Class- X Session - 2022-23

Subject - Science (086)

Sample Question Paper - 10

with Solution

Max. Marks: 80 **Time Allowed: 3 hours**

General Instructions:

i. *This question paper consists of 39 questions in 5 sections.*
ii. *All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.*
iii. ***Section A** consists of 20 objective type questions carrying 1 mark each.*
iv. ***Section B** consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should in the range of 30 to 50 words.*
v. ***Section C** consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should in the range of 50 to 80 words*
vi. ***Section D** consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.*
vii. ***Section E** consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.*

Section A

1. Generally, non-metals are not conductors of electricity. Which of the following is a good conductor of electricity? **[1]**

   a) Fullerene b) Sulphur

   c) Diamond d) Graphite

2. Reaction between water and quick lime gives rise to calcium hydroxide which of the following statement are correct? **[1]**

   A. The reaction is exothermic

   B. The pH of the final solution is less than 7

   C. The reaction is endothermic

   D. The pH of the final solution is greater than 7

   a) A and C b) C and D

   c) A and D d) All of these

3. Sodium stearate is chemically a: **[1]**

   a) Baking soda b) Bleaching powder

   c) Detergent d) Soap

4. A 10 mm long awl pin is placed vertically in front of a concave mirror. A 5 mm long image of the awl pin is formed at 30 cm in front of the mirror. The focal length of this mirror is **[1]**

a) - 20 cm

b) - 40 cm

c) - 30 cm

d) - 60 cm

5. How are the two strands in a DNA molecule held together? **[1]**

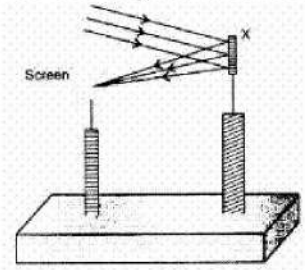
a) Covalent bond

b) Ionic bond

c) Hydrogen bond

d) Phosphate band

6. A student determines the focal length of a device X, by focusing the image of a far off object on the screen positioned as shown in the figure below: **[1]**



The device X is a :

a) Convex mirror

b) Concave mirror

c) Concave lens

d) Convex lens

7. Match the following with correct response. **[1]**

Column A	Column B
(i) Syphilis	(a) Treponema pallidum
(ii) AIDS	(b) Bacterium Neisseria
(iii) Gonorrhoea	(c) Human Immunodeficiency virus
(iv) Trichomoniasis	(d) Trichomonas Vaginalis

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

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

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

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

8. Match the following with correct response. **[1]**

Column A	Column B
(i) Junction between neuron	(a) Thermoreceptors
(ii) The largest cell in the human body	(b) Neuron
(iii) Sense organs for smell	(c) Synapse
(iv) Sense organs for touch	(d) Olfactory receptors

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

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

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

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

9. Ridhima put lime water in the beaker. She finds lime water turns milky. It means **[1]**

a) Presence of lime with germinating seeds

b) Absence of KOH

c) Absence of NaOH

d) Presence of KOH in conical flask in the test tube

10. Cretinism results due to: **[1]**

a) Excess secretion of adrenaline

b) Excess secretion of growth hormone

c) Under secretion of thyroxin

d) Under secretion of growth hormone

11. Match the following with correct response. **[1]**

Column A	Column B
(i) Ovary	(a) Tying or cutting the fallopian tubes
(ii) Vasectomy	(b) Form fruits and ovules from seeds
(iii) Tubectomy	(c) Individual having both the sexes
(iv) Hermaphrodite	(d) Tying or cutting the vas deferens

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

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

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

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

12. Non-metals do not replace hydrogen from acids because**:** **[1]**

a) They are more reactive than hydrogen.

b) None of these

c) They are less reactive than hydrogen.

d) Non-metal being acceptors of electrons.

13. Match the following with the correct response: **[1]**

(i) The bond which holds cations and anions	(a) Ionic
(ii) Self linking property of carbon	(b) Pyridine
(iii) Denatured alcohol	(c) Catenation
(iv) Synthetic detergents	(d) Non-biodegradable

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

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

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

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

14. Which of the following is not a part of the female reproductive system in human beings? **[1]**

a) Fallopian Tubes

b) Vas deferens

c) Uterus

d) Ovary

15. Which of the following are exothermic processes? **[1]**

i. Reaction of water with quick lime

ii. Dilution of an acid

iii. Evaporation of water

iv. Sublimation of camphor (crystals)

a) (i) and (ii)

b) (iii) and (iv)

c) (ii) and (iii)

d) (i) and (iv)

16. **Assertion (A):** During electrolysis of a concentrated aqueous solution of sodium chloride, hydrogen is produced at the anode and chlorine gas is produced at the cathode. **[1]**
Reason (R): Ions get attracted to oppositely charged electrodes.

