PREVIOUS YEAR QUESTION PAPER

2008

General Instructions:

1. The question paper comprises of two Sections, A and B. You are to attempt both the sections.
2. All questions are compulsory.
3. All questions of Section A and all questions of Section B are to be attempted separately.
4. There is no overall choice. However, internal choice has been provided in some questions. Only one option in such questions is to be attempted.
5. Question numbers 1–6 in Section A and 17 to 19 in Section B are short answer questions. These questions carry one mark each.
6. Question numbers 7–10 in Section A and 20 to 24 in Section B are short answer questions and carry two marks each.
7. Question numbers 11–14 in Section A and 25 and 26 in Section B are also short answer questions and carry three marks each.
8. Question numbers 15 and 16 in Section A and 27 in Section B are long answer questions and carry five marks each.

SECTION A

1. Balance the following chemical equation:

$Fe(s) + H_2O(g) \rightarrow Fe_3O_4(s) + H_2(g)$

Sol:- $3Fe(s) + 4H_2O(l) \rightarrow Fe_3O_4(s) + 4H_2(g)$

Marks: 1

2. Why is respiration considered an exothermic process?

Sol:- Respiration is called an exothermic reaction because during respiration, breaking down of glucose/food in the presence of oxygen occurs with release of energy.

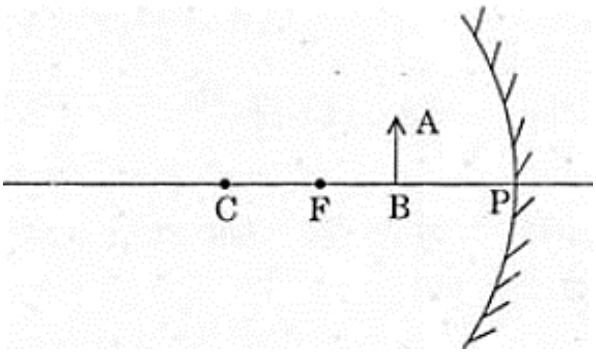
Marks: 1

3. How does the flow of acid rain water into a river make the survival ofaquatic life in the river difficult?

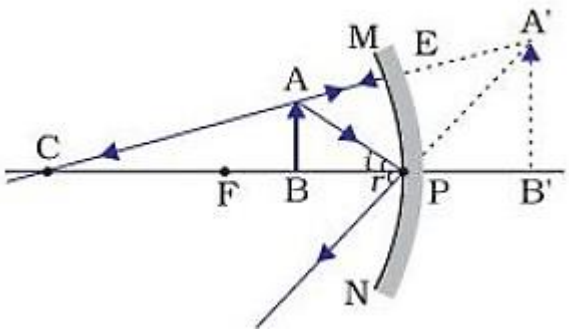
Sol:- When acid rain water flows into the rivers, it lowers the pH of river water making the survival of aquatic life difficult.

Marks: 1

4. Draw the following diagram in your answer-book and show the formation of image of the object, AB with the help of suitable rays.



Sol:-



Marks: 1

5. Why is a series arrangement not used for connecting domestic electrical appliances in a circuit?

Sol:- A series arrangement is not used for connecting domestic electrical appliances in a circuit because:

i) Same current flows through each device, but different devices need current of different values to operate.

ii) If one device in a series circuit is defective, current is cut off.

iii) Total resistance of the circuit increases, so current flowing is reduced.

iv) Selective operation of devices is not possible.

Marks: 1

6. Out of 60 W and 40 W lamps, which one has a higher electrical resistance when in use?

Sol:- 40 W lamp

Marks: 1

7. Write the chemical formula for washing soda. How may it be obtained from baking soda? Name an industrial use of washing soda other than washing clothes.

Sol:- Washing soda: $Na_2CO_3.10H_2O$

It is obtained by heating baking soda.

$2NaHCO_3 \xrightarrow{\Delta} Na_2CO_3 + H_2O + CO_2$

$Na_2CO_3 + 10H_2O \longrightarrow Na_2CO_3.10H_2O$

Uses: It is used in the manufacture of glass, soap and paper.

