SAMPLE PAPER - 2

Class 10 - Science

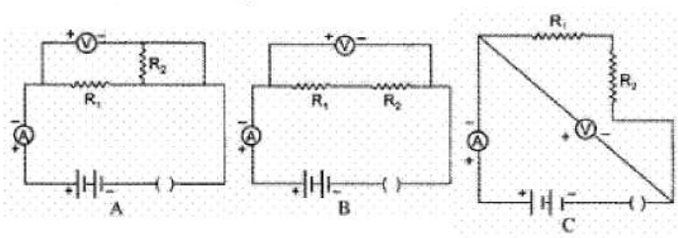
Time Allowed: 3 hours **Maximum Marks: 80**

General Instructions:

1. This question paper consists of 39 questions in 5 sections.
2. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
3. Section A consists of 20 objective type questions carrying 1 mark each.
4. 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.
5. 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.
6. 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.
7. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts

Section A

1. While doing their experiment, on finding the equivalent resistance, of two resistor connected in series, three students A, B, C set up their circuits as shown below : **[1]**



The correct set up is that of

a) Student B and C
b) Student A and B
c) Student B, C and A
d) Student C and A

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

Column A	Column B
(i) Genes	(a) Units of inheritance
(ii) Factors	(b) Impressions of past organism
(iii) Fossils	(c) Entities which control the expression of traits
(iv) Sex chromosomes	(d) Determine sex of an individual

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

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

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

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

3. For determining the percentage of water absorbed by raisins in a given time, apart from water, raisins and a watch, we shall also require **[1]**

a) a thermometer

b) a filter paper, a weighing balance

c) a beaker

d) All of these

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

1. S.I unit of magnetic field
2. Magnetic field inside the solenoid
3. Compass needle
4. Solenoid

A. Small bar magnet capable of rotating freely

B. Tesla

C. Temporary magnet

D. Uniform

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

5. Which of the following metals exist in their native state in nature? **[1]**

i. Cu

ii. Au

iii. Zn

iv. Ag

a) (ii) and (iii)

b) (iii) and (iv)

c) (i) and (ii)

d) (ii) and (iv)

6. Substance **X** is formed by the reaction of carboxylic acid and alcohol. It is used in making ice creams, cold drinks, perfumes and in flavouring agent. Name **X**. **[1]**

a) Aldehyde

b) Alkyne

c) Ester

d) Ketone

7. Which one of the following can be used as an acid–base indicator by a visually impared student? **[1]**

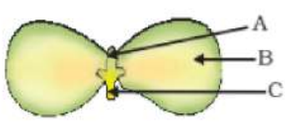
a) Litmus

b) Vanilla essence

c) Turmeric

d) Petunia leaves

8. In Figure, the parts A, B, and C are sequentially **[1]**



a) cotyledon, plumule and radicle

b) plumule, radicle and cotyledon

c) radicle, cotyledon and plumule

d) plumule, cotyledon and radicle

9. The pH of the gastric juices released during digestion is **[1]**

a) equal to 0 b) equal to 7

c) more than 7 d) less than 7

10. A bisexual flower contains: **[1]**

a) Stamens only b) Both stamens and carpels

c) Carpels only d) Either stamens or carpels

11. In human males, all the chromosomes are paired perfectly except one. This/these unpaired chromosome is/are **[1]**

i. large chromosome

ii. small chromosome

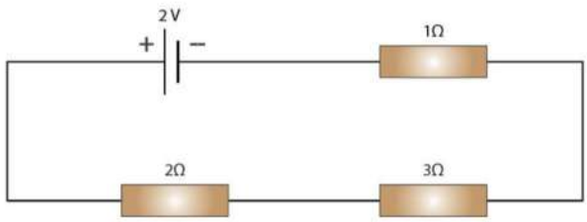
iii. Y-chromosome

iv. X-chromosome

a) (iii) and (iv) b) (i) and (ii)

c) (ii) and (iv) d) (iii) only

12. In the circuit shown below: **[1]**



The potential difference across the 3Ω resistors is:

a) 2 V b) $\frac{1}{9}$ V

c) $\frac{1}{2}$ V d) 1 V

13. If R is the radius of curvature of a spherical mirror and f is its focal length then: **[1]**

a) R = f b) R = $\frac{f}{2}$

c) R = 3f d) R = 2f

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

(i) Bronze	(a) Iron
(ii) Stainless steel	(b) Aluminium
(iii) Solder	(c) Tin and lead
(iv) Duralumin	(d) Copper