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 but R is false.

d) A is false but R is true.

17. **Assertion (A):** Two resistance having value R each. Their equivalent resistance is $\frac{R}{2}$. **[1]**
Reason (R): Given Resistance is connected in parallel.

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 but R is false.

d) A is false but R is true.

18. **Assertion (A):** Digestion breaks large complex molecules to simple smaller molecules which can be easily absorbed. **[1]**
Reason (R): Digestion is necessary for the absorption of all molecules.

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 but R is false.

d) A is false but R is true.

19. Vinegar is a solution of **[1]**

a) 5% – 8% acetic acid in water

b) 50% – 60% acetic acid in alcohol

c) 5% – 8% acetic acid in alcohol

d) 50% – 60% acetic acid in water

20. **Assertion (A):** Lead, tin and bismuth are purified by liquation method. **[1]**
Reason (R): Lead, tin and bismuth have low m.p. as compared to impurities.

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 but R is false.

d) A is false but R is true.

Section B

21. Microorganisms are often referred to as the 'scavengers of the environment.' Explain. **[2]**

22. Differentiate between a glass slab and a glass prism. What happens when a narrow beam of **[2]**

i. a monochromatic light, and

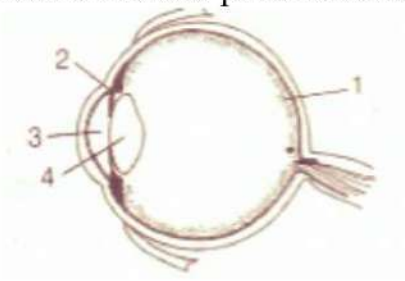
ii. white light passes through

a. glass slab and

b. glass prism?

OR

Name the four parts labelled as 1, 2, 3 and 4 in the given figure.



23. Define the term power of a lens. Give its SI unit. State whether the power of a converging lens is positive or negative. **[2]**

24. Why and how does water enter continuously into the root xylem? **[2]**

25. A student reports the police about the illegal vending of alcohol near his school. He also knew about denatured alcohol. **[2]**

i. What is denatured alcohol?

ii. What would happen if somebody consumes denatured alcohol?

26. What are strong and weak acids? In the following list of acids, separate strong acids from weak acids**:** **[2]**

Hydrochloric acid, citric acid, acetic acid, nitric acid, formic acid, sulphuric acid

Section C

27. Suggest any two methods for reducing the problem of waste disposal. **[3]**

28. Pratyush took sulphur powder on a spatula and heated it. He collected the gas evolved by inverting a test tube over it. **[3]**
What will be the action of gas on

i. Dry litmus paper?

ii. Moist litmus paper?

Write a balanced chemical equation for the reaction taking place.

29. Distinguish between a convex lens and a concave lens. **[3]**

OR

How can you distinguish between plane mirror, convex mirror and concave mirror by merely looking at the image formed in each case?

30. Name the following **[3]**

i. The process in plants that links light energy with chemical energy.

ii. Organisms that can prepare their own food.

iii. The cell organelle where photosynthesis occurs.

iv. Cells that surround a stomatal pore.

v. Organisms that cannot prepare their own food.

vi. An enzyme secreted from gastric glands in the stomach that act on proteins.

31. DNA copies generated during reproduction will be similar but may not be identical to the original. justify this statement. **[3]**

OR

The embryo gets its nutrition from the mother's blood with the help of special tissue.

i. What is this special tissue called?

ii. Give any other function of this tissue apart from one mentioned above.

iii. Explain the structure of this special tissue.

32. A student sitting at the back of the classroom cannot read clearly the letters written on the backboard. What advice will a doctor give to her? **[3]**

33. Under what conditions permanent electromagnet is obtained, if a current carrying solenoid is used? Support your answer with the help of a labelled circuit diagram. **[3]**

Section D

34. Name various plant hormones. Also give their physiological effects on plant growth and development. **[5]**

OR

What are the major parts of the brain? Mention the functions of different parts.

35. Equal length of magnesium ribbon are taken in two test tubes A and B. H_2SO_4 is **[5]**

added to test tube A and H_2CO_3 in the test tube **B** in equal amounts:

i. Identify the test tube showing vigorous reaction.

ii. Give reason to support your answer.

iii. Name the gas liberated in both the tubes. How will you prove its liberation?

iv. Write chemical equations for both reactions.

v. Out of the two acids taken above.

a. Which one will have lower pH value?

b. Which one will have lower H^+ concentration?

