

**CLASS X (2020-21)**  
**SCIENCE (CODE 086)**  
**SAMPLE PAPER-10**

**Time : 3 Hours****Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.
- (ii) Section–A – question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.
- (iii) Section–B – question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should be in the range of 30 to 50 words.
- (iv) Section–C – question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should be in the range of 50 to 80 words.
- (v) Section–D – question no. 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.
- (vi) There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.
- (vii) Wherever necessary, neat and properly labelled diagrams should be drawn.

## Section-A

1. What is a chemical equation? [1]

**Ans :**

A chemical equation is a representation of chemical change in terms of symbols and formulae of reactants and products.

**or**

Balance the following chemical equation:

**Ans :**

2. What is a neutralisation reaction? [1]

**Ans :**

The reaction between acid and base to form salt and water is called neutralisation reaction.

3. Define allotropy. [1]

**Ans :**

Allotropy is the property of an element to exist in different physical forms but have similar chemical properties.

4. In which forms do most plants absorb nitrogen? [1]

**Ans :**

Nitrates and nitrites.

5. What is ascent of sap? [1]

**Ans :**

Absorbed water from the soil contains dissolved minerals (nitrates, phosphates, etc.) and hence it is called sap. This sap moves upwards due to the 'transpiration pull' developed in the xylem elements. Thus, transportation of sap from roots to the leaves at the top is called ascent of sap.

**or**

Which is the major nitrogenous waste product in

human beings? How is it removed from the body?

**Ans :**

The major nitrogenous waste product in human beings is urea. Urea is removed/ eliminated from the body through urine.

6. Why does lack of oxygen in muscles often lead to cramps among cricketers? [1]

**Ans :**

This is due to the conversion of pyruvate to lactic acid in the absence of oxygen.

7. Write two different uses of concave mirrors. [1]

**Ans :**

Concave mirrors are used in (a) torches, (b) searchlights, (c) headlights of vehicles, etc.

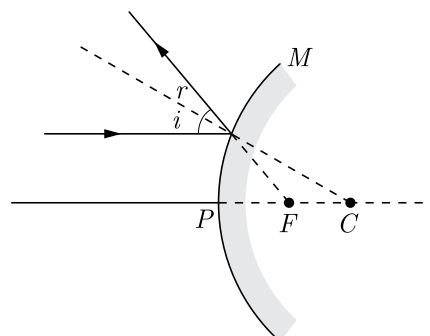
**or**

Define the term magnification.

**Ans :**

The ratio of the height of image to the height of object is called magnification.

8. Draw a labelled ray diagram to show the path of the reflected ray corresponding to an incident ray of light parallel to the principal axis of a convex mirror. Mark the angle of incidence and angle of reflection on it. [1]

**Ans :**

9. Why do we see a rainbow in the sky only after rainfall? [1]

**Ans :**

Rainbow is caused by dispersion of sunlight by tiny water droplets, present in the atmosphere. The water droplets behave like prisms and disperse sunlight.

10. Mention the condition under which a current can flow in a conductor. [1]

**Ans :**

The condition under which a current can flow in a conductor is that the circuit is closed and there is a potential difference across the conductor.

**or**

What are the special features of a heating wire?

**Ans :**

It must have high specific resistance and high melting point.

11. On what effect of an electric current does an electromagnet work? [1]

**Ans :**

An electromagnet works on the principle of magnetic effect of current.

12. State Faraday's law of electromagnetic induction. [1]

**Ans :**

Whenever the magnetic field lines linked with a coil change due to relative motion of a magnet and the coil, an induced current is produced in the coil. The magnitude of induced current is directly proportional to the rate of change of number of magnetic field lines linked to the coil.

13. Which of the following are always at the second trophic level of food chains?

Carnivores, Autotrophs, Herbivores [1]

**Ans :**

Herbivores are always at the second trophic level of food chains.

**or**

What will be the amount of energy available to the organisms of the 2nd trophic level of a food chain, if the energy available at the first trophic level is 10,000 joules?

**Ans :**

On applying the 10% law to the food chain, the organisms of the 2nd trophic level of the food chain will have  $\frac{10}{100} \times 10,000 = 1000$  joules of energy.

**For question numbers 14, 15 and 16, two statements are given-one labelled Assertion (A) and the other labelled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below :**

- (a) Both A and R are true and R is correct explanation of the assertion.  
 (b) Both A and R are true but R is not the correct explanation of the assertion.  
 (c) A is true but R is false.  
 (d) A is false but R is true.

14. **Assertion :** Calcium carbonate when heated gives calcium oxide and water.

**Reason :** On heating calcium carbonate, decomposition reaction takes place. [1]

**Ans :** (d) A is false but R is true.

15. **Assertion :** Mutation is sudden change in the genetic material.