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

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

15. A well-stained leaf peel preparation when focused under the high power of the microscope would show **[1]**

A. epidermal cells, stomata, guard cells each with one nucleus and many chloroplasts

B. epidermal cells, stomata, guard cells with many nuclei and one chloroplast each

C. stomata and guard cells without nuclei or chloroplast

D. stomata but no guard cells or epidermal cells

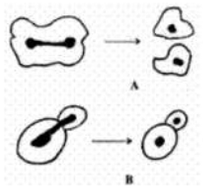
a) (B)

b) (A)

c) (C)

d) (D)

16. Slides A and B show stages of asexual reproduction in two different organisms. **[1]**



The slides A and B are depicting

a) Binary fission in Amoeba and budding in Yeast

b) Budding in both Amoeba and Yeast

c) Binary fission in Yeast and budding in Amoeba

d) Binary fission in both Amoeba and Yeast

17. **Assertion (A):** No net force acts on a rectangular coil carrying a steady current when suspended freely in a uniform magnetic field. **[1]**

Reason (R): Force on coil in magnetic field is always non-zero.

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):** Sodium hydroxide reacts with zinc to produce hydrogen gas. **[1]**

Reason (R): Acids react with active metals to produce hydrogen gas.

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. **Assertion (A):** Unlike cabbage, sunflower plant has long internode with leaves that are far apart. **[1]**

Reason (R): Sunflower produces sufficient amounts of Gibberellins during its growing period.

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.

20. **Assertion (A):** Decomposers keep the environment clean. **[1]**

Reason (R): They recycle matter by breaking down the organic remains and waste products of plants and animals.

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. You are given an organic compound having the molecular formula C_2H_8. Give the name and formula of the compound formed: **[2]**

a. when one H atom of C_3H_8 is replaced by a Cl atom.

b. when one H atom of C_3H_8 is replaced by OH group.

c. when one H atom of C_3H_8 is replaced by a CHO group.

d. when one H atom of C_3H_8 is replaced by a COOH group.

e. when two H atoms joined to the middle carbon atom of C_3H_8 are replaced by one O atom.

OR

Give three characteristic properties of covalent compounds.

22. What is the need for a system of control and coordination in an organism? **[2]**

23. Write the food chain operating in a freshwater pond. Mention the food habit of each trophic level in this food chain. **[2]**

24. Calculate the percentage of energy that will be available to big fish in the following foods chain: Small algae, zooplankton, fish, big fish.The energy available to small algae from sun is 10000 J. **[2]**

25. How is the refractive index of a medium related to the speed of light? Obtain an expression for refractive index of a medium with respect to another in terms of speed of light in these two media? **[2]**

OR

We wish to obtain an equal sized inverted image of a candle flame on a screen kept at distance of 4 m from the candle flame.

a. Name the type of lens that should be used.

b. What should be the focal length of the lens and at what distance from the candle flame from the lens be placed.

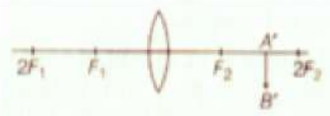
c. Draw a labelled diagram to show the image formation in this case.

26. The molecular formula of A is C_{10} $H_{18}$and B is $C_{18}H_{36}$. Name the homologous series to which they belong. **[2]**

Section C

27. Define a chemical reaction. State four observations which help us to determine that a chemical reaction has taken place. Write one example of each of the observations with a balanced chemical equation. **[3]**

28. Observe the following incomplete ray diagram of an object where the image A'B' is formed after refraction from a convex lens. **[3]**

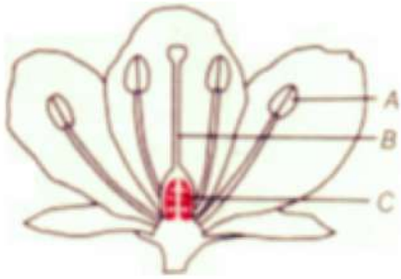


On the basic of above information fill in the blanks.

i. The position of object AB would have been...

ii. Size of the object would have been ... than the size of image.

29. Name the parts A, B and C shown in the following diagram and state one function of each. **[3]**



OR

Ravi took three bread slices and kept them in the following conditions

i. Slice 1 in a dry and dark place

ii. Slice 2 in moist and dark place

iii. Slice 3 in moist and in refrigerator

What would he observe in each of the above conditions? Give reasons for your answer.

30. When one enters a less lighted room from a place of intense light, he is not able to see anything for sometime, but after sometime the things become somewhat visible. Explain how this happens? **[3]**

31. Why are decomposition reactions called the opposite of combination reactions? Write equations for these reactions. **[3]**

32. A study found that children with light-coloured eyes are likely to have parents with light coloured eyes. On this basis, can we say anything about whether the light eye colour trait is dominant or recessive? Why or why not? **[3]**

OR

Study the following cross that shows the self-pollination in F_1, fill in the blank the genotype and phenotype in the F1 generation. What type of cross it is?

