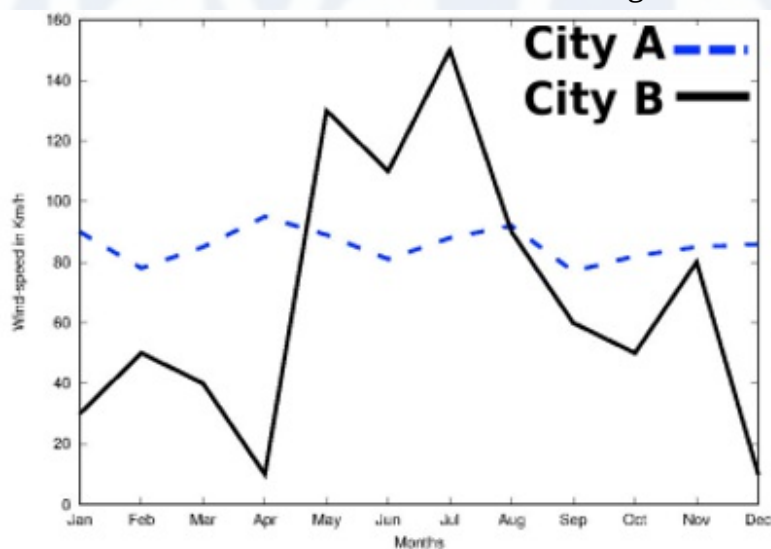
Section A

1. What is the significance of the arrow head between the reactants and the products?
2. Name the group to which the element with electronic configuration 2, 8, 3 belongs.
3. **Answer the questions that follows on the basis of your understanding of the following paragraph and the related studied concepts:** Renewable energy sources such as wind energy are vital for the Indian economy, not only from the point of view of supply but also from the perspective of environmental and social benefits. India is the world's fifth-largest wind-power producer and the largest windmill facilities in India are installed in Tamil Nadu. Muppandal is a small village of Tamil Nadu and one of the most important sites of wind-farm in the state. It uses wind from the Arabian Sea to produce renewable energy. The suitability of Muppandal as a site for wind farms stems from its geographical location as it has access to the seasonal monsoon

winds. The electrical generators used on wind turbines in sites like Muppandal produce an output AC of 240 V and a frequency of 50 Hz even when the wind speed is fluctuating. A transformer may be required to increase or decrease the voltage so it is compatible with the end usage, distribution or transmission voltage, depending on the type of interconnection.

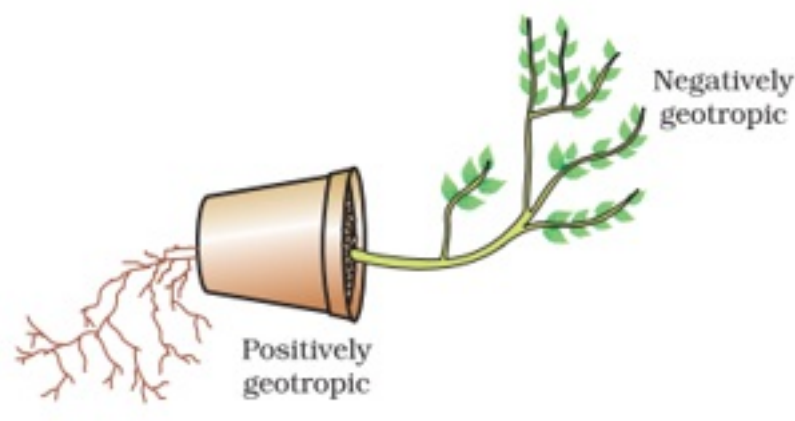


- i. State the principle behind the electric generator.
- ii. The output frequency of the wind turbine is 50 Hz. What is meant by this statement?
- iii. Why do you think Muppandal is at an advantageous position for this project?
- iv. Based on the data represented in the graph below, which of the two cities A or B would be an ideal location for establishing a wind-farm and why?