**Reason :** Variation is useful for the survival of species over time. [1]

**Ans :** (b) Both A and R are true but R is not the correct explanation of the assertion.

16. **Assertion :** Man is a herbivore.

**Reason :** Omnivores eat both plant parts and meat of animals. [1]

**Ans :** (d) A is false but R is true.

**or**

**Assertion :** The food in the ecosystem is preserved in a linear fashion.

**Reason :** Plants use the solar energy in reducing carbon dioxide to carbon.

**Ans :** (b) Both A and R are true but R is not the correct explanation of the assertion.

17. **Read the following and answer any four questions from 17.1 to 17.5.**  $1 \times 4$

In Modern Periodic Table, metals are towards the left hand side, non-metals are towards the right hand side and there is a zig-zag line between them which contains metalloids.

Metals are electropositive, i.e., they have a tendency to lose electrons. As the effective nuclear charge acting on the valence shell electrons increases across a period, the tendency to lose electron will decrease so metallic character decreases. Down the group, the effective nuclear charge experienced by valence electrons is decreasing because the outermost electrons are farther away from the nucleus. Therefore, they can be lost easily and thus metallic character increases down the group.

Non-metals on the other hand, are electronegative. They tend to form bonds by gaining electrons.

Non-metallic character increases along the period and decreases down the group.

**17.1** Which of the following element is not a metalloid?

- (a) Ge  
 (b) As  
 (c) Ar  
 (d) Te

**Ans :** (c) Ar

Ar is a non-metal.

**17.2** The order of metallic character of some elements is  $N < P < As < Sb < Bi$ . The most electronegative among these elements is

- (a) N  
 (b) P  
 (c) Sb  
 (d) Bi

**Ans :** (a) N

Electronegativity decreases down the group.

- 17.3** Which of the following statements is correct?  
 (a) Electronegativity increases down the group.  
 (b) Metallic character decreases down the group.  
 (c) Effective nuclear charge decreases down the group.  
 (d) The force of attraction between the nucleus and the outermost electrons increases down the group.

**Ans :** (c) Effective nuclear charge decreases down the group.

- 17.4** Which of the following property increases along the period?  
 (a) Atomic size  
 (b) Metallic character  
 (c) Electropositivity  
 (d) Non-metallic character

**Ans :** (d) Non-metallic character

Non-metallic character increases along the period because electronegativity increases along the period.

- 17.5** Which of the following is the most non-metallic element?

- (a) P (b) Cl  
 (c) Se (d) Br

**Ans :** (b) Cl

Non-metallic character increases along the period and decreases down the group.

**18. Read the following and answer any four questions from 18.1 to 18.5. 1 × 4**

Energy is needed to maintain a state of order in our body. The source of energy and materials is the food we eat. Some organisms use simple food material obtained from inorganic sources and other organisms utilise complex substances. These complex substances have to be broken down into simpler ones before they can be used for the upkeep and growth of the body.

- 18.1** All non-green organisms fall under the category of

- (a) autotrophs (b) heterotrophs  
 (c) saprobes (d) chemotrophs

**Ans :** (b) heterotrophs

All non-green organisms fall under the category of heterotrophs as they depend on other organisms in order to obtain food.

- 18.2** The diagram below is an experiment conducted to study a factor necessary for photosynthesis.



(A)

(B)

The test performed on the leaf and the solution used for the test are respectively

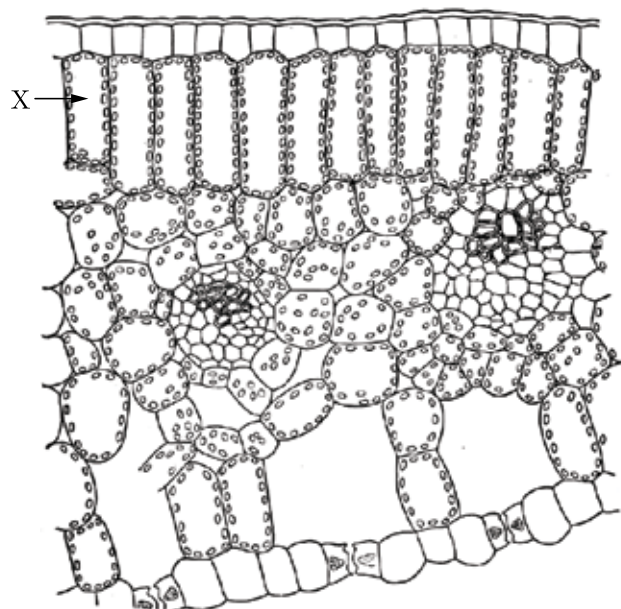
- (a) starch test and potassium iodide

- (b) chlorophyll test and ethyl alcohol  
 (c) photosynthesis test and potassium iodide  
 (d) starch test and ethyl alcohol

**Ans :** (a) starch test and potassium iodide

The given diagram indicates that starch test is performed on the leaf and potassium iodide is used for the test.