Parents	RRYY	x	rryy
	Round, yellow		wrinkled, green
F_1 —	Rr Yy	x	?
	Round, yellow		

33. What are the common defects of vision that can be corrected by the use of suitable eyeglasses or spectacles? **[3]**

Section D

34. i. Give differences between roasting and calcination with suitable examples. **[5]**

ii. Explain how the following metals are obtained from their compounds by the reduction process. Give one example of each type.

a. Metal M which is in the middle of the reactivity series.

b. Metal N which is high up in the reactivity series.

OR

(i) Hydrogen is not a metal but it has been assigned a place in the reactivity series of metals. Explain.

(ii) How would you show that silver is chemically less reactive than copper?

35. i. Draw a diagram depicting human alimentary canal and label the components gall bladder, liver and pancreas in it. **[5]**

ii. State the role of liver and pancreas.

iii. Name the organs which perform the following functions in humans.

a. Absorption of digested food

b. Absorption of water

OR

a. Write the reaction that occurs when glucose breaks down anaerobically in yeast.

b. Write the mechanism by which fishes breath in water.

c. Name the balloon likes structures present in lungs. List its two functions.

d. Name the respiratory pigment and write its role in human beings.

36. i. Draw the magnetic field lines through and around a single loop of wire carrying electric current. **[5]**

ii. State whether an alpha particle will experience any force in a magnetic field, if :

a. It is placed in the field at rest.

b. It moves in the magnetic field parallel to field lines.

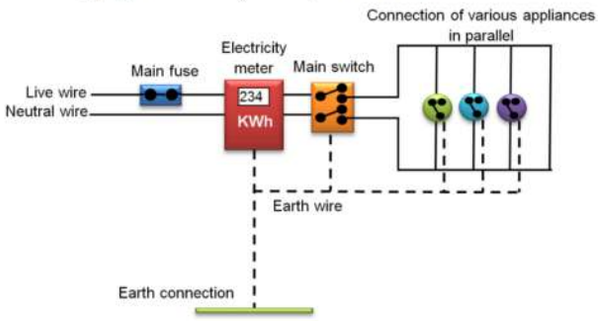
c. It moves in the magnetic field perpendicular to field lines.

Justify your answer in each case.

Section E

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

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



(i) What is the colour of the live wire?

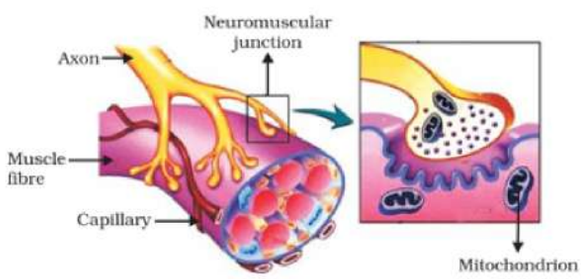
(ii) Where is the fuse placed in the electric supply in the above-given figure?

OR

What is the commercial unit of the power supply?

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in the dendrite of the next neuron. This is a general scheme of how nervous impulses travel in the body. A similar synapse finally allows the delivery of such impulses from neurons to other cells, such as muscles cells or glands.



(i) Why does the flow of signals in a synapse from axonal end of one neuron to dendritic end of another neuron take place but not in the reverse direction?

(ii) From where the electrical impulse travels?

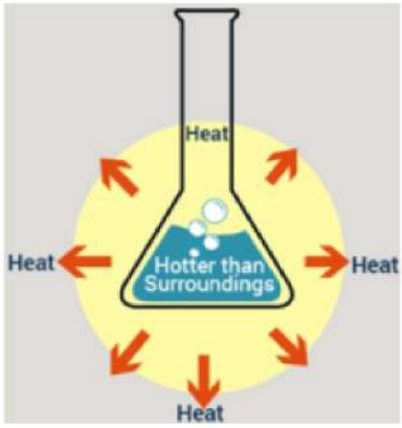
(iii) Name the chemical which released at the end of axon to transmit the signal to the other neuron.

OR

What happens at the synapse between 2 neurons?

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

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



(i) What is the exothermic reaction?

(ii) Write an example of an exothermic reaction.

(iii) How will you obtain sulphuric acid from an acidic oxide?

OR

While diluting an acid, why is it recommended that the acid should be added to water and not water to the acid ?

Solution

SAMPLE PAPER - 2

Class 10 - Science

Section A

1. **(a)** Student B and C
   Explanation: Resistors have one common point, voltmeter and ammeter are connected in proper way.

2. **(b)** (i) - (a), (ii) - (c), (iii) - (b), (iv) - (d)
   Explanation:
   - Genes are the primary unit of inheritance that are specific for a specific individual.
   - Factors are the traits which are transferred from parents to offsprings.
   - Fossils are the dead remains of extinct species.
   - Sex chromosomes decide the sex of an organism whereas autosomes decide the phenotypic expressions.

