Class 10 - Science
Sample Paper - 03 (2022-23)

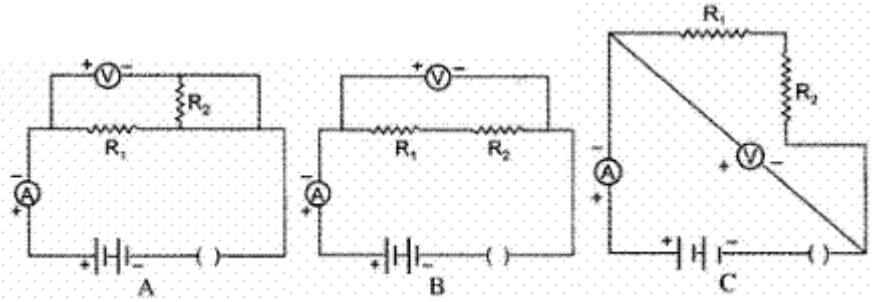
Maximum Marks: 80
Time Allowed: : 3 hours

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. 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 :



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. Alternative forms of a gene are called
a) Chromosomes
b) Multiples

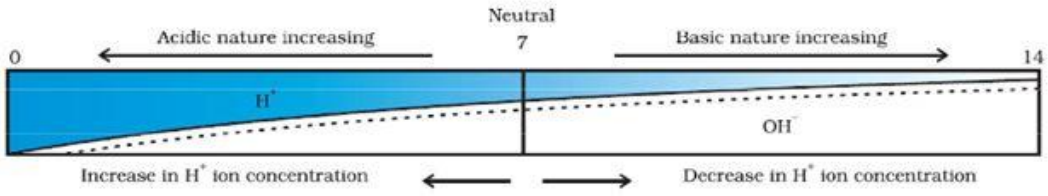
c) Loci
d) Alleles

3. The xylem in plants are responsible for:
   a) transport of amino acids
   b) transport of oxygen
   c) transport of food
   d) transport of water

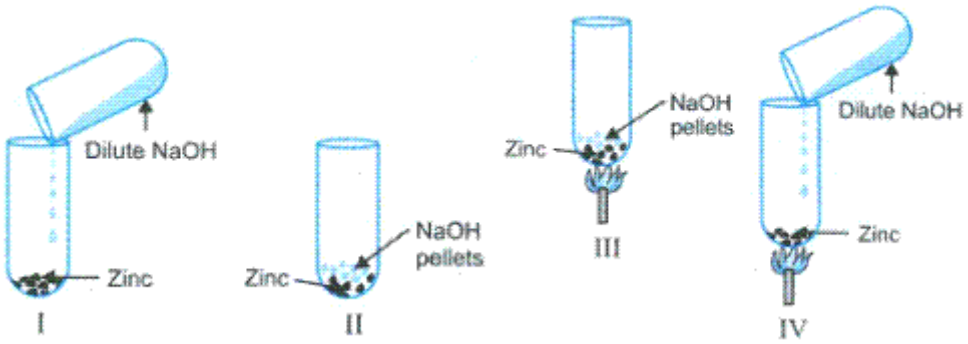
4. Find the incorrect statement
   A. Field lines emerge from the south pole and merge at north pole.
   B. Magnetic field lines can intersect each other.
   C. A wire with a red insulation is usually the neutral wire of an electric supply.
   D. All of these

   a) D
   b) C
   c) A
   d) B

5. Which of the following pairs will give displacement reaction(s)?
   a) $FeSO_4$ solution and silver metal
   b) $AgNO_3$ solution and copper metal
   c) NaCl solution and copper metal
   d) $MgCl_2$ solution and aluminum metal
6. Which of the following properties is not true regarding organic compounds?
   a) They are generally covalent compounds.
   b) Compounds have high melting and boiling points.
   c) Generally insoluble in water.
   d) Show isomerism



7. A solution turns blue litmus red, its pH is likely to be
   a) 5
   b) 9
   c) 10
   d) 8
8. In roses the method commonly used to produce new plants is
   a) Bud grafting
   b) Tissue culture
   c) Layering
   d) Cutting
9. The figures below show set-ups for studying the reaction of zinc with sodium hydroxide.



The correct set-up is
a) I
b) III
c) IV
d) II

10. Which vegetative part is used in the propagation of Bryophyllum?
a) Leaf
b) Stem
c) Root
d) Petal

11. Two pea plants one with round green seeds (RRyy) and another with wrinkled yellow (rrYY) seeds produce F_1 progeny that have round, yellow (RrYy) seeds. When F_1 plants are selfed, the F_2 progeny will have new combination of characters. Choose the new combination from the following

i. Round, yellow
ii. Round, green
iii. Wrinkled, yellow
iv. Wrinkled, green

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

12. Why is tungsten used exclusively for the filament of an incandescent lamp?
a) Tungsten can be drawn into thin wires which in turn offers high resistance.
b) All of these
c) Tungsten has a fairly good resistivity.
d) The melting point of tungsten is very high.