- 18.3** Below given diagram represents the cross section of a leaf.



Identify "X" and choose the correct combination of plots provided in the following table.

	X	Description	Function
(a)	Chlorophyll	A green coloured pigment	Essential for photosynthesis
(b)	Chloroplast	A cell organelle	Conducts photosynthesis
(c)	Vascular bundle	Vascular tissue	Transportation in plants
(d)	Chloroplast	A green coloured pigment	Essential for photosynthesis

**Ans :** (b)

In the given diagram "X" represents the chloroplast, i.e., the cell organelles that contain chlorophyll.

- 18.4** Which of the following statement(s) is (are) true about stomata?

- I. These are the tiny pores present on the surface of the leaves.  
 II. Through these, massive amounts of gaseous exchange take place.  
 III. Plants open these pores when carbon dioxide is not required for photosynthesis.  
 IV. Guard cells operate the opening and closing of these pores.  
 (a) I and II only (b) I and III only  
 (c) I, II and III only (d) I, II and IV only

**Ans :** (d) I, II and IV only

Since large amounts of water can also be lost through the stomata, the plant closes these pores when it does not need carbon dioxide for photosynthesis.

18.5 Study the table below and select the row that has the incorrect information.

	Organism	Type of heterotrophic nutrition
(a)	Amoeba	Holozoic
(b)	Mushroom	Saprophytic
(c)	Lice	Parasitic
(d)	Lion	Parasitic

Ans : (d)

Lion show holozoic type of nutrition. In such type of nutrition, the digestion of food follows after the ingestion of food. Thus, digestion takes place inside the body of the organism while parasitic nutrition is a mode of heterotrophic nutrition where an organism lives on the body surface or inside the body of another type of organism. The parasite obtains nutrition directly from the body of the host. The parasites derive their nourishment from their host.

19. Read the following and answer any four questions from 19.1 to 19.5. 1 × 4

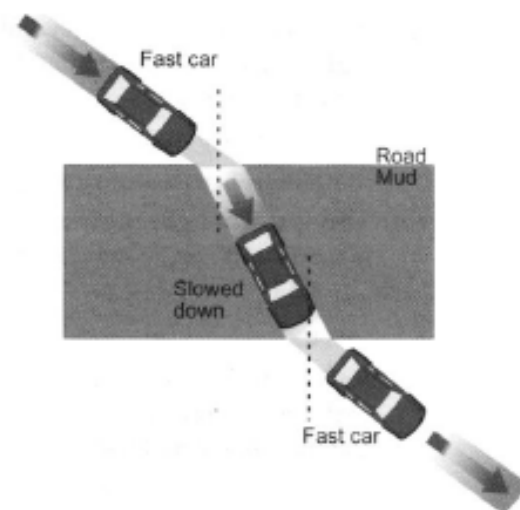
A ray of light travelling from a rarer medium to a denser medium slows down and bends towards the normal. When it travels from denser medium to a rarer medium, it speeds up and bends away from the normal.

Consider an analogy to assist in our understanding of these two important principles. Suppose that a fast car is travelling across the road towards a thick mud at an angle, the mud slows down one side of the car, and the path of the car bends.

The more it is slowed, the more it bends. Upon exiting the thick mud on the opposite side, the car speeds up and achieves its original speed. In effect, this analogy would be representative of light wave crossing two boundaries.

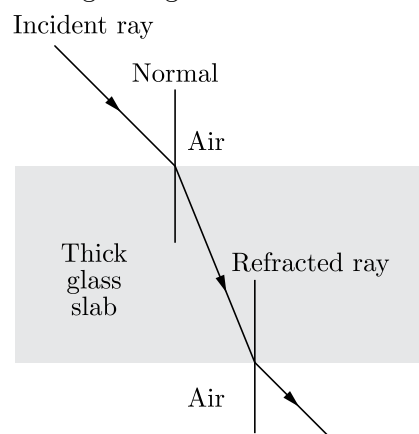
At the first boundary (the road to thick mud boundary), the light ray (or the car) would be slowing down; and at the second boundary (the mud to road boundary), the light ray (or the car) would be speeding up. We can apply our two important principles listed above and predict the direction of bending and the path of the car as it travels through the thick mud. As indicated in the diagram, upon entering the mud, the car slows down and the path of the car bends towards the normal (perpendicular line drawn to the surface). Upon exiting the mud, the car speeds up and the path of the car bends away from the normal. The path of the car is closer to the normal in the slower medium and farther from the normal in the faster medium.