3. **(d)** All of these
   Explanation: A beaker, a thermometer, a filter paper, a weighing balance these are the materials required for the experiment.

4. **(c)** 1-B, 2-D, 3-A, 4-C
   Explanation: (1) The tesla (symbolized T) is the standard unit of magnetic flux density.
   (2) A solenoid is a tightly wound helical coil of wire whose diameter is small compared to its length. The magnetic field generated in the centre, or core, of a current carrying solenoid is essentially uniform, and is directed along the axis of the solenoid.
   (3) The needle of a magnetic compass is 'just' a small bar magnet that is balanced carefully so it can rotate freely.
   (4) Solenoid is temporary strong magnet, when connected through external source like battery or when electricity passed through it. It is also known as electromagnet.

5. **(d)** (ii) and (iv)
   Explanation: Gold and silver (Au and Ag) are also known as Noble metals as they are less reactive and exist in their native state in nature.

6. **(c)** Ester
   Explanation: Substance X is an ester. The reaction in which a carboxylic acid combines with an alcohol to form an ester is called esterification. Some volatile esters with characteristic odours are used in synthetic flavours, perfumes, and cosmetics. Certain volatile esters are used as solvents for lacquers, paints, and varnishes; large quantities of ethyl acetate and butyl acetate are commercially produced for this purpose.

7. **(b)** Vanilla essence
   Explanation: An acid-base indicator shows a colour change from red to blue or blue to red which is not recognisable by a visually impaired student. To detect this change, the olfactory indicator is required which gives a particular odour during this colour change. So vanilla essence is used because of its fruity smell.

8. **(d)** plumule, cotyledon and radicle
   Explanation:
   - A represents the plumule which forms the shoot.
   - B represents the cotyledon, and
   - C represents the radicle that forms the roots.

9. **(d)** less than 7
   Explanation: The pH must be less than 7, so the juices are more gastric and can easily breakdown food into simpler molecules. Usually, the pH is 3.0.

10. **(b)** Both stamens and carpels
    Explanation: A bisexual flower consists of both the male and the female reproductive parts. The male part is known as the stamen and the female is the carpel/pistil.

11. **(a)** (iii) and (iv)
    Explanation: In human beings, there are 23 pairs of the chromosome, out of which one pair is sex chromosome. In males,

there are two types of sex chromosomes-X and Y. In males, all chromosomes are paired except sex chromosomes. Hence, normal-sized X chromosomes and small-sized Y chromosomes are unpaired.

12. **(d)** 1 V
Explanation: We know that the potential difference across a resistor is calculated as V = IR. Therefore, substituting the values we get potential difference across the resistor of 3Ω as 1V.

13. **(d)** R = 2f
Explanation: R = 2f

14. **(a)** (i) - (d), (ii) - (a), (iii) - (c), (iv) - (b)
Explanation:
    - Bronze is an alloy of copper.
    - Stainless steel is an alloy of iron.
    - Solder - an alloy of tin and lead - is used to join metals for electrical work.
    - Duralumin is an alloy of aluminium.

15. **(b)** (A)
Explanation: This is the correct observation. Under high power, the cells and their components are seen clearly.

16. **(a)** Binary fission in Amoeba and budding in Yeast
Explanation: Amoeba is a very good example of the organism which reproduces by binary fission.
Yeast is an example of unicellular organism which reproduces by budding.
These are the correct stages of asexual reproduction in the organisms.

17. **(c)** A is true but R is false.
Explanation: Force acting on each pair of the opposite sides of the coil are equal.

18. **(b)** Both A and R are true but R is not the correct explanation of A.
Explanation: Sodium hydroxide is a strong base, reacts with active metal (zinc) to produce H_2 gas. The reaction is given as follows:
$Zn(s) + 2NaOH(aq) \longrightarrow Na_2ZnO_2(aq) + H_2(g)$

19. **(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.

20. **(a)** Both A and R are true and R is the correct explanation of A.
Explanation: Decomposers keep the environment clean by decomposing or consuming the dead remains of other organisms.