13. When a ray of light from rarer to denser it will:
a) Return into the same medium
b) Bend away from the normal
c) Pass straight
d) Bends towards the normal

14. Reaction between X and Y, forms compound Z. X loses electron and Y gains electron. Which of the following properties is not shown by Z?

a) Occurs as solid
b) Conducts electricity in molten state
c) Has high melting point
d) Has low melting point

15. Which colour of the visible spectrum is most effective in photosynthesis?
a) Red
b) Yellow
c) Green
d) Blue

16. Which of the following is the correct sequence of events of sexual reproduction in a flower?
a) Pollination, fertilisation, seedling, embryo
b) Pollination, fertilization, embryo, seedling
c) Seedling, embryo, fertilisation, pollination
d) Embryo, seedling, pollination, fertilisation

17. **Assertion (A):** A proton moves horizontally towards a vertical long conductor having an upward electric current. It will deflect vertically downward.
Reason (R): Seeing the proton and the conductor from the side of the proton, the magnetic field at the site of the proton will be towards the right. Hence the force $\vec{F} = q\vec{v} \times \vec{B}$ will deflect the proton vertically downward.
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):** Ammonia solution is an alkali.
Reason (R): Ammonia solution turns blue litmus paper red.
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):** Abscisic acid is responsible for wilting of leaves.
Reason (R): It is a growth inhibitor.
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):** CFCs deplete the ozone layer.
Reason (R): CFCs are used as refrigerants and in fire extinguishers.
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. Why does an atom of an element react with another atom to form a molecule?

OR

Complete the following reactions:

i. $H_2C = CH_2 + H_2O \xrightarrow{H_3PO_4}$
ii. $HC \equiv CH + Br_2 \rightarrow$
iii. $C_2H_5OH + Na \rightarrow$

22. Explain in brief why hormonal responses are slower than reflex actions.
23. Define an ecosystem. Draw a block diagram to show the flow of energy in an ecosystem.
24. State any three ways of effective Garbage disposal so that pollution caused by it can be minimized.
25. A concave mirror produces three times magnified (enlarged) real image of an object placed at 10 cm in front of it. Where is the image located?

OR

Find the power of a concave lens of focal length 2 m.

26. Give various types of chemical bonds that can be formed between two atoms. Give at least two examples of each.

Section C

27. Identify the type of reaction in the following

a. $ZnCO_3 + 2HCl(aq) \longrightarrow ZnCl_2(aq) + H_2CO_3(aq)$
b. $2NaBr(aq) + Cl_2(g) \longrightarrow 2NaCl(aq) + Br_2(aq)$
c. $2CuO(s) \xrightarrow{heat} 2Cu(s) + O_2(g)$

28.

i. What should be the position of the object when a concave mirror is to be used
   a. as a shaving mirror and
   b. in torches producing parallel beam of light?
ii. A man standing in front of a mirror, finds his image having a very small head and legs of normal size. What type of mirrors are used in designing such a mirror?

29. Answer the following:

i. With the help of a diagram demonstrate the process of regeneration as seen in Planaria?
ii. Which type of cells are used by such multicellular organisms to regenerate?

OR

Name one sexually transmitted disease each caused due to bacterial infected and viral infection. How can these prevented?

30.

i. State two main causes of a person developing near-sightedness. With the help of a ray diagram, suggest how he can be helped to overcome his disability?
ii. The far point of myopic person is 100 cm in front of the eye. Calculate the focal length and power of a lens required to enable him to see distant objects clearly.

31. 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.

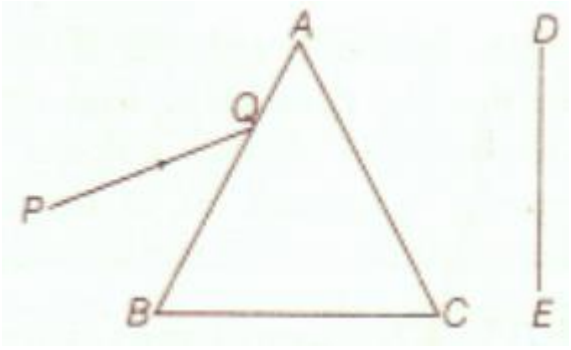
32. In pea plant, round seed is dominant over the wrinkled. If a cross is carried out between these two plants, give answer to the following questions.

i. Mention the genes for the traits of parents.
ii. State the trait of F_1 hybrids.
iii. Write the ratio of F_2 progeny obtained from this cross. What is the name of the cross?

OR

Two plants, A with white flowers and B with red flowers were crossed. The F_1 progeny shows all red flowers and F_2 has three red and one white. Categorise the trait as dominant and recessive.

33. A narrow beam PQ of white light is passing through a glass prism ABC as shown in the diagram.



Trace it on your answer sheet and show the path of the emergent beam as observed on the screen DE.

i. Write the name and cause of the phenomenon observed.
ii. Where else in nature is this phenomenon observed?
iii. Based on this observation, state the conclusion which can be draw about the constituents of white light.

Section D

34. Give reasons:

a. Platinum, gold and silver are used to make jewellery.
b. Sodium, potassium and lithium are stored under oil.
c. Aluminium is a highly reactive metal, yet it is used to make utensils for cooking.
d. Carbonate and sulphide ores are usually converted into oxides during the process of extraction.
e. Lemon or tamarind juice are effective in cleaning tarnished copper vessels.