4. Environmental triggers such as light, or gravity will change the directions that plant parts grow in. These directional, or tropic, movements can be either towards the stimulus, or away from it. So, in two different kinds of phototropic movement, shoots respond by bending towards light while roots respond by bending away from it. How does this help the plant? Plants show tropism in response to other stimuli as well. The

roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively, in response to the pull of earth or gravity is, obviously, geotropism. If 'hydro' means water and 'chemo' refers to chemicals, what would 'hydrotropism' and 'chemotropism' mean? Can we think of examples of these kinds of directional growth movements? One example of chemotropism is the growth of pollen tubes towards ovules, about which we will learn more when we examine the reproductive processes of living organisms.



Answer the following questions:

- a. Where does negative phototropism occur in plants?
 - b. Phototropism in shoots is attributed due to which plant hormone?
 - c. Tendrils exhibit/ twining of tendrils show which type of tropic movement?
 - d. If the stem grows towards sunlight and root grows just opposite to it, then what type of movement of stem is it?
5. Which of the following statement is/are true?
- A. The speed of all colours is same in air or vacuum.
 - B. The speed of all colours is different in denser media.
 - C. Speed of light in air is $3 \times 10^8 \text{ ms}^{-1}$
 - D. Refractive index has no unit.
- a. A and B
 - b. A, B and C
 - c. B and D
 - d. All of these

OR

Four students reported the following observation tables for the experiment, to trace the path of a ray of light passing through a glass slab for different angles of incidence. The observations, likely to be correct are those of student.

$\angle i$	$\angle r$	$\angle e$
30°	40°	30°
40°	50°	40°
50°	60°	50°

(I)

$\angle i$	$\angle r$	$\angle e$
30°	20°	30°
40°	30°	40°
50°	40°	50°

(II)

$\angle i$	$\angle r$	$\angle e$
30°	20°	40°
40°	30°	50°
50°	40°	60°

(III)

$\angle i$	$\angle r$	$\angle e$
30°	20°	20°
40°	30°	30°
50°	40°	40°

(IV)

- a. IV
 - b. III
 - c. I
 - d. II
6. Coliform is a group of bacteria's found in
- a. human alimentary canal
 - b. human Intestines
 - c. human liver
 - d. human lungs
7. The rate of electric energy loss in a thermal device due to resistance R is given by:
- A. $P = I^2 R$
 - B. $P = \frac{V^2}{R}$
 - C. $P = I^2 V$
 - D. $P = \frac{V}{I}$
- a. A and C
 - b. A and D
 - c. A and B
 - d. B and C
8. Which of the following salt is used in lab to seal air gaps in apparatus so as to make the air tight arrangement?
- a. $\text{CaSO}_4 \cdot 2\text{H}_2\text{O}$
 - b. $\text{ZnSO}_4 \cdot 7\text{H}_2\text{O}$

- c. $\text{MgSO}_4 \cdot 7\text{H}_2\text{O}$
- d. $\text{CaSO}_4 \cdot \frac{1}{2}\text{H}_2\text{O}$

OR

Stinging hair of nettle leaves inject

- a. ethanoic acid
- b. methanoic acid
- c. carbonic acid
- d. hydrochloric acid

9. All living organisms of the earth constitute a:

- a. Biotic community
- b. Biome
- c. Biosphere
- d. Ecosystem

10. Abiotic components of ecosystem are:

- a. Climatic factors
- b. Decomposers
- c. Both Inorganic substances and climatic factors
- d. Inorganic substances

11. Match the following with the correct response:

(1) Copper is used in electrical appliances	(A) Hydrogen sulphide
(2) Sodium is very reactive	(B) Good conductor
(3) Silver is tarnished	(C) Graphite

(4) Non-metal and good conductor	(D) Stored in kerosene
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- a. 1-A, 2-C, 3-B, 4-D
- b. 1-C, 2-B, 3-D, 4-A
- c. 1-B, 2-D, 3-A, 4-C
- d. 1-D, 2-A, 3-C, 4-B

12. NaCl and Na₂SO₄ belong to the family of

- a. chloride salts
- b. neutral salts
- c. sodium salts
- d. sulphate salts

13. **Assertion:** CH₃Cl is obtained from CH₄ by the action of Cl₂ in the presence of sunlight.

Reason: It is obtained by addition reaction.

- a. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.
- b. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.
- c. Assertion is INCORRECT but, reason is CORRECT.
- d. Assertion is CORRECT but, reason is INCORRECT.