Marks: 2

8. Give an example of a decomposition reaction. Describe an activity to illustrate such a reaction by heating.

Sol:- $CaCO_3 \xrightarrow{\Delta} CaO + CO_2$

(or any other example)

Activity:

Take 2 g of ferrous sulphate crystals in a dry test tube. Heat this test tube over the flame for some time. On heating, green color of the crystals changes into dark brown and a gas with characteristic smell of burning sulphur is obtained.

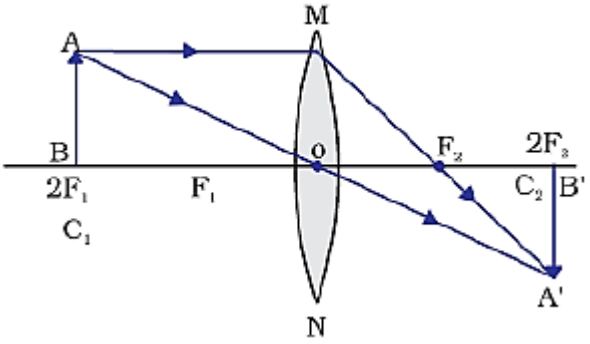
Marks: 2

9. Draw ray diagrams to represent the nature, position and relative size of the image formed by a convex lens for the object placed:

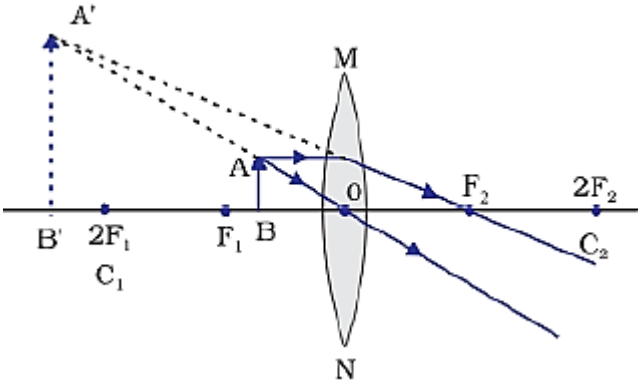
a) at $2F_1$.

b) between F_1 and the optical centre O of lens.

Sol:- (a)



(b)



Marks: 2

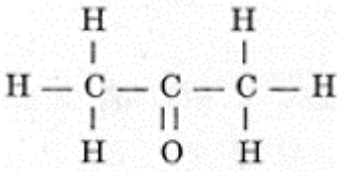
10. What is meant by the term, 'magnetic field'? Why does a compass needle show deflection when brought near a bar magnet?

Sol:- Magnetic field - The region around a magnet in which force of the magnet can be experienced. A compass needle is a small bar magnet so it experiences the force of the other bar magnet when brought near it and deflects.

Marks: 2

11. **a)** Why are covalent compounds generally poor conductors of electricity?

b) Name the following compound:



c) Name the gas evolved when ethanoic acid is added to sodium carbonate. How would you prove the presence of this gas?

Sol:- **a)** Covalent compounds do not provide ions in aqueous solutions hence they do not conduct electricity.

b) Propanone/acetone

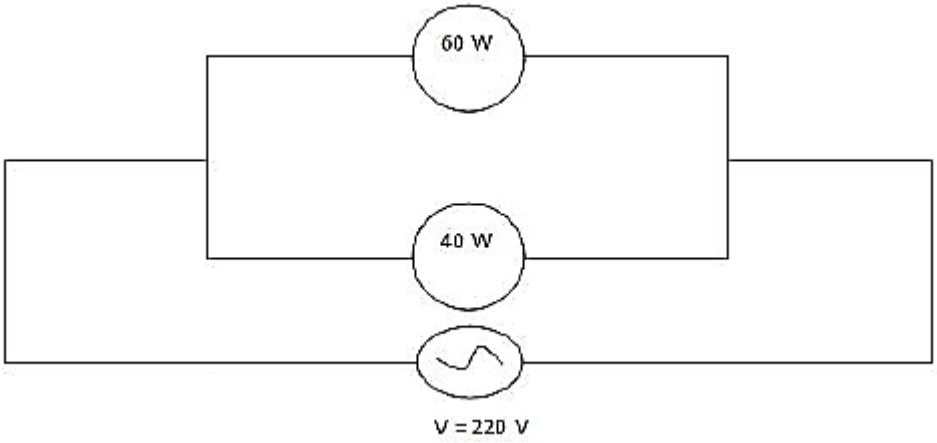
c) CO_2 gas is obtained when ethanoic acid is reacted with sodium carbonate. Presence of the gas can be tested by passing the gas through lime water. Carbon dioxide gas turns lime water milky.
Marks: 3