OR

A metal **M** which is one of the best conductors of heat and electricity used in making electric wires is found in nature as sulphide ore M_2S?

i. Name the metal **M**.
ii. Which process will be suitable for extraction of this metal M from its ore M_2S?
iii. Write the balanced chemical reactions involved in the process of extraction.
iv. With the help of a labelled diagram, explain the process of electrolytic refining of the metal.

35. Given below is a well-labelled diagram of the human respiratory system.

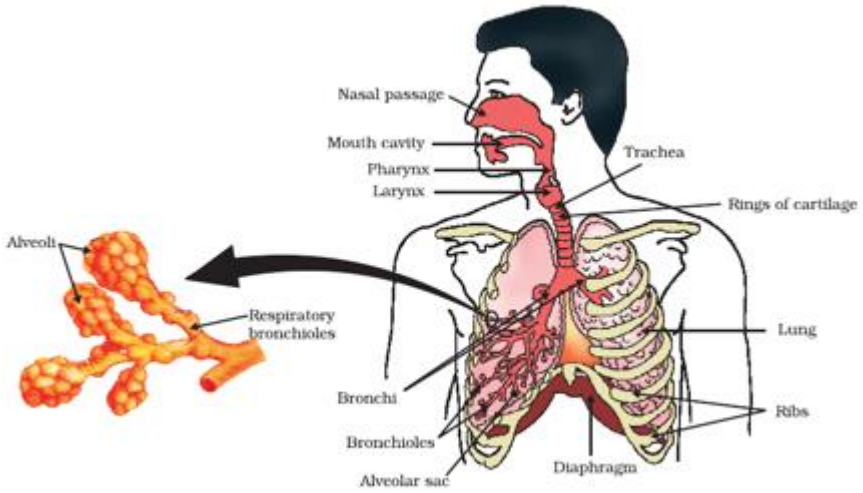


Diagram: Human Respiratory System

Using the above diagram, answer the following questions:

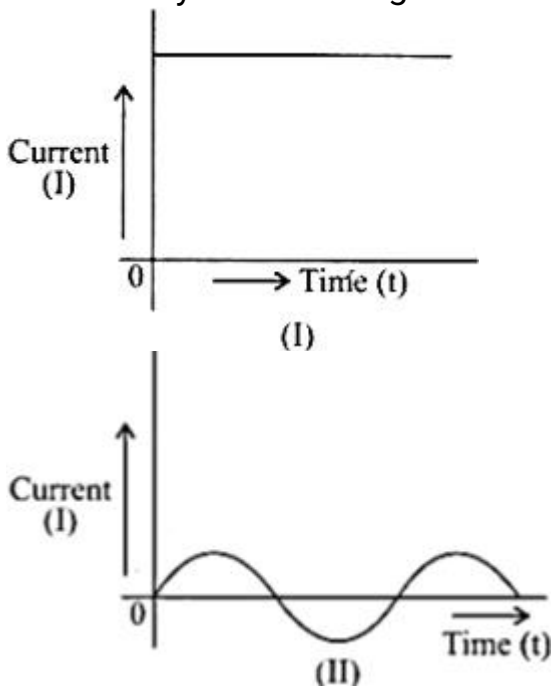
i. Why nasal hair and mucus are present in the nasal chamber?
ii. Why trachea does not collapse even when there is no air?
iii. Where the exchange of respiratory gases take place?
iv. What happens when we breathe in?
v. Why the lungs always contain a residual volume of air?

OR

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

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

36. Study the following current-time graphs from two different sources:



   a. Use above graphs to list two differences between the current in the two cases.
   b. Identify one source each for these currents.

Section E

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

The electrical energy consumed by an electrical appliance is given by the product of its power rating and the time for which it is used. The SI unit of electrical energy is Joule. Actually, Joule represents a very small quantity of energy and therefore it is inconvenient to use where a large quantity of energy is involved. So for commercial purposes, we use a bigger unit of electrical energy which is called kilowatt-hour. 1 kilowatt-hour is equal to 3.6×10^6 joules of electrical energy.

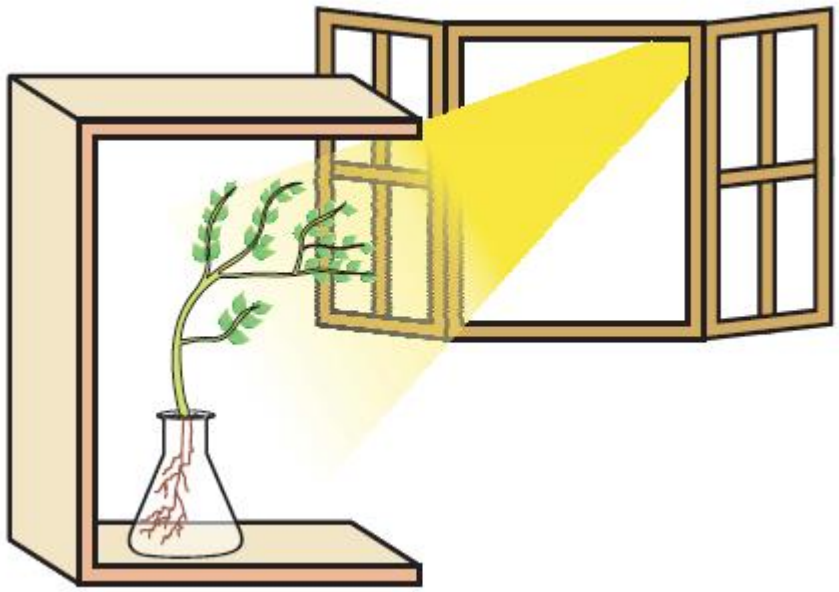
i. The energy dissipated by the heater is E. When the time of operating the heater is doubled, what would be the energy dissipated?
ii. The power of a lamp is 60 W. What will be the energy consumed in 1 minute?