OR

What are hydrated salts and water of crystallization ?

36. What is the pattern of magnetic field due to a circular coil carrying current? **[5]**

Section E

37. **Read the text carefully and answer the questions:** **[4]**

Mendel crossed tall and dwarf pea plants to study the inheritance of one gene. He collected the seeds produced as a result of this cross and grew them to generate plants of the first hybrid generation which is called the first filial progeny or F_1 Mendel then self-pollinated the tall F_1 plants and he obtained F_2 generation.

(i) In garden peas, the round shape of the seeds is dominant over the wrinkled shape. A pea plant heterozygous for the round shape of seed is selfed and 1600 seeds produced during the cross are subsequently germinated. How many seedlings would have a non-parental phenotype?

(ii) If A' represents the dominant gene and 'a represents its recessive allele, which of the following would be the most likely result in the first generation offspring when Aa is crossed with aa?

OR

What result Mendel would have got if he self-pollinated a homozygous tall F_2 plant?

38. **Read the text carefully and answer the questions:** **[4]**

When oxygen combines with other elements or compounds, the process is called oxidation the substances that combine with oxygen are said to have been oxidized.

The reduction is exactly the opposite of oxidation. If a substance loses oxygen during a reaction, it is said to be reduced. When hydrogen burns the hydrogen combines with oxygen to form water $2H_2 + O_2 = H_2O$

The hydrogen is oxidized in this reaction, but at the same time, the oxygen is reduced. Whatever oxidation occurs reduction must also occur.

(i) Which chemical process is used for obtaining a metal from its oxide?

(ii) In the given reaction, which reactant species is oxidized?

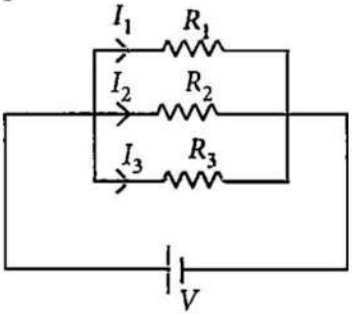
(iii) In the given reaction, which reactant species is reduced?

OR

If four molecules of Hydrogen are combined with oxygen then how many molecules of water are formed?

39. **Read the text carefully and answer the questions:** **[4]**

If two or more resistances are connected in such a way that the same potential difference gets applied to each of them, then they are said to be connected in parallel.

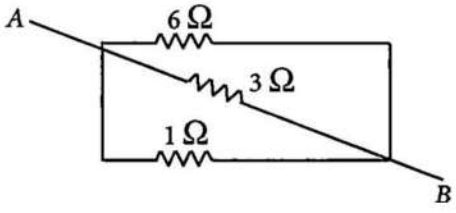


The current flowing through the two resistances in parallel is, however, not the same. When we have two or more resistances joined in parallel to one another, then the same current gets additional paths to flow and the overall resistance decreases.

(i) Three resistances, 2 Ω, 6 Ω and 8 Ω are connected in parallel, then what will be the equivalent resistance?

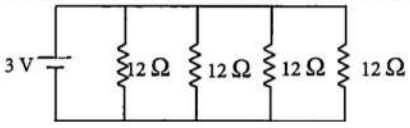
(ii) A wire of resistance 12Ω is cut into three equal pieces and then twisted their ends together, then what will be the equivalent resistance?

(iii) Three resistances are connected as shown. Calculate the equivalent resistance between A and B?



OR

Find the current in each resistance.