Section B

21. a. Chloropropane, CH_3-CH_2-CH_2-Cl
    b. Propanol, CH_3-CH_2-CH_2-OH
    c. Butanal, CH_3-CH_2-CH_2-CHO
    d. Butanoic acid, CH_3-CH_2-CH_2-COOH
    e. Propanone, CH_3-CO-CH_3

OR

Characteristic properties of covalent compounds.
i) Covalent compounds exist as single molecules which are mostly in gaseous state(hydrogen,oxygen, ammonia).Some of them may be liquid(bromine) and few as solids(iodine, phosphorus)
ii) Covalent compounds have usually low melting and boiling point.Since no ions are present in the covalent molecules.
iii) Covalent compounds are poor conductors of electricity because the current is carried by the movement of ions.
iv) Covalent compounds generally react in molecular form.
v) Covalent compounds are not soluble in water.They dissolve in covalent solvent like carbon tetrachloride,benzene etc. (any three)

22. System of control and co-ordination evokes an appropriate movement in response to any change in external environment. Multicellular organisms have complex body. So it, co-ordinates various organs of body of an organism work together in a proper manner to produce proper reaction to stimulus.

23. Phytoplankton →copepods →small fish →large fish
In this simple food chain of freshwater pond, large fish is the top consumer, small fish is the secondary consumer and the

copepods are the primary consumers and phytoplankton are the producers which are autotrophs, which lies at the beginning of the food chain.

24. The food chain is:

Small algae	→ Zooplankton	→ Fish	→ Big fish
10000 J from sun	10% of 10,000 J	10% of 1000 J	10% of 100 J
$= \frac{10 \times 10,000}{10} = 1000\ J$	$= \frac{10 \times 1000}{10} = 100\ J$	$\frac{10 \times 100}{10} = 10\ J$	

Percentage of energy availble to big fish = $\frac{10 \times 100}{10000} = \frac{1}{10} = 0.1J$

25. The refractive index of a medium is given by

$n_m = \frac{\text{speed of light in air}}{\text{speed of light in medium}} = \frac{c}{v}$

Let v1 and v2 is the speed of light in medium 1 and medium 2 respectively.

The refractive index of medium 2 with respect to medium 1 is given by the ratio of the speed of light in medium 1 and in medium 2 can be represented as:

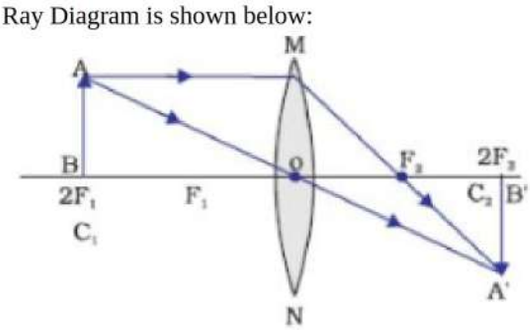
$n_{21} = \frac{v_1}{v_2}$

OR

a. As the image is real, inverted and of same size as that of object, the lens should be used is Convex lens.

b. This happened only when an object placed at $2F_1$. Therefore, the focal length of the lens is 2 metre. The image is formed at $2F_2$, therefore the distance of candle flame from the lens is 4 metre.

c. Ray Diagram is shown below:



26. A belongs to the homologous series of alkynes having tripple bonds between C-C and its general formula is C_nH_{2n-2} (n=10) and B belongs to the homologous series of alkenes having double bonds between C-C bonds its general formula is C_nH_{2n}. (where, n=18).

Section C

27. Chemical reaction is the transformation of chemical substance into another chemical substance. Only a rearrangement of atoms takes place in a chemical reaction. Old bonds are broken and new bonds are formed. Some of the characteristics of chemical reactions are:

i. **Change in colour:** In some reactions, there is a change in colour after the reaction. For example, a chemical reaction between citric acid and purple-coloured potassium permanganate solution is characterised by a change in colour of potassium permanganate from purple to colourless.

$Pb(NO_3)_2(aq) + 2KI \longrightarrow 2KNO_3(aq) + PbI_2(s)$

$Pb(NO_3)_2(aq)+2KI$ - Colourless

$PbI_2(s)$ - Yellow

ii. **Formation of precipitate:** The chemical reaction between sulphuric acid barium chloride solution. $BaCl_2(aq) + H_2SO_4(aq) \longrightarrow 2HCl(aq) + BaSO_4(s)$

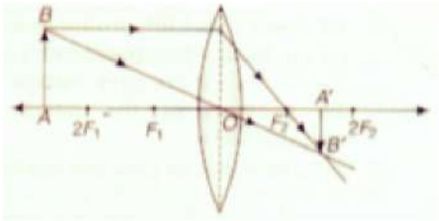
iii. **Change in temperature:** Temperature change is the characteristic of many reactions. For example, the chemical reaction between quicklime and water to form slaked lime. In this reaction temperature of the reaction is increased.

$CaO(s)+H_2O(l) \longrightarrow Ca(OH)_2(aq)+Heat$

iv. **Evolution of gas:** Some reactions are characterised by evolution of gas as a result of chemical reaction. For example, the chemical reaction between sodium carbonate and hydrochloric acid is characterised by the evolution of carbon dioxide gas.