OR

The electrical refrigerator rated 400 W operates 8 hours a day. The cost of electrical energy is ₹5 per kWh. Find the cost of running the refrigerator for one day.

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

Fill a conical flask with water. Cover the neck of the flask with a wire mesh. keep two or three freshly germinated bean seeds on the wire mesh. Take a cardboard box which is open from one side. Keep the flask a wire mesh. Kin the box in such a manner that the open side of the box faces light coming from a window as shown in the given figure. After two or three days, you will notice that the shoots bend towards light and roots away from light. Now turn the flask so that the shoots are away from light and the roots towards the light. Leave it undisturbed in this condition for a few days. Plants show tropism in response to other stimuli as well. The roots of a plant always grow downwards while the shoots usually grow upwards and away from the earth. This upward and downward growth of shoots and roots, respectively, in response to the pull of earth or gravity, is obviously, geotropism.



i. What has represented by the given activities?
ii. Do old parts of the shoot and root change direction? Is there any difference in the direction of the new growth?
iii. What can we conclude from this activity?

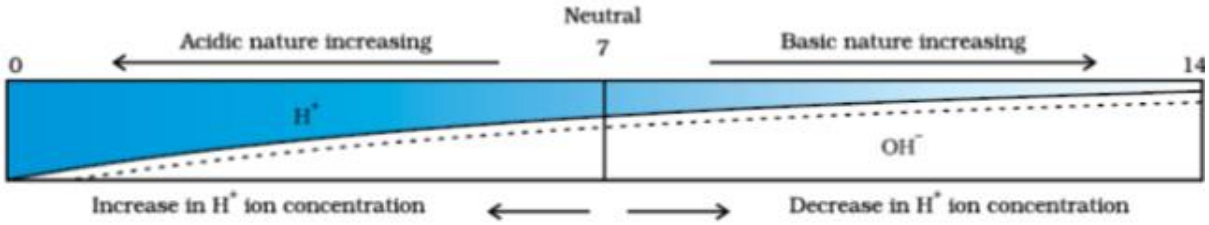
OR

What is geotropism?

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

A scale for measuring hydronium ion in a solution is called the pH scale. The pH of a neutral solution is 7. A value of less than 7 on the pH scale represents an acidic solution. As the pH value, increases from 7 to 14 it represents OH- ion concentration

in solution i.e a basic solution.



i. What is the pH range of the Human Body?
ii. The strength of acid and bases depends on which factor?
iii. If the pH of soil X is 7.5 while that of soil Y is 4.5, then which soil should be treated with powdered chalk to adjust its pH?

OR

Tooth decay starts when the pH of the mouth is lower than which pH?

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Solution

Section A

1. (a) Student B and C
   Explanation: Resistors have one common point, voltmeter and ammeter are connected in proper way.
2. (d) Alleles
   Explanation: An alternative form of a gene is known as an allele. Alleles vary in their sequence which may or may not result in a variant phenotype of a particular trait. Alleles represent variations of a gene that is responsible for a particular trait.
3. (d) transport of water
   Explanation: Xylem, plant vascular tissue that conveys water and dissolved minerals from the roots to the rest of the plant and also provides physical support. Xylem tissue consists of a variety of specialized, water-conducting cells known as tracheary elements, which help it to transport water throughout the plant.

4. (a) D
   Explanation: Magnetic field emerges from north pole to south pole and has only one direction, thus no two field lines overlap.
   A wire with red insulation is usually the live wire of electric supply.
   So, all statements are incorrect.
5. (b) $AgNO_3$ solution and copper metal
   Explanation: AgNO3 solution and copper: Copper is more reactive than silver and will displace it from its solution.

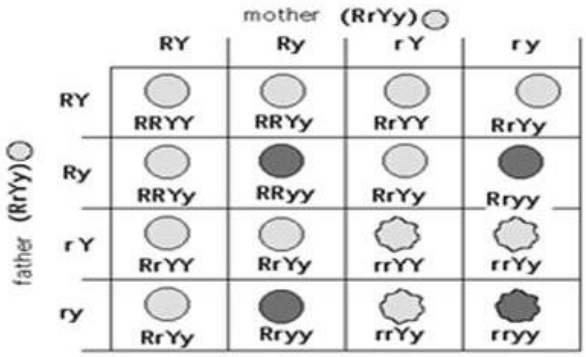
$2AgNO_3 + Cu \rightarrow Cu(NO_3)_2 + 2Ag$

NaCl solution and copper metal: Copper metal is less reactive than sodium and will not be able to displace it from its solution.