Solution

Section A

1. **(d)** Graphite
   Explanation: Graphite is a good conductor of electricity and heat. Graphite has weak intermolecular forces between its layers. Hence it has de-localized electrons. As electrons are free to move through its structure, it conducts heat and is a good conductor of electricity.
2. **(c)** A and D
   Explanation: Calcium hydroxide, when dissolved in water, is an exothermic reaction and produces an alkaline media.
3. **(d)** Soap
   Explanation: Sodium stearate ($C_{17}H_{35}COONa$) is chemically a sodium salt of stearic acid ($C_{17}H_{35}COOH$). Stearic acid (IUPAC name - Octadecanoic acid) is a saturated fatty acid with an 18-carbon chain. **Soaps** are sodium or potassium salts of long-chain fatty acids.
4. **(a)** - 20 cm
   Explanation: Here, size of object = O = +10.0 mm = +1.0 cm (as, 1 cm = 10 mm)
   Size of Image size = 1 = 5.0 mm = 0.5cm
   Image distance, v = -30 cm (as image is real)
   Let. object distance = u
   Focal length, f = ?
   Magnification m = $\frac{1(Size\ of\ image)}{O(Size\ of\ image)}$
   Magnification is given by m = $\frac{-v}{u}$
   $\frac{1}{0} = \frac{-v}{u}$
   $\frac{05}{1} = \frac{-30}{u}$
   U = - 60 cm
   Focal length is given by $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$
   $\frac{1}{f} = \frac{1}{-30} + \frac{1}{-60} = \frac{-2-1}{60}$
   $= \frac{-3}{60}$
   F = -20 cm
5. **(c)** Hydrogen bond
   Explanation: Each DNA molecule consists of two twisted strands of bases that form a shape called a double helix. The two strands are held together by hydrogen bonds between pairs of bases.
6. **(b)** Concave mirror
   Explanation: Because the screen is on the same side of the object which means it is never a lens becoz it happens behind the lenses in such case. Moreover Concave mirror forms real images i.e. image can be obtained on a screen.
7. **(b)** (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
   Explanation:
   - **Syphilis** is a sexually transmitted infection caused by the bacterium **Treponema pallidum** subspecies pallidum.

- The **human immunodeficiency virus (HIV)** is a lentivirus (a subgroup of retrovirus) that causes HIV infection and over time **acquired immunodeficiency syndrome (AIDS)**.
- **Gonorrhea** is an infection caused by the bacterium **Neisseria gonorrhoeae**. It not only affects the reproductive tract, but can also affect the mucous membranes of the mouth, throat, eyes, and rectum.
- **Trichomoniasis** (or "trich") is a very common sexually transmitted disease (STD). It is caused by infection with a protozoan parasite called **Trichomonas vaginalis**.

8. **(a)** (i) - (c), (ii) - (b), (iii) - (d), (iv) - (a)
   Explanation:
   - In the nervous system, a synapse is a structure which serves as Junction between neuron that permits a neuron to pass an electrical or chemical signal to another neuron.
   - A neuron is an electrically excitable cell that processes and transmits information through electrical and chemical signals that is why it is the largest cell in the human body.
   - Olfactory receptors are responsible for the detection of odorants which give rise to the sense of smell.
   - Thermoreceptors are able to detect heat and cold and are found throughout the skin in order to allow sensory reception throughout the body.
9. **(b)** Absence of KOH
   Explanation: KOH absorbs the CO_2 gas so, in the absence of KOH, CO_2 gas turns lime water milky.
10. **(c)** Under secretion of thyroxin
    Explanation: Under secretion of thyroxin
11. **(b)** (i) - (b), (ii) - (d), (iii) - (a), (iv) - (c)
    Explanation:
    - A flower is a plant's reproductive structure. One major part is the carpel, the female reproductive structure that includes the ovary. Inside the ovary is an ovule that, when fertilized, will develop into a seed. A seed contains an embryo (baby plant), the endosperm (food for the embryo), and a seed coat.
    - Vasectomy is a surgical procedure for male sterilization or permanent contraception. During the procedure, the male vas deferens are severed and then tied or sealed in a manner so as to prevent sperm from entering into the urethra and thereby prevent fertilization.
    - Tubal ligation or tubectomy (also known as having one's "tubes tied") is a surgical procedure for sterilization in which a woman's fallopian tubes are clamped and blocked or severed and sealed, either of which prevents eggs from reaching the uterus for implantation.
    - Hermaphrodite is an animal having both male and female sex organs or other sexual characteristics, either abnormally or (in the case of some organisms) as the natural condition.
12. **(d)** Non-metal being acceptors of electrons.
    Explanation: Non-metals are electronegative. They do not provide free electrons. Hence they do not replace hydrogen from acids.
13. **(d)** (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
    Explanation:
    - Ionic bonds are formed between cations and anions.

- Catenation is the linkage of atoms of the same element into longer chains. Catenation occurs most readily in carbon.
- Pyridine is added to alcohol to make it unsuitable for drinking.
- Most of the synthetic detergents are non-biodegradable. They cannot be decomposed by micro-organisms like bacteria.