$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$

28. i. The position of object AB would have been beyond $2F_1$.



ii. Size of the object would have been bigger than the size of image.

29.

Part	Function
A- Anther	Formation of pollen grains and storing it till pollination starts.
B- style	Connecting stigma to ovary. Where pollen grains stuck to stigma, grows it's pollen tube to facilitate the movement of 2 male gametes.
C- Ovary	Contains ovule which develop into seeds after fertilization of male and female gamete, while ovary forms the fruit.

OR

i. In slice 1, no change will be observed or it will remain sterile because it lacks moisture, which is necessary for any organism to thrive.

ii. A white cottony mass surrounded with black pin head-like structures are seen spreading on the surface of slice 2. This is because tiny spores of Rhizopus present in air will thrive in humid conditions. Thus slice 2 kept in moist and dark place, develops sporangia and spores, which are favourable for the growth of fungus.

iii. In slice 3, also no change is observed (remains sterile) as it is kept at low temperature in the refrigerator. Which does not allow fungal growth. Moisture and warm conditions are necessary for fungal growth.

30. When we are in bright sunlight the aperture of the pupil would be small to regulate the amount of light entering the eye preventing glare, discomfort and damage to eyes. As we enter a dark room less amount of light would enter our eyes due to small size of pupil, and we won't be able to see objects clearly. It takes some time to regulate the size of the pupil through iris. Hence, it requires some time to see things.

31.

In a decomposition reaction, a single substance breaks down into two or more substances while in a combination reaction, two or more substances react to produce one substance. Therefore, decomposition reactions are called opposite of combination reactions.
Example of decomposition reaction: $NH_4Cl(s) \rightarrow HCl(g) + NH_3(g)$
Example of combination reaction: HCl (g) + NH_3(g) $\rightarrow$ NH_4Cl (s)

32. On this basis we cannot say that light eye colour is dominant or recessive until a cross is made between parent having light eye colour and another with dark eye colour is made. Only then it will be possible to predict the dominant or recessive nature of gene.

OR

Parents	RRYY	x	rryy
	Round, yellow		wrinkled, green
F_1 —	Rr Yy	x	Rr Yy
	Round, yellow		**Round, yellow**

The given cross is a dihybrid cross that shows the inheritance of two different traits simultaneously. In the given question, when pure breeding dominant parent plant (RRYY) crossed with pure breeding recessive parent plant (rryy), it gives heterozygous dominant progeny in the F_1 generation. All progeny in this cross will have genotype RrYy and exhibit round yellow. Self-cross of F1 progeny will give F_2 generation.

33. There are mainly four common defect of vision that can be corrected by the use of suitable eyeglasses or spectacles. There are

i. Myopia or near-sightedness,

ii. Hypermetropia or far-sightedness,

iii. Presbyopia, and

iv. Astigmatism

Section D

34. i.

Roasting	Calcination
Ore is heated in the excess supply of air(oxygen)	Ore is heated in the absence or limited supply of air (oxygen)
Roasting is done for sulphide ores.	Calcination is done for carbonate ores.
SO_2 is produced along with metal oxide.	CO_2 is produced along with metal oxide.
e.g. $2ZnS(s) + 3O_2(g) \xrightarrow{\Delta} 2ZnO(s) + 2SO_2(g)$	e.g. $ZnCO_3(s) \xrightarrow{\Delta} ZnO(s) + CO_2(g)$

ii. a. The metal M which is in the middle of the reactivity series (such as iron, zinc, etc) is moderately reactive. Their sulphide and carbonate ore is first converted into their oxides by the process of roasting and calcination, respectively. The metal oxides (MO) are then reduced to the corresponding metals by using suitable reducing agents such as carbon, e.g. zinc metal can be obtained from its oxide as follows:

$$\underset{Zinc\ oxide}{ZnO(s)} + \underset{Carbon}{C(s)} \rightarrow \underset{Zinc}{Zn(s)} + \underset{Carbon\ monoxide}{CO(g)}$$

b. The metal N which is high up in the reactivity series (such as sodium, magnesium, etc) is very reactive and can be obtained by electrolysis of their molten salt and not the aqueous\ solution. These metals cannot be obtained by heating their ore alone. e.g. sodium is obtained by the electrolysis of molten sodium chloride (NaCl).

c. **At cathode:** $Na^+ + e^- \rightarrow Na$

At anode: $2Cl^- \rightarrow Cl_2 + 2e^-$

OR

(i) Though hydrogen is not a metal but even then it has been assigned a place in the activity series. The reason is that like metals, hydrogen also has a tendency to lose electron and forms a positive ion H^+.

The metals which lose electrons less readily than hydrogen are placed below it and the metals which lose electrons more readily than hydrogen are placed above it in the reactivity series of metals.