$MgCl_2$ solution and aluminum: Aluminium is less reactive than magnesium and will not be able to displace it from its solution.

$FeSO_4$ solution and silver metal: Silver is less reactive than iron and will not be able to displace it from its solution.

6. (b) Compounds have high melting and boiling points.
   Explanation: Compounds have high melting and boiling points.
7. (a) 5
   Explanation: Bases turn red litmus blue and acids turn blue litmus red. Acid solution has a pH value less than 7. Since the solution turns blue litmus red, its pH is likely to be 5.
8. (d) Cutting
   Explanation: Cutting is a method of vegetative propagation used to grow roses.
9. (c) IV
   Explanation: Zinc reacts with sodium hydroxide on heating to produce hydrogen gas rapidly.
   $Zn + 2NaOH \rightarrow Na_2ZnO_2 + H_2$
10. (a) Leaf
    Explanation: In the leaves of Bryophyllum meristematic marginal notches are present. From these meristematic tissues, new plants can develop after coming in contact with soil.
11. (c) (ii) and (iii)
    Explanation: The new combination in F_2 progeny will be round, yellow, and wrinkled green. The phenotypic ratio 9:3:3:1 is obtained. This can be shown by following Punette square:



12. (b) All of these
    Explanation: Tungsten (W) is exclusively used for making filaments of electric bulbs. Tungsten has a fairly good resistivity ($5.20 \times 10^{-8} \Omega m$) at 20 degrees C. Tungsten is ductile and can be drawn into thin wires. Thin wires offer high resistance, offer great heating effect, and produce light ($H = I^2Rt$). The thin wires of tungsten do not melt at high temperatures since the melting point of tungsten is very high (3380 degrees C).
13. (d) Bends towards the normal
    Explanation: Speed of light changes when it travels from one medium to another. The speed of light decreases while it travels from rarer to denser medium. Hence it

bends towards normal. On the other hand, the speed of light increases while it travels from denser to rarer medium. Hence, it bends away from normal.

14. (d) Has low melting point

Explanation: Given that the compound X and Y form compound Z.
Here, X loses electron and Y gains electron meaning that an ionic or an electrovalent bond is formed. Thus, the compound Z is a crystalline solid, has high melting and boiling point. It conducts electricity in the molten state.
The compound Z cannot have a low melting point.

15. (a) Red

Explanation: Greenlight is the least effective for plants because they are themselves green due to the pigment Chlorophyll. This pigment absorbs red light the best and converts the light into energy that it uses for metabolism. Photosynthesis occurs when pigments (chlorophyll) molecules in the plant cell absorb light photons and transfer them around to create chemical energy. Different colour light helps plants achieve different goals as well. Blue light, for example, helps encourage vegetative leaf growth. Red light, when combined with blue, allows plants to flower.

16. (b) Pollination, fertilization, embryo, seedling

Explanation: In pollination, the pollen grains transfer from stamen (anther) to stigma after which fertilization takes place during which germ cells fuse together to form a zygote which in turn leads to embryo formation. Fertilized ovule becomes seed and seeds germinate to produce a seedling.

17. (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.

18. (c) A is true but R is false.

Explanation: A is true but R is false.
Ammonia gas, which is alkaline, turn the red litmus paper blue.

19. (a) Both A and R are true and R is the correct explanation of A.

Explanation: Abscisic acid is responsible for wilting of leaves because it is a growth inhibitor.

20. (a) Both A and R are true and R is the correct explanation of A.

Explanation: The ozone layer is getting depleted at the higher levels of the atmosphere due to the effect of chlorofluorocarbons (CFCs) which are used as refrigerants and in fire extinguishers.

Section B

21. The atom of an element reacts with another atom to form a molecule because by doing so it gets its octet (or duplet) completed. Also, it results in the decrease of energy.

OR

i. Hydration of ethene with water to form ethanol.

$$H_2C = CH_2 + H_2O(g) \xrightarrow{H_3PO_4,\ 300\ ^oC} CH_3 - CH_2 - OH$$

ii. Addition reaction of bromine with ethyne to form tetra-bromo ethane.

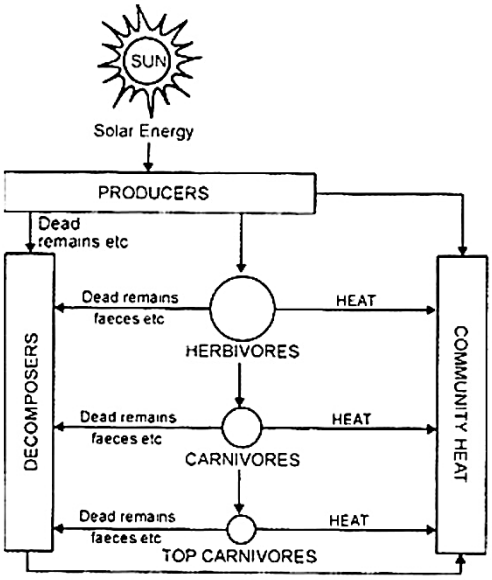
$$HC \equiv CH + 2Br_2 \rightarrow H - \overset{Br}{\underset{Br}{C}} - \overset{Br}{\underset{Br}{C}} - H$$

iii. Reaction of ethanol with sodium metal to form sodium ethoxide and hydrogen gas.

$$2C_2H_5OH + 2Na \rightarrow 2C_2H_5ONa + H_2\uparrow$$

22. Hormonal responses are slower than the reflex actions because hormones, which initiate and control the responses, are chemicals transported by blood. On the other hand, in reflex actions, the impulses are electrical in nature and are transmitted by specialised cells called neurons that makeup nervous tissue. It does not need the involvement of the brain. It means, when the nerve signal travels to the spinal cord, it triggers an automatic response before the brain realizes it. The spinal cord then reacts by sending a signal causing the person to react.