14. **(b)** Vas deferens
Explanation: The ductus deferens, also known as the vas deferens, is a tiny muscular tube in the male reproductive system that carries sperm from the epididymis to the ejaculatory duct. There is a pair of these ducts in the male body, with one duct carrying sperm from each testis to the left and right ejaculatory ducts.
15. **(a)** (i) and (ii)
Explanation: The exothermic process is the one that releases an enormous amount of heat. When water reacts with water and acid reacts with water it releases an enormous amount of heat.
16. **(d)** A is false but R is true.
Explanation: During electrolysis of a concentrated aqueous solution of sodium chloride. Ions get attracted to oppositely charged electrodes, sodium is produced at the anode and chlorine gas is produced at the cathode.
17. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: When two resistance R_1 and R_2 connected in parallel than their equivalent resistance will be r = $\frac{R_1 R_2}{R_1 + R2}$.
18. **(c)** A is true but R is false.
Explanation: Digestion breaks large complex organic molecules to simple smaller ones which can be easily absorbed. However, certain molecules such as glucose, vitamin C etc, do not need any digestion before their absorption.
19. **(a)** 5% – 8% acetic acid in water
Explanation: A 5% - 8% solution of acetic acid in water called vinegar.
20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Both A and R are true and R is the correct explanation of A.

Section B

21. Scavangers feed upon discarded and dead waste. Micro organisms are called scavengers of the environment because they decompose dead bodies of plants and animals present in the soil and help in cleaning the environment by removing waste products. They lie at the top of food chain.
22. **Glass slab:** It is rectangular in shape and made up of glass. In glass slab, the direction of the incident ray and the emergent ray of light are parallel to each other.
Glass Prism: It has two triangular sides, two inclined rectangular sides, and one rectangular base. In glass prism, the direction of the incident ray and the emergent ray of light is not parallel to each other.
When a narrow beam of monochromatic light passes through:
    - Glass slab: It deviates from the actual path but the direction of the incident ray and the emergent ray of light are parallel to each other.
    - Glass prism: It has deviated from the actual path but the direction of the incident ray and the emergent ray of light are not parallel to each other.

When a narrow beam of white light passes through:
    - Glass slab: The splitting of white light into its constituent color does not occur. And the direction of the incident ray and the emergent ray of light are parallel to each other.

- Glass prism: The splitting of white light into its constituent seven colors occurs. And the direction of the incident ray and the emergent ray of light is not parallel to each other.

OR

i. Retina, it is a sensory membrane where image is formed.
ii. Ciliary muscles, it changes the focal length of the lens.
iii. Pupil. aperture through which light enters.
iv. Eye lens, focus light onto the retina.

23. Power of a lens is defined as the reciprocal of its focal length f (in metres).
$P = \frac{1}{f(in\ m)}$
The Si unit of power of a lens is Diopter. The power of a converging lens is positive as f is +ve.

24. Root hairs have thin walls. Due to this, water enter s the root hairs because of osmosis. Water from root hairs continuously moves into the root xylem. To maintain the osmotic gradients, the cells of root hairs take up ions from the soil.

25. i. Denatured alcohol is ethanol made unfit for human consumption by adding one or more chemicals (denaturants) to it. Denaturing refers to removing a property from the alcohol (being able to drink it), not to chemically altering or decomposing it, so denatured alcohol contains ordinary ethyl alcohol.
ii. If someone consumes denatured alcohol, it results in coagulation of protoplasm causing acute nausea, blindness and even death.

26. In aqueous solutions, strong acids ionise completely and provide hydronium ($[H_3O]^+$) ions. On the other hand, weak acids are partially ionised and an aqueous solution of same molar concentration provides a much lesser concentration of hydronium ($[H_3O]^+$) ions.
Strong acids — Hydrochloric acid, sulphuric acid, nitric acid (Mineral acids are strong acids)
Weak acids — Citric acid, acetic acid, formic acid (Organic acids are weak acids)

Section C

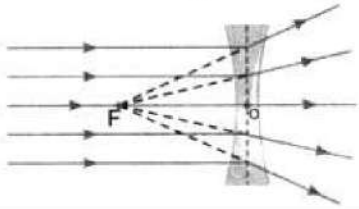
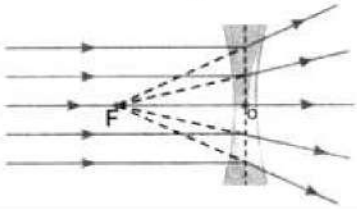
27. The amount of waste for disposal can be reduced by:

(a) Separation of biodegradable and non-biodegradable waste at source.
(b) Decomposing the bio degradable waste & producing manure or bio-gas from it.
(c) Recycling non biodegradable waste like plastic, metal cans etc.

28. The gas is sulphur-dioxide (SO_2)
i. It will not react with dry litmus paper.
ii. The gas will bleach moist litmus paper.
The balanced chemical equation is
$S + O_2 \xrightarrow{heat} SO_2$

29.