This analogy can be extended to the path of a light ray as it passes from air into and out of a rectangular block of glass.



19.1 A student studies that when a ray of light travels from air into the glass slab, it bends towards the normal. But as refracted ray emerges out of the glass slab to the vacuum, it bends away from the normal, as shown.

Which option explains the law of refraction of light through the glass slab?



- (a) Light always bends towards the normal slab in a glass slab.
- (b) Ray of light travelling in the air is always considered as the incident ray, and the one in the glass is the refracted ray.
- (c) The incident ray, the refracted ray and the normal to the interface always lie on the same plane.
- (d) Ray of light always travels in a straight path irrespective of change in medium.

Ans : (c) The incident ray, the refracted ray and the normal to the interface always lie on the same plane.

All the refracted rays follow the first law of refraction i.e., the incident ray, the refracted ray and the normal to the interface of two transparent media at a point of incidence, all lie in the same plane.

19.2 A student studies that speed of light in air is 300000 km/s whereas that of speed in a glass slab is about 197000 km/s. What causes the difference in speed of light in these two media?

- (a) Difference in density
- (b) Difference in amount of light
- (c) Difference in direction of wind flow
- (d) Difference in temperature

**Ans :** (a) Difference in density

The speed of light varies with density as the medium with higher density decreases the speed of light and medium with lower density increases the speed of light.

**19.3** The speed of light in air is  $3 \times 10^8$  m/s, whereas that of the speed of light in water is  $2.26 \times 10^8$  m/s. What is the refractive index of water with respect to air?

- (a) 2.64
- (b) 1
- (c) 1.32
- (d) 0.75

**Ans :** (c) 1.32

Speed of light in air,  $c = 3 \times 10^8$  m/s

Speed of light in water,  $v = 2.26 \times 10^8$  m/s

Refractive index of glass,  $n = \frac{c}{v}$

$$n = \frac{3 \times 10^8}{2.26 \times 10^8} = 1.32$$

**19.4** Rahul conducts an experiment using an object of height 10 cm and a concave lens with focal length 20 cm. The object is placed at a distance of 25 cm from the lens. Can the image be formed on a screen?

- (a) Yes, as the image formed will be real.
- (b) No, as the image formed will be inverted.
- (c) No, as the image formed will be virtual.
- (d) Yes, as the image formed will be erect.

**Ans :** (c) No, as the image formed will be virtual.

Here,  $f = -20$  cm [concave lens]  
 $u = -25$  cm;  $v = ?$

Using lens formula,

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

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

$$\frac{1}{v} = -\frac{1}{20} - \frac{1}{25} = \frac{-9}{100}$$

$$v = \frac{-100}{9} \text{ cm}$$

The negative sign shows that the image is formed in front of the lens and the image is virtual. So, it cannot be obtained on a screen.

**19.5** A ray of light continues moving along the same path while passing through air-glass interface. The angle of incidence for the ray is

- (a) zero
- (b)  $90^\circ$
- (c) less than  $90^\circ$
- (d) greater than  $90^\circ$

**Ans :** (a) zero

No bending of light occurs when light is incident normally on a boundary of two media since angle of incidence and angle of refraction both are zero.

**20. Read the following and answer any four questions from 20.1 to 20.5. 1 × 4**

It is now well known that “magnetic field is caused by electric current.”

Whenever there is a change in magnetic flux linked with a coil (or circuit) an emf is induced in the coil. This phenomenon is called electromagnetic induction.

The emf produced in the coil is called the induced emf. If the coil is closed, the current thus produced is called as induced current.

The direction of induced current is determining by Fleming’s right hand rule.

These induced current are used in a moving coil microphone, tape-recorders, video-recorders, hard-discs in computers, etc.

**20.1** The direction of magnetic field around straight conductor carrying current can be determined by

- (a) Fleming’s right hand rule
- (b) Fleming’s left hand rule
- (c) Right hand thumb rule
- (d) Lenz’s law

**Ans :** (c) Right hand thumb rule

Right hand thumb rule, here thumb points in the direction of current and fingers of right hand indicates direction of magnetic field.

**20.2** Induced current flows through coil

- (a) only for the period during which magnetic field changes through it.
- (b) less than the period during which magnetic field changes through it
- (c) more than the period during which magnetic field changes through it
- (d) none of these

**Ans :** (a) only for the period during which magnetic field changes through it.

According to the Faraday’s law, the relative motion between magnetic field and coil induced the current.