23. An ecosystem is a community of living organisms in conjunction with the non-living components of their environment, interacting as a system.



24. Pollution caused by garbage can be controlled by-
(a) Recycling of certain wastes products like plastic and paper.
(b) Maximizing the use of biodegradable products like that of paper, cloth bags etc.
(c) Producing biogas from the organic wastes.
(d) Separation of biodegradable and non-bio-degradable waste during disposal.
(e) Making the compost of biodegradable wastes by decomposing them under the layers of soil.

25. Magnification, m = - 3 (since image is real)
Object distance, u = -10 cm Image distance, v= ?
We know that magnification for the mirror.
Thus, the image is located at a distance of 30 cm in front of the mirror.

OR

Focal length of concave lens = - 2 m
P = - 1/f = 1/(-2m)
= -0.5 D

26. **(a) Electrovalent or ionic bond:** Example: Sodium chloride (NaCl), Magnesium chloride ($MgCl_2$), Potassium fluoride (KF) etc.
(b) Covalent bond: Examples. Chlorine molecule (Cl_2), Oxygen molecule (O_2), Hydrogen chloride gas (HCl), etc.

Section C

27.

a. Double decomposition reaction [An exchange of ions took place]
b. Displacement reaction [A more reactive non-metal displaces a less reactive non-metal from its salt solution.]
c. Decomposition reaction/Reduction reaction [A compound decomposes to form two or more products./CuO is reduced to Cu.]

28.

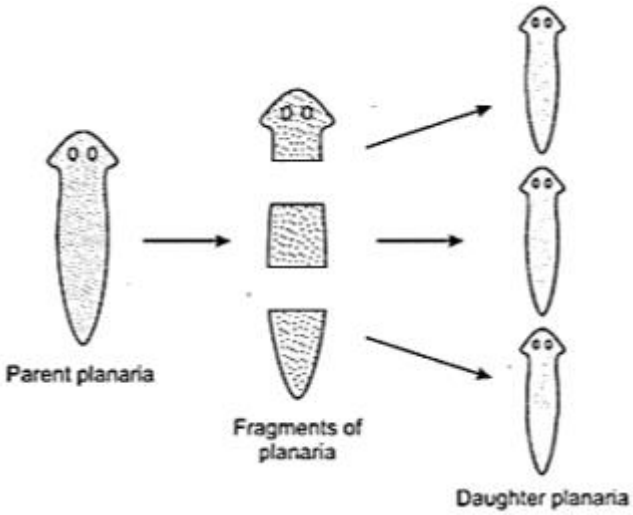
i.
   a. Object should be between pole and focus.
   b. At the focus.

ii.
   a. Small head-convex mirror.
   b. Legs of normal size-plane mirror.

29.

i. Regeneration is the process by which an organism has the ability to regenerate its lost parts of the body that might have been removed by injury or by some other methods. Planaria have the ability to give rise to new individuals from their body parts. When Planaria is cut into many pieces, each piece grows into a complete organism. Regeneration is carried out by specialized cells which have the capacity to develop, proliferate and differentiate into various cell types

and tissues.



ii. A single pluripotent adult stem cell type (neoblasts) is used by such multicellular organisms to regenerate.

OR

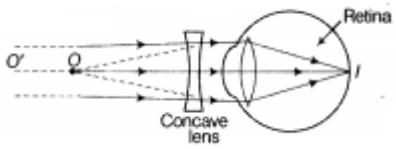
Sexually transmitted disease caused due to

1. Bacterial infection is gonorrhoea, and
2. Viral infection is AIDS (Acquired Immune Deficiency syndrome). These disease can be prevented by responsible sexual behaviour such as use of condom during intercourse, etc.

30.

i. Near sightedness (myopia) defect arises either because of :
(a) decrease in focal length of eye lens.(b) elongation of the eye ball

ii. To correct this defect of vision, he must use a concave lens of suitable focal length. The concave lens of suitable focal length will bring the image back to the retina as shown in the given figure.



iii. Given, v = -100 cm , u = ∞
Using lens formula,
$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} \Rightarrow \frac{1}{-100} - \frac{1}{\infty} = \frac{1}{f}$
f = -100 cm = -1 m.
$\therefore$ Power of lens,
P = $\frac{1}{f(m)} = \frac{1}{-1}$ = -1D.