Convex Lens	Concave Lens

Convex Lens	Concave Lens
1. It is a thicker at the center than at the edges. 2. Is has real Focus. 3. It converges a parallel beam of light on reflection through it. 4. 	1. It is thinner at the center than at the edges. 2. It has virtual focus. 3. It diverges a parallel beam of light on refraction through it. 4. 

OR

1. If image is of same size, laterally inverted and erect, it is plane mirror.
2. If image is bigger or smaller in size and inverted or erect, it is concave mirror.
3. If image is smaller in size and erect as in rear view mirror , it is convex mirror.

30. i. Photosynthesis is a process by which green plants having chlorophyll can synthesize simple sugar (glucose) from water and CO_2 using the energy of sunlight. The light energy is used in a splitting of water molecules into hydrogen and oxygen (i.e. chemical energy).

ii. **Autotrophs:** The organisms which can synthesize their own food from inorganic substances present in the environment are called autotrophs. An *autotroph* or primary producer, is an organism that produces complex organic compounds , e.g. green plants, autotrophic bacteria etc.

iii. **Chloroplast:** Chlorophyll is the green pigment capable of trapping light energy required during photosynthesis. This pigment is present in the chloroplast of leaves of all green plants.

iv. Guard cells are present in the stomata under the leaves rim. Each stomatal pore is surrounded by a pair of guard cells, that control their opening and closing by the inflow and outflow of water.

v. **Heterotrophs:** The organisms which cannot make their own food from inorganic substances and depend on other organisms for their food are called heterotrophs, e.g. all animals, yeast, most bacteria, etc.

vi. **Pepsin:** It is a protein-digesting enzyme secreted from gastric glands present in the walls of the stomach, an enzyme in the stomach that begins the digestion of proteins by splitting them into peptones (see peptidase). It is **produced** by the action of hydrochloric acid on pepsinogen, which is **secreted** by the gastric glands.

31. DNA copies generated will be similar, but may not be identical to the original as some variation are so drastic that new DNA copy cannot work with the cellular apparatus it inherits. Such a newborn cell will simply die. Therefore, there could be many other variations in the DNA copies that would not lead to such a drastic outcome. Thus, the surviving cells are similar but slightly different from each other. This tendency of variation during reproduction is the basis for evolution.

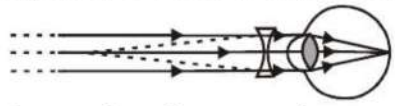
OR

i. This special tissue that provides nutrition is called the placenta.

ii. Besides providing nutrition to the embryo, placenta helps in removing waste products from embryo, it also helps in providing oxygen to the embryo and eliminating carbon dioxide from embryo.

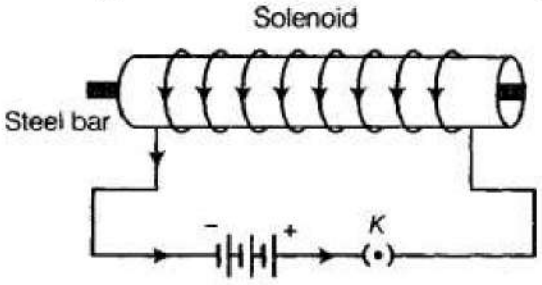
iii. The placenta is a disc-like structure that is attached to the wall of the uterus. It is formed by two sets of a minute finger-like process called villi. One set from uterine wall and other set from the embryo. The blood flows through the fine capillaries of the placenta.

32. This student is unable to see far off objects. This means that the student is suffering form myopia. Doctor will prescribe a concave lens a suitable focal length.



Correction for myopia

33. The conditions to obtain permanent electromagnet, if a current carrying solenoid is used, are given as follows:
    i. The current through the solenoid should be direct current.
    ii. The rod inside the solenoid must be made of a magnetic material.
    iii. The magnetic material should be of high retentivity.



Section D

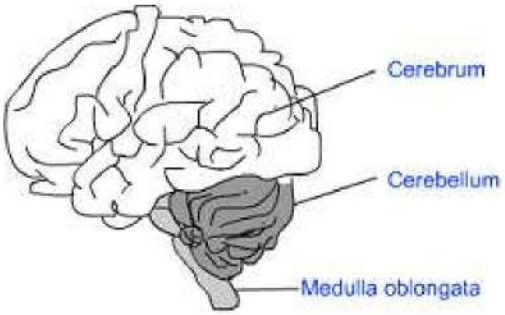
34. Plants also perform chemical coordination for various activities with the help of hormones. These are the chemical compounds released by stimulated cells that diffuse to various locations in plants performing different functions. These hormones produced by plants are also called as phytohormones.
    Different types of hormones produced by plants are: Auxin, Gibberellins, Cytokinins, Abscisic acid, Ethylene.
    The physiological effect of each plant hormone (called phytohormone) is described in following table.