**20.3** The direction of induced current is determined by

- (a) Fleming’s right hand rule
- (b) Fleming’s left hand rule
- (c) Right hand thumb rule
- (d) Lenz’s law

**Ans :** (a) Fleming’s right hand rule

Fleming right hand rule, in which, forefinger  $\rightarrow \vec{B}$  (direction of magnetic field), middle finger  $\rightarrow$  direction of current and thumb  $\rightarrow$  direction of motion of conductor.

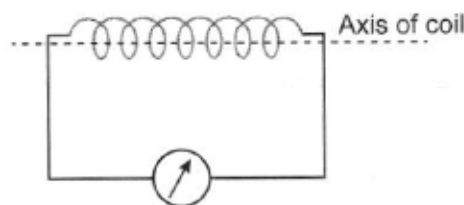
**20.4A** technique of taking image of different body organs which is based on magnetic effect of current is

- (a) MRI
- (b) X-ray
- (c) sonography
- (d) none of these

**Ans :** (a) MRI

MRI is based on Electromagnetic Induction principle.

**20.5** A student connects a coil of wire with a sensitive galvanometer as shown in figure. He will observe the deflection in the galvanometer if bar magnet is



- (a) placed near one of the faces of the coil and parallel to the axis of the coil
- (b) placed near one of the faces of the coil and perpendicular to the axis of the coil
- (c) moved towards or away from the coil and parallel to the axis of the coil
- (d) placed inside the coil

**Ans :** (c) moved towards or away from the coil and parallel to the axis of the coil

According to Faraday’s law relative change between current carrying coil and magnetic field cause induced current in the coil.

## SECTION-B

- 21.** Name two physical properties each of sodium and carbon in which their behaviour is not as expected from their classification as metal and non-metal respectively. [2]

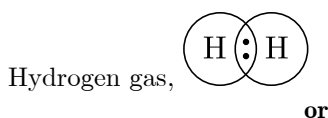
**Ans :**

**Sodium metal:** Soft, low melting point.

**Carbon non-metal:** Graphite conducts electricity, diamond has a very high melting point.

- 22.** Draw the electron dot structure of the gas molecule which is liberated when zinc metal is treated with aqueous NaOH solution. [2]

**Ans :**



What is heteroatom? Give an example.

**Ans :**

The atom which replace one or more hydrogens in a hydrocarbon chain such that the valency of carbon remains satisfied is called heteroatom. For example, oxygen, nitrogen, etc.

- 23.** How does water affect the rate of photosynthesis in plants? [2]

**Ans :**

Water controls the opening and closing of stomata. The deficiency of water causes stomata to open very little or it may even remain closed. Therefore, carbon dioxide (required as a raw material for photosynthesis) cannot enter into the leaves and thus lack of water slows down the rate of photosynthesis.

- 24.** List two different functions performed by pancreas in our body. [2]

**Ans :**

- (i) Pancreas secrete digestive enzymes which help in the digestion process.
- (ii) The endocrine part of pancreas (Langerhans cells) produce hormones like glucagon, insulin, etc.

or

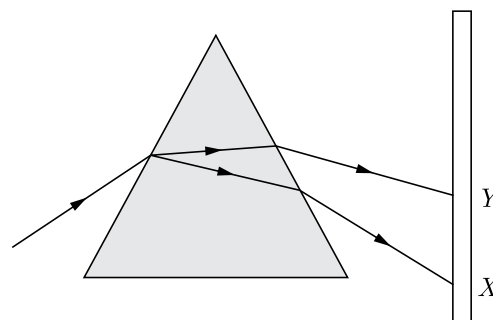
What is peptic ulcer? How is peptic ulcer caused?

**Ans :**

An ulcer on the inner membrane lining of the stomach

is called peptic ulcer. Peptic ulcer is caused by the high acidity of gastric juice secretions.

- 25.** In the figure given below, a narrow beam of white light is shown to pass through a triangular glass prism. After passing through the prism, it produces a spectrum *XY* on the screen.



- (i) Name the phenomenon.
- (ii) State the colours seen at *X* and *Y*. [2]

**Ans :**

- (i) The phenomenon is called dispersion.
- (i) *X* – Violet *Y* – Red.

- 26.** Two wires made of copper and nichrome have equal lengths and equal resistance. Which is thicker? (The resistivity of nichrome is greater than resistivity of copper.) [2]

**Ans :**

For copper wire,  $R_C = \rho_C \frac{l}{A_C}$  ... (1)

For nichrome wire,  $R_N = \rho_N \frac{l}{A_N}$  ... (2)

From (1) and (2),

$$\frac{\rho_C}{A_C} = \frac{\rho_N}{A_N}$$

[resistances are equal]

Since,  $\rho_N > \rho_C ; A_N > A_C$

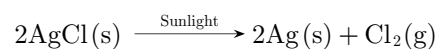
Thickness of nichrome is greater.