(ii) By displacement reaction silver can be shown to be chemically less reactive than copper or copper is more reactive than silver. If a piece of silver is immersed in a solution of copper sulphate, no reaction will take place because silver is less reactive than copper and will not displace copper from the copper sulphate solution.

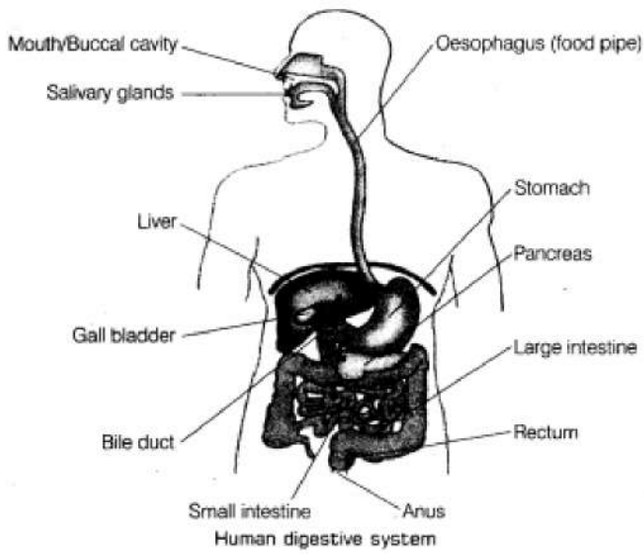
$$CuSO_4(aq) + Ag(s) \rightarrow No\ reaction$$

On the other hand, if a copper plate is placed in a solution of silver nitrate, copper will slowly displace silver from the solution and blue solution of copper nitrate is formed.

$$\underset{Colourless}{2AgNO_3(aq)} + Cu(s) \rightarrow \underset{Blue}{Cu(NO_3)_2(aq)} + 2Ag(s)$$

This shows that copper is more reactive than silver.

35. i.



Human digestive system

ii. Liver detoxifies chemicals and metabolizes drugs. The primary functions of the liver are:
Bile **production** and **excretion**. **Excretion** of bilirubin, cholesterol, **hormones**, and drugs. **Metabolism** of **fats**, **proteins**, and **carbohydrates**.

iii. pancreas **makes** digestive enzymes that flow through the pancreatic duct to the small intestine. These enzymes, along with bile from the gallbladder, **break** down food for use as energy by the body. The pancreas also **makes** insulin and glucagon,

hormones that help regulate blood glucose (sugar) levels.

iv. Absorption of food occurs in the small intestine. Digestion is the breakdown of large insoluble **food** molecules into small water-soluble **food** molecules so that they can be **absorbed** into the watery blood plasma. These smaller substances are **absorbed** through the small intestine into the blood stream., while the water and minerals are reabsorbed back into the blood in the colon (large intestine) where the pH is slightly acidic about 5.6 ~ 6.9.

OR

a. $\text{Glucose} \xrightarrow{\text{In Cytoplasm}} \text{Pyruvate} \xrightarrow{\text{In absence of oxygen}} Ethanol + CO_2 + Energy$

b. Fishes breathe in water through the mouth and force it past the gills where the dissolved oxygen is taken up by the blood.

c. The balloon like structure present in the lungs is Alveoli. Two Functions of Alveoli are:-

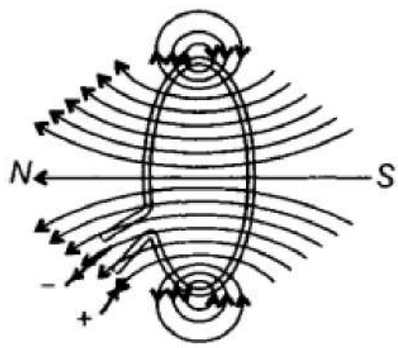
(i) They contain an extensive network of blood vessels that exchanges gases.

(ii) They increase the surface area of absorption of gases.

d. The respiratory pigment is Haemoglobin.

Role:- Due to high affinity for O_2, it helps in its transport from alveoli to the tissue.

36. i. The magnetic fields lines due to a circular coil are shown in the figure given below. At every point on a current carrying circular loop, the magnetic field is in the form of concentric circles around it. As we move away from it, the radii of the circle tend to increase. When we reach the center of the loop, the field appears to be a straight line.



ii. a. No, it will not experience any force. As, magnetic field exerts force on a moving charged particle only.