31. 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

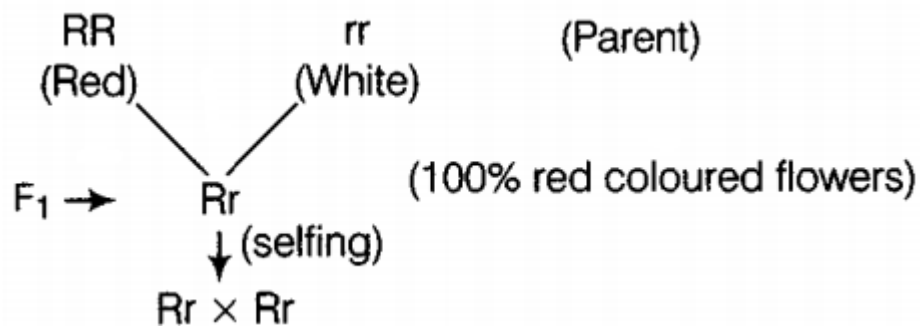
iv. **Evolution of gas:** Some reactions are characterised by evolution of gas as a result of chemical reaction. For example, the chemical reaction between sodium carbonate and hydrochloric acid is characterised by the evolution of carbon dioxide gas.
$Zn + H_2SO_4 \longrightarrow ZnSO_4 + H_2$

32.

i. RR for homozygous pure round. And rr for homozygous pure wrinkle pea plant.
ii. Rr (hybrid) - heterozygous. All are round since round is dominant over wrinkled.
iii. 3:1 (phenotypic ratio), 1:2:1 (genotypic ratio) The name of this cross is monohybrid cross.

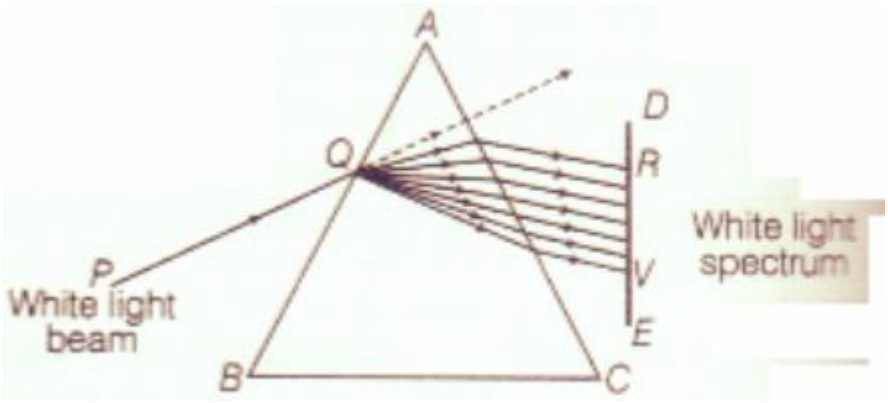
OR

When two plants, A with white flowers and B with red flowers were crossed,
In F_1 generation all the plants have red coloured flowers and in F_2 generation the ratio of red : white is 3 : 1.
The dominant trait is red colour in flowers.
The recessive trait is white colour in flowers.



Gametes	R	r
R	RR(red)	Rr(red)
r	Rr(red)	rr(red)

33.



i. The phenomenon of splitting of white light into its constituent colours is called dipersion of light. It is caused due to difference in speed of constituent colours of light travel in the medium other than air/vacuum because of different speed they bend at different angles.
ii. In nature, this Phenomenon is observed in formation of rainbow where all the seven colours constituting white light is visible.
iii. Based on phenomenon of dispersion, we can conclude that
    a. White light consists of seven colours. Violet, indigo, blue, green, yellow, orange and red.
    b. Violet light suffers maximum deviation and red light suffers minimum deviation.

Section D

34.

a. Platinum, gold and silver are used to make jewelry because of their bright shiny surface and high resistance to corrosion. Also they have high malleability and ductility.
b. Sodium, potassium and lithium are stored under oil to prevent their reaction with oxygen, moisture and carbon dioxide of air so as to protect them.
c. Aluminum metal forms a thin layer of aluminum oxide all over its surface under the action of moist air. This layer prevents the metal underneath from further corrosion. It is cheap, easily available, malleable and ductile. Therefore, it is used to make utensils for cooking.
d. It is easier to obtain a metal from its oxides as compared to its sulphides and carbonates. So, prior to reduction, metal carbonate and sulphides must be converted into metal oxides. A carbonate ore is converted into oxide by calcination whereas a sulphide ore is converted into oxide by roasting.

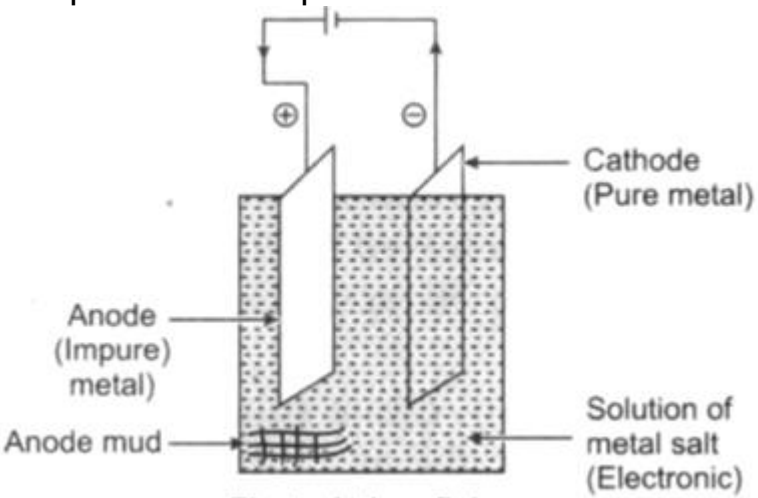
e. When copper vessels are exposed to moist air, they form a green coating of basic copper carbonate [$CuCO_3.Cu(OH)_2$].