14. **Assertion:** A voltmeter and ammeter can be used together to measure resistance but not power.

Reason : Power is proportional to voltage and current.

- a. Assertion is INCORRECT but, reason is CORRECT.
- b. Assertion is CORRECT but, reason is INCORRECT.
- c. Both assertion and reason are CORRECT but, reason is NOT THE CORRECT explanation of the assertion.

- d. Both assertion and reason are CORRECT and reason is the CORRECT explanation of the assertion.

Section B

15. What happens when:

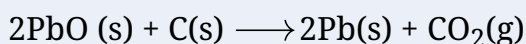
(a) ZnCO_3 is heated in the absence of oxygen?

(b) a mixture of Cu_2O and Cu_2S is heated?

16. Why is a combustion reaction known as an oxidation reaction?

OR

Which of the statements about the reaction below are incorrect?



- i. Lead is getting reduced
 - ii. Carbon dioxide is getting oxidised
 - iii. Carbon is getting oxidised
 - iv. Lead oxide is getting reduced
17. What is a homologous series? State any two characteristics of homologous series?
18. How is respiration different from breathing.

OR

What is the significance of respiration?

19. Find the focal length of a convex mirror whose radius of curvature is 32 cm?
20. Draw well-labelled diagram of V.S of mature ovule of Angiosperms.
21. What is a tropic movement? Explain with an example.
22. Though the same current flows through line wires and the filament of a bulb, yet only the latter glows. Why?
23. Draw the symbols of the following components that are used in the circuit diagram:

- i. Wires crossing without joining
- ii. Variable resistance or rheostat
- iii. A battery or a combination of cells

24. (i) Which among iron and mercury is a better conductor?
(ii) Which material is the best conductor and why?

OR

If an object is held at a distance of 60 cm from a convex mirror of focal length 20 cm. At what distance from the convex mirror, should a plane mirror be held, so that images in the two mirrors coincide?

Section C

25. i. Why does an aqueous solution of acid conduct electricity?
ii. How does the concentration of hydrogen ions $[H_3O]^+$ changes when the solution of an acid is diluted with water?
iii. Which has higher pH. A concentrated or dilute solution of HCL?
iv. What would you observe on adding dil HCL acid to
a. Sodium bicarbonate placed in a test tube.
b. Zinc metal in a test tube.
26. a. The modern periodic table has been evolved through the early attempts of Dobereiner, Newland and Mendeleev. List one advantage and one limitation of all the three attempts.
b. Name the scientist who first of all showed that atomic number of an element is a more fundamental property than its atomic mass.
c. State Modern periodic law.
27. What is digestive gland? Name the various digestive glands of man and their secretions.
28. In man four types of blood groups A, B, AB and O are controlled by three alleles of a gene. What is the mechanism of inheritance of the blood groups?

OR

Why is it more appropriate to compare the process of evolution with branches of a tree rather than with a ladder?

29. a. Draw magnetic field lines produced around a current-carrying straight conductor passing through cardboard. Name, state and apply the rule to mark the direction of these field lines.
- b. How will the strength of the magnetic field change when the point where the magnetic field is to be determined is moved away from the straight wire carrying constant current? Justify your answer.
30. What is prism? What is its action? Write down the relation between angle of incidence, angle of emergence, angle of prism and angle of deviation.

OR

- i. What is meant by power of a lens? Define its SI unit.
- ii. You have two lenses A and B of focal lengths +10 cm and - 10 cm, respectively. State the nature and power of each lens. Which of the two lenses will form a virtual and magnified image of an object placed 8 cm from the lens? Draw a ray diagram to justify your answer.

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Answer
Section A

1. The significance of the arrow head is that, it points towards the products and shows the direction of the reaction.

Reactant → Products

During a chemical reaction if a gas is evolved it is denoted by upward arrow(↑).

During a chemical reaction if a precipitate is formed it is denoted by downward arrow(↓).

2. The electron configuration of an element shows how many electrons are present. Add them to get the atomic number. $2 + 8 + 3 = 13$.

Alternatively, there are 3 shells of electrons so the element is in period 3, and the last shell has 3 electrons so it is in Group (13 or IIIA).

3. i. The principle behind the electric generator is Electromagnetic Induction- the phenomenon of producing current in a coil by changing the magnetic field associated with it.