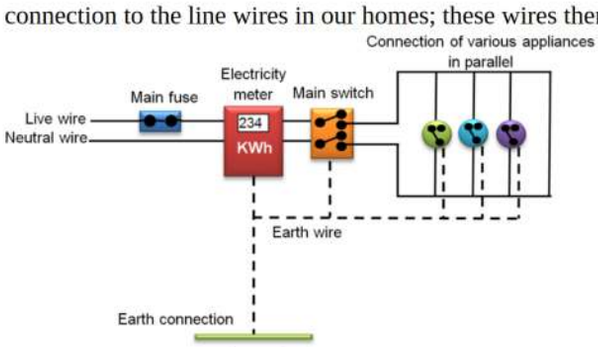
b. No, it will not experience any force because magnetic field exerts a force in perpendicular direction to motion of the particle.

c. Yes, it will experience a force in a direction perpendicular to the direction of its own motion and the direction of magnetic field can be determined by Fleming s left hand rule.

Section E

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

In our homes, either the overhead electric poles or underground cables support the power supply flowing through the mains supply. One of the wires in this supply is covered with insulation in the colour red, and another wire colored black. At the meter board, these wires pass into an electric meter through the main fuse. The main switch, live wire, and the neutral wire are in connection to the line wires in our homes; these wires then supply electricity to separate electric circuits within the house.



(i) Live wire is of Red colour.

(ii) The fuse is connected in between live wire.

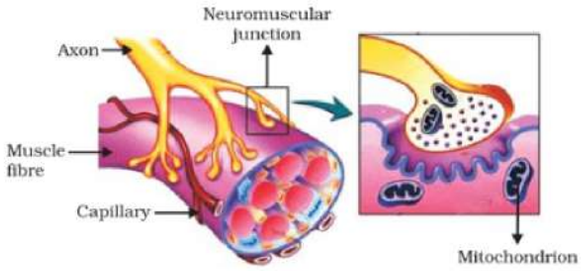
OR

KWh is the commercial unit of power supply.

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

In animals, control and coordination are provided by nervous and muscular tissues. Touching a hot object is an urgent and dangerous situation for us. We need to detect it and respond to it. How do we detect that we are touching a hot object? All information from our environment is detected by the specialised tips of some nerve cells. These receptors are usually located in

our sense organs, such as the inner ear, the nose, the tongue, and so on. So gustatory receptors will detect taste while olfactory receptors will detect the smell. This information, acquired at the end of the dendritic tip of a nerve cell sets off a chemical reaction that creates an electrical impulse. This impulse travels from the dendrite to the cell body, and then along the axon to its end. At the end of the axon, the electrical impulse sets off the release of some chemicals. These chemicals cross the gap, or synapse, and start a similar electrical impulse in the dendrite of the next neuron. This is a general scheme of how nervous impulses travel in the body. A similar synapse finally allows the delivery of such impulses from neurons to other cells, such as muscles cells or glands.



(i) At the synapse, (functional junction between neurons) axon terminal comes in close proximity to the dendron terminal of next neuron. Axon terminal is expanded to form pre-synaptic knob and the other dendrite terminal forms post- synaptic depression.

(ii) The electrical impulse travels form the dendrite to the cell body, then along the axon to its end.

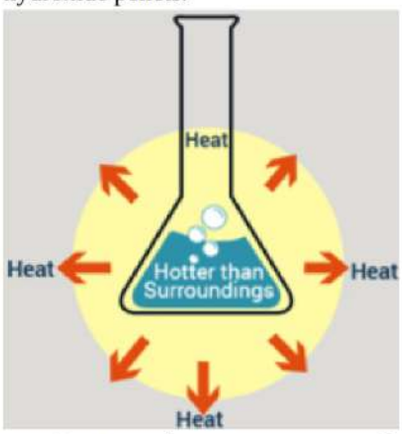
(iii)Acetylcholine is released at the end of the axon to transmit the signal to the other neuron.

OR

A synapse is a gap between two neurons. At the synapse, the electrical signals are converted into chemicals that can easily cross over the gap and pass on to the next neurons where it again converted into electrical signals.

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

The dissolving of an acid or a base in water is a highly exothermic reaction. Care must be taken while mixing concentrated nitric acid or sulphuric acid with water. The acid must always be added slowly to water with constant stirring. If water is added to a concentrated acid, the heat generated may cause the mixture to splash out and cause burns. The glass container may also break due to excessive local heating. Look out for the warning sign on the can of concentrated sulphuric acid and on the bottle of sodium hydroxide pellets.



(i) An exothermic reaction is a chemical reaction that releases energy through light or heat.

(ii) Mixing of acid with water is a highly exothermic reaction.

(iii)When sulphur trioxide (acidic oxide) is dissolved in water, an exothermic reaction takes place with the formation of sulphuric acid.

$SO_3 + H_2O \rightarrow H_2SO_4$

OR

Since the process of dissolving an acid in water is exothermic, it is always recommended that acid should be added to water. If it is done the other way, then it is possible that because of the large amount of heat generated, the mixture splashes out and causes burns.