## SECTION-C

- 27.** 2 g of silver chloride is taken in a china dish and the china dish is placed in sunlight for sometime. What will be your observation in this case? Write the chemical reaction involved in the form of a balanced chemical equation. Identify the type of chemical reaction. [3]

**Ans :**

The white silver chloride turns grey in sunlight. This is because silver chloride decomposes to form silver and chlorine gas.



It is a photodecomposition reaction.

- 28.** Distinguish between ionic and covalent compounds under the following properties:

- (i) Strength of forces between constituent elements
- (ii) Solubility of compounds in water
- (iii) Electrical conduction in substances [3]

**Ans :**

- (i) Ionic compounds have strong force of attraction between the oppositely charged ions (e.g., Na<sup>+</sup> and Cl<sup>-</sup>), so they are solids. Covalent compounds have weak force of attraction between their molecules, so they are usually liquids or gases.
- (ii) Ionic compounds are soluble in water but covalent compounds are insoluble in water.
- (iii) Ionic compounds conduct electricity when dissolved in water or when melted because they contain ions (charged particles). But, covalent compounds like glucose do not conduct electricity because they do not contain ions.

**29.** An element 'X' has mass number 35 and number of neutrons 18. Write atomic number and electronic configuration of 'X'. Also write group number, period number and valency of 'X'. [3]

**Ans :**

Atomic number of X = Mass number of X – Number of neutrons N

$$= 35 - 18 = 17$$

Therefore, electronic configuration of X = 2, 8, 7

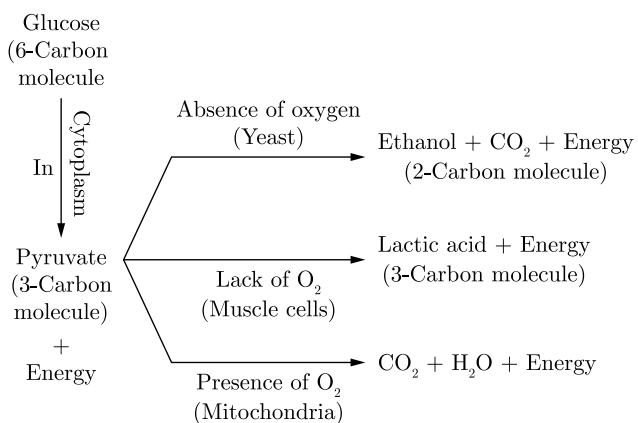
Group number = 17

Period number = 3

Valency = 8 – 7 = 1

**30.** Explain the processes of aerobic respiration in mitochondria of a cell and anaerobic respiration in yeast and muscle with the help of word equations. [3]

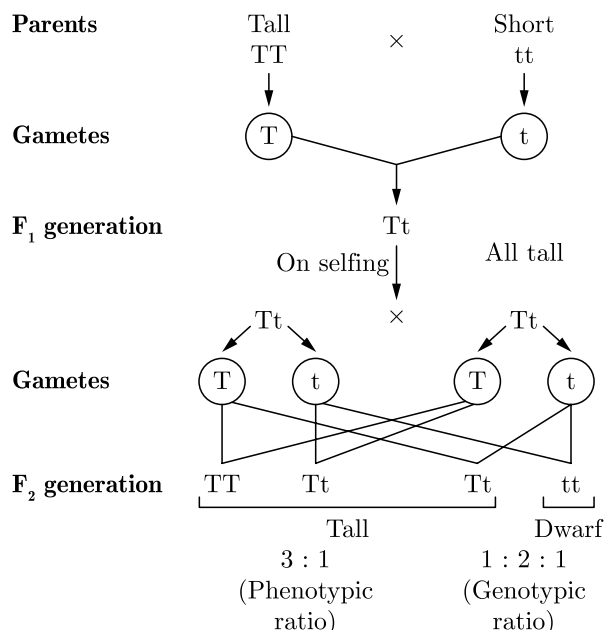
**Ans :**



**31.** Name the plant Mendel used for his experiment. What type of progeny was obtained by Mendel in F<sub>1</sub> and F<sub>2</sub> generations when he crossed the tall and short plants? Write the ratio he obtained in F<sub>2</sub> generation plants. [3]

**Ans :**

Pea Plant/Garden pea/Pisum sativum was used by Mendel for his experiment.  
 Progeny in F<sub>1</sub>-All tall; Progeny in F<sub>2</sub>-Tall and short.  
 Ratio obtained in F<sub>2</sub> generation plants-3 Tall : 1 Short.



or

List two differences in tabular form between dominant trait and recessive trait. What percentage/proportion of the plants in the F<sub>2</sub> generation/progeny were round, in Mendel's cross between round and wrinkled pea plants?