- ii. The polarity of the output alternating current changes every 1/100 seconds.

Alternately: In 1 second the output (AC) completes 50 cycles.

- iii. The suitability of Muppandal as a site for wind farms stems from its geographical location as it has access to the seasonal monsoon winds.

- iv. City A

It is more suitable for a wind-farm as there is consistently high wind-speed in that city throughout the year.

4. a. Root
b. Auxin
c. Thigmotropism
d. Positive phototropic movement.

5. (d) All of these

Explanation: All the given statements are correct. The speed of all colours is same in

air or vacuum i.e.

But the speed of all colours is different in a denser medium. Refractive index has no unit since it is a ratio. The absolute refractive index of a medium (n_m) is given by $n_m = \frac{c}{v}$ where c is the speed of light in air, and v is the speed of light in the medium.

OR

(d) II

Explanation: When light is entering from optically rarer to optically denser medium, the angle of incidence will be greater than the angle of refraction.

Since $\angle i = \angle e$ and $\angle r < \angle i$ for dense glass slab.

6. (b) human Intestines

Explanation: Coliforms are bacteria that are always present in the digestive tracts of animals, including humans, and are found in their wastes. They are also found in plant and soil material.

7. (c) A and B

Explanation: The rate at which electric energy is lost (dissipated) or consumed in a thermal device due to resistance R is given by $P = VI$ or

8. (d) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$

Explanation: POP is used in chemical laboratories for sealing air gaps in apparatus where air-tight arrangement is required.

OR

(b) methanoic acid

Explanation: Methanoic acid is acidic in nature. Stinging hair of nettle leaves inject methanoic acid causing burning pain.

9. (c) Biosphere

Explanation: All living organisms of the Earth constitute a biosphere (zone of life on Earth). The term "biosphere" was coined by geologist Eduard Suess in 1875, which he defined as the place on Earth's surface where life dwells.

10. (c) Both Inorganic substances and climatic factors

Explanation: An ecosystem consists of biotic components comprising living

organisms and abiotic components comprising physical factors like temperature, rainfall, wind, soil and minerals.

11. (c) 1-B, 2-D, 3-A, 4-C

Explanation: Copper is a good conductor of electricity and is used in electrical appliances. Sodium is very reactive and is stored under kerosene. Silver is tarnished by hydrogen sulphide. Tarnish is a thin layer of corrosion that forms over it. Graphite is an allotrope of carbon and a good conductor of electricity. It is used for making carbon electrodes and graphite electrodes in dry cells and electric arcs.

12. (c) sodium salts

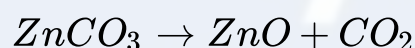
Explanation: All salts having sodium ions as positive radical belong to the same family, i.e. sodium family. For example: sodium chloride, sodium sulphate, sodium nitrate, etc.

13. (d) Assertion is CORRECT but, reason is INCORRECT. Explanation: Assertion is CORRECT but, reason is INCORRECT.

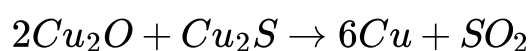
14. (b) Assertion is CORRECT but, reason is INCORRECT. Explanation: Assertion is CORRECT but, reason is INCORRECT.

Section B

15. (a) When zinc carbonate is heated in the absence of oxygen, we get zinc oxide and carbon dioxide.

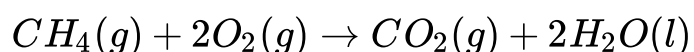


(b) When a mixture of copper oxide and copper sulphide is heated, we get pure copper.



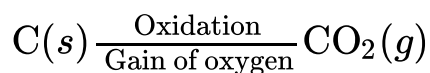
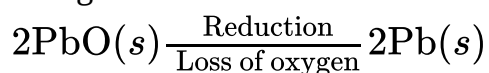
16. Combustion reactions are known as oxidation reactions because they take place in the presence of oxygen of air. For eg.

Burnnig of Methane (CH_4) is a combustion reaction



OR

The given reaction can be written in the form of two separate reactions:



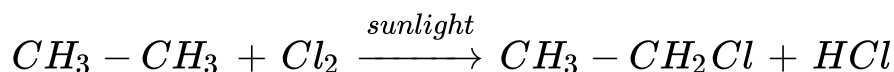
Therefore, according to above reactions, statements i & ii are incorrect and statements iii & iv are correct.