$$2Cu + \underset{From\ Moistair}{CO_2 + O_2 + H_2O} \rightarrow \underset{Basic\ Copper\ Carbonate\ (Green)}{CuCO_3.Cu(OH)_2}$$

The sour substances such as lemon or tamarind juice contain acids. Lemon juice contains citric acid and tamarind contains tartaric acid. These acids dissolve the coating of copper oxide or basic copper carbonate present on the surface of tarnished copper vessels and make them shining red-brown again.

OR

i. Metal M is Copper(Cu).
ii. It is concentrated by the Froth-Floatation process. Impure copper is purified by electrolytic refining.
iii. Reaction involve in the process of extraction:
Roasting: $2Cu_2S + 3O_2 \longrightarrow 2Cu_2O + 2SO_2$
Basemerisation: $Cu_2S + 2Cu_2O \longrightarrow 6Cu + SO_2$
iv. Impure metal is taken as anode whereas pure metal is taken as cathode. Soluble salt of metal is taken as electrolyte. When an electric current is passed, impure metal changes to ions which gain electrons at the cathode and change into pure metal. Impurities are left behind as anode mud.



Electrolytic refining

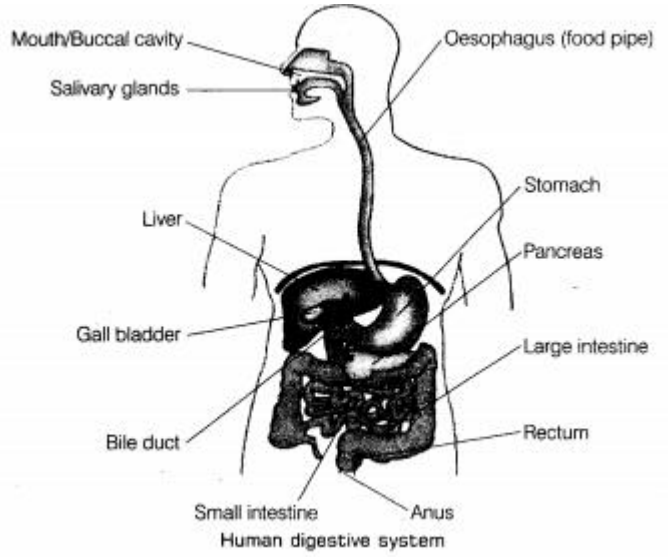
35.

i. The nasal hair and mucus present in the nasal passage trap the dust particles and other impurities present in the inhaled air so that clean air goes into the lungs.
ii. Trachea does not collapse even when there is no air in it because it is supported by rings of soft bones called cartilage.
iii. The alveoli provide a surface where the exchange of respiratory gases can take place.
iv. When we breathe in, the ribs are lifted up and the diaphragm flattens which increases the size of the chest cavity.

v. During the breathing cycle, when air is taken in and let out, the lungs always contain a residual volume of air so that there is sufficient time for oxygen to be absorbed and for the carbon dioxide to be released.

OR

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.

36.

a.

I	II
Current (I) shows Direct Current (D.C.).	Current (II) shows Alternating Current (A.C.).
Current D.C flows in one direction only. It is called a direct current. The magnitude and direction of the flow of current remain the same.	Current A.C reverses direction after equal intervals of time. It is called alternating current. The magnitude and direction of current change continuously at definite intervals of time.
The magnitude of current in D.C does not become zero with the passage of time.	The magnitude of A.C becomes zero after a regular time interval.

b. Source of (I) D.C. → A cell, battery, D.C. generator,
Source of (II) A.C. → A.C. generator.

Section E

37.

i. $E \propto t$
When the time of operating the heater is doubled, the energy dissipated is doubled.

ii. Given: P = 60 W, t = 1 min
E = 60 × 1 × 60 = 3600 J

OR

Given: P = 400 Ω, t = 8 hour
E = 400 × 8 = 3200 Wh = 3.2 kWh
Cost = 3.2 × 5 = ₹16

38.

i. These activities show tropic movements in plants due to their growth.

ii. Yes, old parts of the shoot and root change direction and there is a difference in the direction of new growth.

iii. Movement is related to stimulus i.e. plant organs either move towards the source of stimulus or away from it. Stimuli that cause movements in plants are gravity, light, touch, water, and chemical substances.

OR

Movements in the organs of a plant due to gravity are known as geotropism. This causes the roots to bend down towards the soil.

39.

i. The pH range of the Human Body is 7 to 7.8.

ii. The strength of acids and bases depends on the number of H^+ ions produced and the number of OH^- ions produced.

iii. Soil Y is acidic. Hence, it should be treated with powdered chalk to reduce its acidity.

OR

When the pH in the mouth falls below 5.5, tooth decay starts. Bacteria present in the mouth produce acid by degradation of sugar and food particles which remain in the mouth after eating.