**Ans :**

	Dominant trait	Recessive trait
1.	The trait which appears in the F <sub>1</sub> progeny is dominant.	The trait which remains hidden or which does not appear in the F <sub>1</sub> progeny is the recessive trait.
2.	It appears in more numbers.	It appears in less number.

75% of the plants were with round seeds.

**32.** (i) List four characteristics of the images formed by plane mirrors.  
 (ii) How can you distinguish between a plane mirror, a concave mirror and a convex mirror without touching them? [3]

**Ans :**

- (i)
  - (a) Image formed by a plane mirror is always virtual and erect.
  - (b) The size of the image is equal to that of the object.
  - (c) The image formed is as far behind the mirror as the object is in front of it.
  - (d) The image is laterally inverted.
- (ii) By observing the virtual images formed by the three mirrors, we can distinguish-between the mirrors as:
  - (a) Plane mirror will produce an image of the same size,
  - (b) Concave mirror will produce a magnified image, and
  - (c) Convex mirror will produce a diminished image.

33. Why are forests considered “biodiversity hot spots”? Suggest four approaches towards the conservation of forests. [3]

**Ans :**

Forests are rich reservoir of biodiversity containing a large number of plants and animals. So they are called as biodiversity hot spots.

Approaches towards conservation of forests:

- (i) Help of local people should be taken/local people should be involved.
- (ii) Indiscriminate destruction of forest should be strictly prohibited.
- (iii) Planting of trees should be increased.
- (iv) Destruction of forests should not be done for making roads, dams and hotels etc.

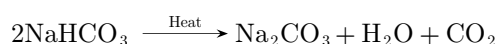
## SECTION-D

34. For making cake, baking powder is taken. If at home your mother uses baking soda instead of baking powder in cake.

- (i) How will it affect the taste of the cake and why?
- (ii) How can baking soda be converted into baking powder?
- (iii) What is the role of tartaric acid added to baking soda? [5]

**Ans :**

- (i) Baking soda is sodium hydrogencarbonate. On heating, it is converted into sodium carbonate which is bitter to taste.



- (ii) Baking soda can be converted into baking powder by the addition of appropriate amount of tartaric acid to it.
- (iii) The role of tartaric acid is to neutralise sodium carbonate and thus cake will not taste bitter.

**or**

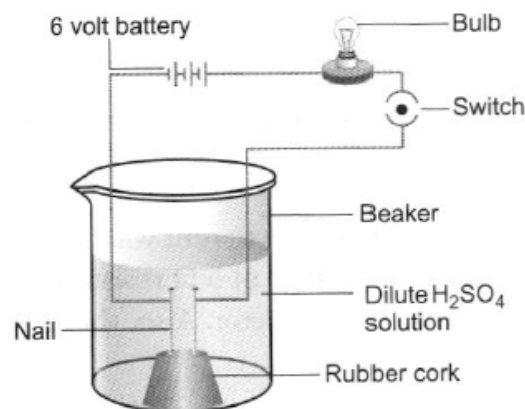
Compounds such as alcohols and glucose also contain hydrogen but are not categorised as acids. Describe an activity to prove it.

**Ans :**

Although alcohols and glucose contain hydrogen, they are not ionised to give  $\text{H}^+$  ions in solution. So, they are not considered as acid.

**Activity:**

- (a) Collect solutions of hydrochloric acid, sulphuric acid, glucose and alcohol.
- (b) Take a beaker of 100 mL.
- (c) Now, take a cork and fix two nails on it as shown in figure.
- (d) Place this cork in the beaker.
- (e) Connect the nails to the two of a 6 volt battery through a bulb and a switch.
- (f) Now, pour dilute  $\text{H}_2\text{SO}_4$  in the beaker so that the nails are immersed in the acid. Switch on the current.
- (i) Repeat the experiment with dilute hydrochloric acid, glucose and alcohol solutions.
- (j) What do you observe?
- (k) Does the bulb glow in all cases?



It is observed that the bulb will glow in case of hydrochloric acid and sulphuric acid, but not in the case of alcohol and glucose.

35. Define pollination. Explain the different types of pollination. List two agents of pollination. How does suitable pollination lead to fertilization? [5]

**Ans :**

Pollination is defined as the transfer of pollen from anther or stamen to stigma of the flower.

**Types of pollination:**

- (i) **Self pollination:** Transfer of pollen from anther or stamen to stigma occurs in the same flower or to the flower of same plant.
- (ii) **Cross pollination:** Pollen is transferred from anther or stamen of one flower to stigma of another flower of another plant of same species.