17. A **homologous series** is a series of similarly constituted compounds in which the different members have the same functional group and same chemical properties and in which any two successive members differ in their molecular formula by $-\text{CH}_2$ group. The various organic compounds that form part of the **homologous series** are called **homologues**.

E.g. All **alkanes** have similar structures with single covalent bonds and show similar chemical properties. Thus, all alkanes form a homologous series. The successive members CH_4 (methane), C_2H_6 (ethane), C_3H_8 (propane), etc of alkanes differ from each other by $-\text{CH}_2$ group.

Two characteristics of homologous series are as follows:

- (i) All the compounds of a homologous series have the same functional group. E.g. All alkanes have single covalent bonds between carbon atoms in their structure.
- (ii) All the compounds of a homologous series have the same chemical properties. E.g. All alkanes undergo substitution reactions with halogen vapours in the presence of light.



18. Differences between breathing and respiration

Breathing	Respiration
1) It is ventilation or bringing in of oxygenated air and giving out deoxygenated air.	1) Respiration of animals includes breathing, gaseous exchange and catabolic breakdown of food.
2) Breathing is a physical and voluntary	2) Respiration is a chemical and

process.	involuntary process.
3) Breathing does not liberate energy.	3) It liberates energy.
4) It is restricted to organs where gaseous exchange occurs between blood and atmospheric air.	4) Respiration involves every living cell of the body.
5) Breathing takes place in the respiratory organs called as lungs.	5) Respiration takes place in the cells.
6) Breathing involves respiratory organs and the cells called as alveoli.	6) Respiration involves cells in the body and their organelles.

OR

Significance of respiration.

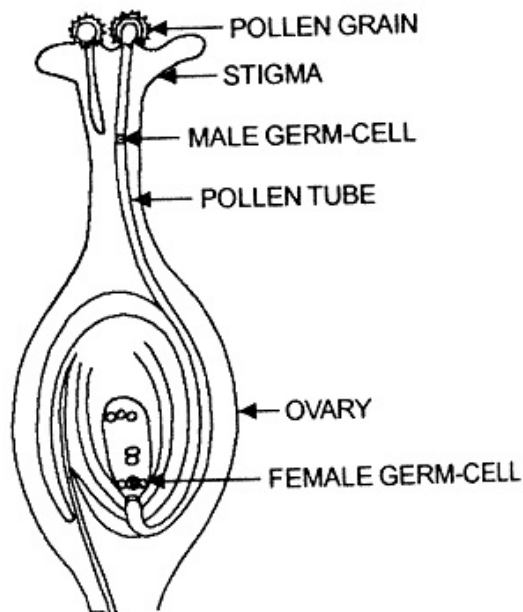
Respiration is very orderly process of the cells because of which organisms are benefited tremendously. These benefits are as follows:

- 1) Energy is released in small packets in a series of steps.
- 2) Energy so released can be utilized by various metabolic processes.
- 3) Energy can be stored to maximum extent and can be used subsequently.
- 4) Energy in small packets does not burn or destroy cells, tissues or organs.

19. Here $r = 32$ cm. (convex mirror)

$$f = \frac{r}{2} = \frac{32}{2} = 16 \text{ cm}$$

20. Mature ovule

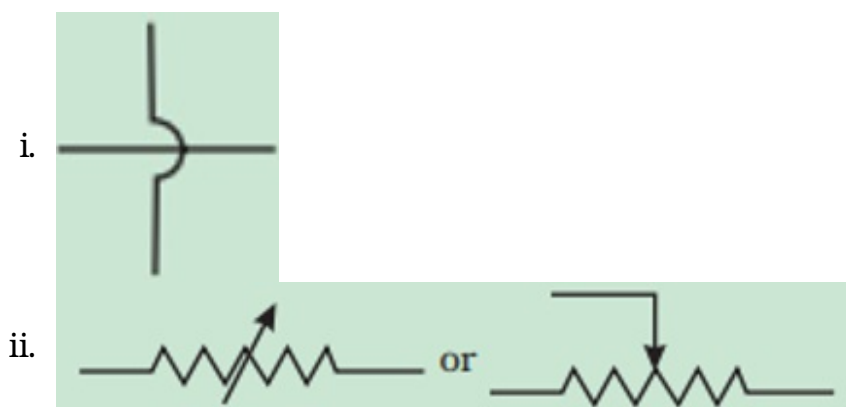


21. Tropic movements are induced growth movements of curvature that occur due to differential growth. These are directional movements that occur in response to external stimuli such as light, gravity, chemicals, water, etc.