Plant Hormone	Physiological Effect
Auxin	◦ It is synthesised in the young tip of roots and shoots. ◦ It diffuses towards the shady side of the plant, which stimulates the cells to grow longer, resulting in bending of shoot towards the light ◦ It promotes cell elongation and division. ◦ It also plays important role in the formation of roots and seedless fruits.
Gibberellins	◦ These hormones helps in growth of stem and flower. ◦ These hormones also Help in germination of seed.
Cytokinins	◦ It promotes cell division and delay ageing in leaves. ◦ It reduces apical dominance and also stimulates the leaf expansion.
Abscisic acid	◦ It is a Growth inhibitor hormone that reverses the growth promoting effects of auxin and gibberellins. ◦ It causes the dormancy of seeds, wilting of leaves, closing of stomata and loss of proteins and chlorophyll.

Plant Hormone	Physiological Effect
Ethylene	◦ It promotes transverse growth, also promotes senescence and abscission of leaves. ◦ It acts as an essential hormone for the ripening of fruits.

OR

The brain is covered by a three layered system of membranes; called meninges. Cerebrospinal fluid is filled between the meninges. The CSF provides a cushion to the brain against mechanical shocks. The brain is located inside the skull for maximum protection. The human brain can be divided into three regions, viz. forebrain, midbrain and hindbrain.



Human Brain

Forebrain: It is divided into three regions:

1. Olfactory Lobes - These lobes receives impulses from olfactory receptors of nose region.
2. Cerebrum - It is the largest part of the brain and helps in speech, intellectuality, mapping, hearing, sight, taste, smell, etc.
3. Diencephalon - It has Hypothalamus which has control centre for hunger, thirst, sweating, emotions, etc.

Midbrain: It controls the reflex movements of head, neck and trunk in response to visual and auditory stimuli, changes in pupil size, etc.

Hindbrain: It consists of three parts:

1. Cerebellum - It maintains posture, equilibrium and Muscle tone.
2. Pon Varolii - It controls some aspects of respiration.
3. Medulla Oblongata - It controls heart rate, breathing movements, coughing, sneezing, vomiting, etc.

35. i. H_2SO_4 test tube i.e., A will show vigorous reaction.

ii. It is because H_2SO_4 is strong acid than H_2CO_3.

iii. Hydrogen gas will be formed. Bring a burning splinter near the gas. It will burn with a 'pop' sound. It shows gas liberated is hydrogen.

iv. $Mg + H_2SO_4 \longrightarrow MgSO_4 + H_2$

$Mg + H_2CO_3 \longrightarrow MgCO_3 + H_2$

v. a. Since H_2SO_4 is more acidic A will have lower pH.

b. H_2CO_3 is a weak acid B will have lower concentration of H^+

OR

Some salts crystalline out from their saturated aqueous solutions with a definite number of molecules of water called water of **crystallization**. Such salts are called **hydrated salts.** These molecules of water of crystallization are in loose chemical combination

with the salt. This water of crystallization is given out by heating the powdered crystals of these salts above $100^{o}C$.

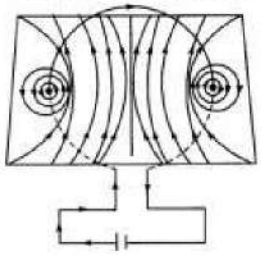
On heating these hydrated crystalline salts, they lose water of crystallization and (i) become amorphous (ii) lose their colour, if coloured and become white.

Eg. $CuSO_4.5H_2O$ – Copper sulphate pentahydrate.

$Na_2CO_3.10H_2O$ – Sodium carbonate decahydrate.

$Na_2SO_410H_2O$ – Sodium sulphate decahydrate.

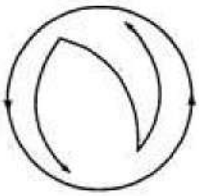
36. **Magnetic field due to circular conductor:** When a current is passed through a circular coil in clockwise direction, the magnetic field will be as shown in figure.



Here the current is passing clockwise when looked from front side. At the points where the conductor passes through horizontal plane, the lines of force are almost circular, their direction being given by right-hand grip rule. Near the central region, the lines are quite straight and at right angles to the plane of the coil.