**Agents of pollination:** Wind, water, insects and animals. (Any two)

After pollination, a tube grows out of the pollen grain and travels through the style to reach the female germ cell in the ovary, which results in fertilization.

36. A current of 1 ampere flows in a series circuit having an electric lamp and a conductor of  $5\ \Omega$  when connected to a 10 V battery. Calculate the resistance of the electric lamp.

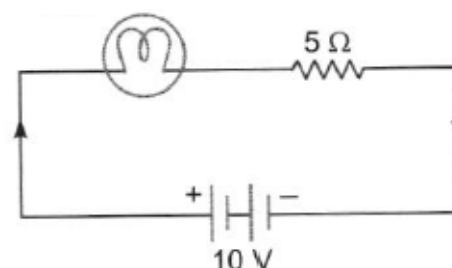
Now if a resistance of  $10\ \Omega$  is connected in parallel with this series combination, what change (if any) in current flowing through  $5\ \Omega$  conductor and potential difference across the lamp will take place? Give reason. [5]

**Ans :**

Let the resistance of the lamp =  $R_1$

Resistance of conductor,  $R_2 = 5\ \Omega$

Total resistance in series,  $R_s = R_1 + R_2$   
 $= R_1 + 5$



Current,  $I = 1\ \text{A}$

Voltage,  $V = 10\ \text{V}$

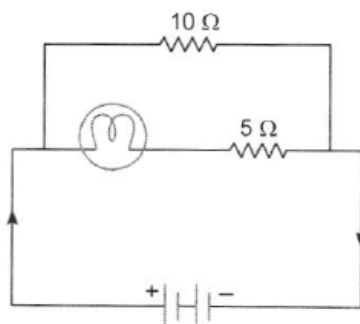


Using Ohm's law,  $V = IR$

$$10 = 1(R_1 + 5)$$

$$R_1 = 5 \Omega$$

Now, a resistance of  $10 \Omega$  is connected in parallel with the series combination. Therefore, the total resistance of the circuit is given by



$$\frac{1}{R_P} = \frac{1}{(R_1 + 5)} + \frac{1}{10}$$

$$\frac{1}{R_P} = \frac{1}{10} + \frac{1}{10}$$

$$\frac{1}{R_P} = \frac{2}{10}$$

$$R_P = 5 \Omega$$

Hence, current flowing in the circuit,

$$I = \frac{V}{R} = \frac{10}{5} = 2 \text{ A}$$

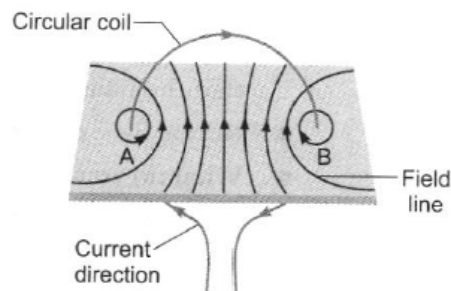
Thus, 1 A current will flow through  $10 \Omega$  resistor and 1 A will flow through the lamp and conductor of  $5 \Omega$  resistance. Hence, there will be no change in current flowing through  $5 \Omega$  conductor. Also, there will be no change in potential difference across the lamp.

**or**

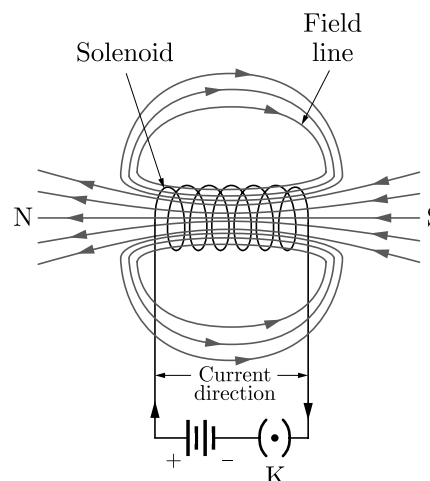
- (i) With the help of a labelled diagram, explain the distribution of magnetic field due to a current through a circular loop. Why is it that if a current carrying coil has  $n$  turns, the field produced at any point is  $n$  times as large as that produced by a single turn?
- (ii) Draw a pattern of magnetic field formed around a current carrying solenoid. What happens to the magnetic field when the current through the solenoid is reversed?

**Ans :**

- (i) The pattern of the magnetic field lines near the wires of the coil are concentric circles. The curvature of these curves go on increasing as we move away from the wire. At the centre of the circular loop, the field lines are nearly straight. The magnetic field produced by a current carrying wire at a given point depends directly on the current passing through it. Therefore, if there is a circular coil having  $n$  turns, the field produced is  $n$ -times as large as that produced by a single turn. This is because the current in each circular turn has the same direction, and the field due to each turn then just adds up.



(ii)



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