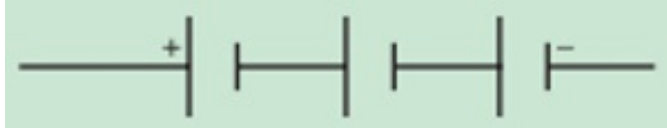
e.g. Roots of a plant move downward in the soil in the direction of gravity and the shoot moves against the direction of gravity.

22. The filament of electric bulb is made up of material like tungsten which has high resistance, whereas the line wires are of negligible resistance. Since the amount of heat generated is proportional to the resistance ($H \propto R$), the filament generates much more heat and it starts glowing.

23. The symbols of the following components that are used in the circuit diagram are as follows:



iii.

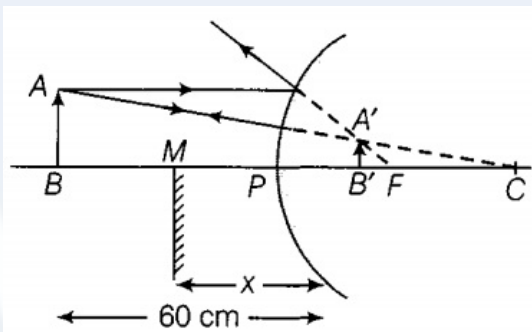


24. (i) Among iron and mercury, iron is a better conductor of electricity because the resistivity of iron ($10.0 \times 10^{-8} \Omega m$) is less than that of mercury ($94.0 \times 10^{-8} \Omega m$).
- (ii) We know that a good conductor of electricity should have a low resistivity. Silver has the lowest resistivity of $1.60 \times 10^{-8} \Omega m$, which means that silver offers the least resistance to the flow of current through it. So, silver is the best conductor of electricity.

Please note: All the above values of resistivity of substances are at $20^\circ C$

OR

$u = -60 \text{ cm}$, $f = +20 \text{ cm}$ (convex mirror)



By mirror formula we know :

$$\frac{1}{v} + \frac{1}{u} = \frac{1}{f}$$

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u} = \frac{1}{20} - \frac{1}{(-60)}$$

$$= \frac{3+1}{60} = \frac{4}{60}$$

$$v = 15 \text{ cm}$$

$$\therefore PB' = 15 \text{ cm}$$

For the images in the two mirrors coincide, let the plane mirror be placed at point M.

$$\text{As, } BM = MB' = MP + PB'$$

$$= x + 15 \dots \dots \dots (i)$$

$$BM = \frac{1}{2} BB' = \frac{1}{2} (60 + 15) = 37.5 \dots \dots (ii)$$

From Eqs. (i) and (ii), we get

$$\Rightarrow x + 15 = 37.5$$

$$\Rightarrow x = 37.5 - 15$$

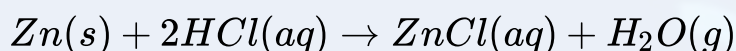
= 22.5 cm

Section C

25. i. An aqueous solution of an acid conducts electricity because in water an acid (HCl) dissociates to give ions. Since the current is carried out by the movement of ions, an aqueous solution of acid conducts electricity.
- ii. During dilution, more of acid dissociates into ions. Thus concentration of $[H_3O]^+$ ions will increase on dilution.
- iii. Even on increasing $[H_3O]^+$ ions, the number of ions per unit volume decreases. Therefore pH will increase on dilution.
- iv. (a) CO_2 gas will evolve accompanied by brisk effervescence.



(b) H_2 gas will evolve accompanied by brisk effervescence.



26. a. **Dobereiner Periodic Table**

Advantage: To predict the atomic mass of middle element in each triad

Limitation: Dobereiner could identify only three triads

Newland Periodic table

Advantage: The properties of the eighth element are a repetition of the properties of the first element.