Further, it is clear from the figure that all the lines enter at the nearer face and leave at the farther face. Evidently, the lines of force due to the current flowing in circular loop closely resemble those produced by a magnetized circular disc of steel of same boundary as that of the coil, so that one face of it is north and other a south pole. The polarity of any face of coil can be determined by remembering a simple rule known as clock rule. If the current round any face of the coil flows in an anticlockwise direction it behaves like a north pole and if the current is in clockwise direction, the face acts as a south pole.

Clockwise current behaves like south pole.



Anti-clockwise current behaves like north pole.

Section E

37. **Read the text carefully and answer the questions:**

Mendel crossed tall and dwarf pea plants to study the inheritance of one gene. He collected the seeds produced as a result of this cross and grew them to generate plants of the first hybrid generation which is called the first filial progeny or F_1 Mendel then self-pollinated the tall F_1 plants and he obtained F_2 generation.

(i) 400

Since this pea plant is heterozygous for the round shape, its genotype would be Rr.

Parents : Rr × Rr
↓ (selfing)
Progeny : RR Rr Rr rr

Phenotypically, the ratio will be 3 : 1, i.e., only rr seedlings will show wrinkled seed phenotype, rest will show round seed shape.

1200 → Round shape (RR, Rr) 400 → Wrinkled (rr)

(ii) Dominant and recessive phenotypes will be 50% each.

A represents the dominant gene and 'a' represents its recessive allele. The most likely result in the first generation offspring when Aa is crossed with aa is :

Parents: Aa × aa

Gametes: (A) (a) (a) (a)

F_1 : Aa Aa aa aa

Hence, A a: aa

1 : 1

OR

Self-pollination of homozygous tall F_2 plant (TT) will give rise to all individuals of genotype TT.

Individuals carrying two identical alleles (RR or rr) are known as homozygous.

38. **Read the text carefully and answer the questions:**

When oxygen combines with other elements or compounds, the process is called oxidation the substances that combine with oxygen are said to have been oxidized. The reduction is exactly the opposite of oxidation. If a substance loses oxygen during a reaction, it is said to be reduced. When hydrogen burns the hydrogen combines with oxygen to form water $2H_2 + O_2 = H_2O$

The hydrogen is oxidized in this reaction, but at the same time, the oxygen is reduced. Whatever oxidation occurs reduction must also occur.

(i) The process is known as the reduction of metal oxide.

(ii) In the given reaction, H_2 is oxidized.

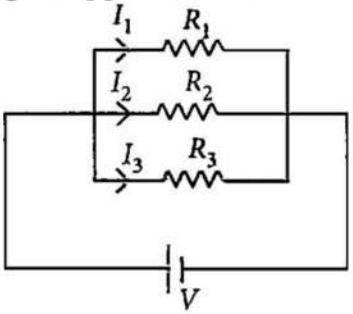
(iii) In the given reaction, O_2 is reduced.

OR

If four molecules of Hydrogen are combined with oxygen then four molecules of water are formed.

39. **Read the text carefully and answer the questions:**

If two or more resistances are connected in such a way that the same potential difference gets applied to each of them, then they are said to be connected in parallel.



The current flowing through the two resistances in parallel is, however, not the same.

When we have two or more resistances joined in parallel to one another, then the same current gets additional paths to flow and the overall resistance decreases.

(i) The equivalent resistance in the parallel combination is lesser than the least value of the individual resistance.

The equivalent resistance of parallel combinations

$\frac{1}{Rp} = \frac{1}{2} + \frac{1}{4} + \frac{1}{8}$

$\Rightarrow$ Rp = $\frac{8}{7}\Omega$

Thus equivalent resistance is less than 2Ω.

(ii) Resistance of each piece $= \frac{12}{3} = 4\Omega$

$\frac{1}{R_p} = \frac{1}{4} + \frac{1}{4} + \frac{1}{4} = \frac{3}{4} \Rightarrow R_p = \frac{4}{3}\Omega$

(iii)All the three resistors are in paralle.

$\therefore \frac{1}{R_p} = \frac{1}{6} + \frac{1}{3} + \frac{1}{1} = \frac{1+2+6}{6} = \frac{9}{6}\, R_P = \frac{6}{9} = \frac{2}{3}\Omega$

OR

All are in parallel.

$\frac{1}{R_p} = \frac{1}{12} \times 4 = \frac{1}{3} \Rightarrow R_p = 3\Omega$

$I = \frac{3}{3} = 1$ A

So, current in each resistor $I' = \frac{3}{12} = \frac{1}{4}$ A