Limitation: It was applicable to the classification of elements up to Calcium only.

Mendeleev's Periodic Table

Advantage: He predicted the existence of some elements that had not been discovered at that time.

Limitation: No fixed position for hydrogen.

- b. Henry Moseley

c. The properties of elements are a periodic function of their atomic numbers.

27. **Digestive gland:** These are also considered to be exocrine glands which have ducts to drop their secretions into the target organ directly. The secretions of the digestive glands help in the process of digestion. These glands include salivary glands, gastric glands, intestinal glands, liver and pancreas.

Digestive glands of Man

a) Salivary glands secrete saliva along with enzymes. Ptyalin is the starch hydrolysing enzyme secreted by salivary glands in human beings. It is also called as salivary amylase. Ptyalin secreted in the mouth brings about digestion of starch in the mouth itself. It hydrolyses starch into disaccharides like maltose and isomaltose and other small dextrins called as limit dextrins. Ptyalin hydrolyses at about 30 percent of the starch in the mouth itself.

b) Gastric glands secrete HCl, pepsinogen, mucous. Gastric juice is a secretion of gastric glands located in the lining of the stomach. It is mainly made up of electrolytes, mucus, enzymes, hydrochloric acid, intrinsic factor etc. HCl secreted by parietal cells provides acidic medium for many enzymes to get activated. Neck cells secrete mucus which lubricated the passage of the food. Chief cells secrete pepsinogen which helps in the digestion of proteins after getting activated into pepsin by HCl. Enzymes of the gastric juice bring about digestion of different components of the food. Gastric lipase helps in emulsification of lipids in the stomach. Partially digested food in the stomach is called as chyme and this passes on into small intestine

c) Intestinal glands are present in the inner lining of small intestine. These secrete various enzymes which aid in the process of digestion of all the components of food. Maltase, sucrase and lactase bring about digestion of carbohydrates. Peptidases help in digestion of proteins. Enterokinase helps in the activation of other enzymes

d) Liver is the largest gland in our body. The liver secretes a yellowish green watery fluid called bile. It is temporarily stored in a sac called the gall bladder. Bile provides an alkaline environment for many enzymes to get active. It also reduces the acidity of chyme. Bile plays an important role in the digestion of fats. Bile is sent into duodenum through a narrow tube-like structure called the bile duct. Bile breaks the larger fat molecules into tiny droplets, thereby increasing their surface area, which helps in the digestion of fats easily.

e) Pancreas is the mixed gland. It acts as both endocrine and exocrine gland. The pancreas secretes the pancreatic juice that helps to digest carbohydrates, proteins and fats. The pancreatic juice converts carbohydrates into simple sugars and glucose, proteins into amino acids, and the lipids into fatty acids and glycerol. Trypsin and chymotrypsin help in the digestion of proteins.

28. More than two forms exist for certain genes. It is an example of multiple alleles. A well known example is ABO blood types in human. The four human blood groups. A,

B, AB and O are phenotypes of the trait.

Three different alleles I^A , I^B and i of gene determine the phenotypes of the four blood groups. The six types of genotypes are as follows:

Phenotype (Blood group)	Genotype
O	ii
A	$I^A I^A$ or $I^A i$
B	$I^B I^B$ or $I^B i$
AB	$I^A I^B$

Both I^A and I^B are dominant over i . Since a person with genotype $I^A I^B$ has AB blood groups. It is an example of codominance.

Thus ABO blood groups exhibit three genetic aspects:

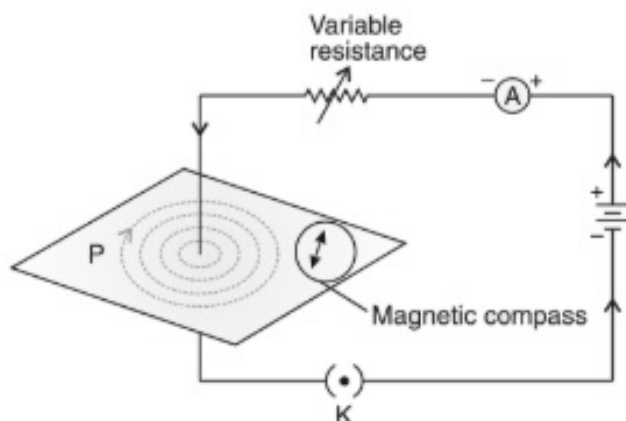
- 1) Dominant recessive mechanism
- 2) Multiple alleles
- 3) Co-dominance.

OR

In the exercise of tracing the evolutionary process we compare tree rather than ladder because the phylogeny is represented in the form of tree as a single branch may give rise to many different forms. So, it is not as if one species is eliminated to give rise to a new one, a single specie may undergo further speciation and give rise to different life forms. Also , it is not as if the newly generated species are in any way better than the order ones. e.g. it is not true that human beings have evolved from chimpanzees has a common ancestor a long time ago. They probably evolved in their own separate ways to give rise to the current forms.

Therefore, it is more appropriate to compare the process of evolution with branches of a tree rather than with a ladder.

29. a. The magnetic field lines produced around a current-carrying straight conductor passing through cardboard is shown below.



A right-hand thumb rule is applied to find the direction of these field lines.

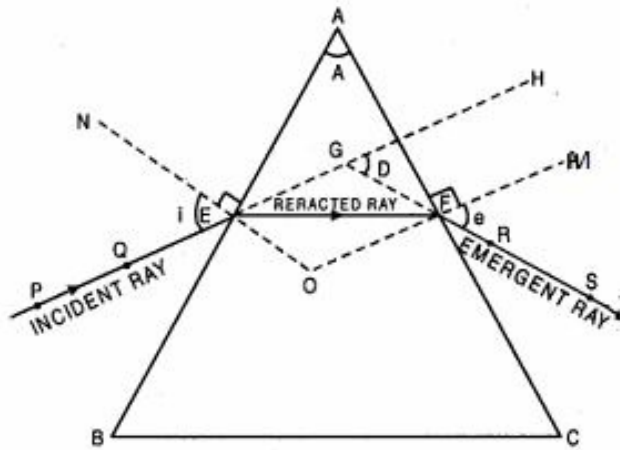
Imagine that you are holding a current-carrying straight conductor in your right hand such that the thumb points towards the direction of the current. Then your fingers will wrap around the conductor in the direction of the field lines of the magnetic field.

- b. When we move away from the straight wire, the deflection of the needle decreases which implies the strength of the magnetic field decreases. The reason is that the concentric circles representing the magnetic field around a current-carrying straight wire become larger and longer as the distance increases.

30. In a glass slab, the emergent ray is parallel to incident ray although emergent ray is displaced laterally. The lateral displacement depends upon the thickness of slab. A glass prism has two triangular bases and three rectangular lateral surfaces. Fix a sheet of paper on drawing board. Place a prism ABC on paper and draw its boundary. Draw a line PE and fix two pins P and Q on it. See from face AC of the prism and fix two more pins R and S so that P, Q, R, S all appear to be in same straight line.

Remove pins and the glass prism. Extend PE towards EH. Join R, S and produce back to meet EH at G. Draw OEN perpendicular to AB and MFO perpendicular to AC. Then PE is incident ray, EF refracted ray and FS, the emergent ray. $\angle PEN = \angle i$ is the angle of incidence, $\angle MFS = \angle e$, the angle of emergence and $\angle HGF = \angle D$, the angle of deviation. If $\angle BAC = \angle A$, the angle of prism, it can be proved that :

$$\angle i + \angle e = \angle A + \angle D$$



OR

The ability of a lens to converge or diverge light rays is called power of the lens. It is defined as the reciprocal of focal length. Its SI unit is dioptre (D). If focal length is expressed in metres, then power is expressed in dioptre. We can say, dioptre is the power of a lens whose focal length is one metre. For concave lens P and f are negative. For convex lens P and f are positive. Lens A of focal length + 10 cm is convex lens

$$\text{and power, } P = \frac{100}{f(\text{in cm})} = \frac{100}{10} = +10D$$

Lens B of focal length - 10 cm is concave lens

$$\text{and power, } P = \frac{100}{f(\text{in cm})} = \frac{100}{-10} = -10D$$

Lens A (i.e. convex lens) will form a virtual and magnified image of an object placed 8 cm from it, as shown.