12. **a)** What are amphoteric oxides? Choose the amphoteric oxides from amongst the following oxides:
Na_2O, ZnO, Al_2O_3, CO_2, H_2O
b) Why is it that non-metals do not displace hydrogen from dilute acids?

Sol:- **a)** Amphoteric oxides are metal oxides which show both basic as well as acidic behavior.
ZnO, Al_2O_3
b) Non-metals cannot lose electrons to H^+ to form H_2 gas because nonmetals are electron-acceptors hence they do not react with dilute acids.
Marks: 3

13. Two lamps, one rated 60 W at 220 V and the other 40 W at 220 V, are connected in parallel to the electric supply at 220 V.
(a) Draw a circuit diagram to show the connections.
(b) Calculate the current drawn from the electric supply.
(c) Calculate the total energy consumed by the two lamps together when they operate for one hour.

Sol:- **(a)**



(b) $I = \frac{P}{V}$

$$I = \frac{60\ \text{W}}{220\ \text{W}} = \frac{3}{11}\ \text{A}$$

$$I_2 = \frac{40\ \text{W}}{220\ \text{W}} = \frac{2}{11}\ \text{A}$$

$$I = I_1 + I_2 = \frac{3}{11} + \frac{2}{11} = \frac{5}{11}\ \text{A} = 0.45\ \text{A}$$

(c) E = P × t = (40 W + 60 W) × 1 h = 100 Wh or 0.1 kWh.
Marks: 3

14. **a)** Distinguish between the terms 'overloading' and 'short-circuiting' as used in domestic circuits.
b) Why are the coils of electric toasters made of an alloy rather than a pure metal?

Sol:- **a)** Short circuiting - When neutral and live wire come in direct contact.
Overloading - When too many appliances are connected to a single socket drawing much more current or power than permissible.
b) Resistivity of an alloy is higher than its constituent metal and alloys do not oxidize as easily as constituent metal at high temperature. That is why the coils of electric toasters are made of an alloy rather than a pure metal.
Marks: 3

15. On the basis of Mendeleev's Periodic Table given below, answer the questions that follow the table:

Group →	I	II	III	IV	V	VI	VII	VIII		
Oxide Hydride	R_2O RH	RO RH_2	R_2O_3 RH_3	RO_2 RH_4	R_2O_5 RH_3	RO_3 RH_2	R_2O_7 RH	RO_4		
Periods ↓	A B	A B	A B	A B	A B	A B	A B	Transition series		
1	H 1·008									
2	Li 6·939	Be 9·012	B 10·81	C 12·011	N 14·007	O 15·999	F 18·998			
3	Na 22·99	Mg 24·31	Al 29·98	Si 28·09	P 30·974	S 32·06	Cl 35·453			
4 First series : Second series :	K 39·102 Cu 63·54	Ca 40·08 Zn 65·37	Sc 44·96 Ga 69·72	Ti 47·90 Ge 72·59	V 50·94 As 74·92	Cr 50·20 Se 78·96	Mn 54·94 Br 79·909	Fe 55·85	Co 58·93	Ni 58·71
5 First series : Second series :	Rb 85·47 Ag 107·87	Sr 87·62 Cd 112·40	Y 88·91 In 114·82	Zr 91·22 Sn 118·69	Nb 92·91 Sb 121·75	Mo 95·94 Te 127·60	Tc 99 I 126·90	Ru 101·07	Rh 102·91	Pd 106·4
6 First series : Second series :	Cs 132·90 Au 196·97	Ba 137·34 Hg 200·59	La 138·91 Tl 204·37	Hf 178·49 Pb 207·19	Ta 180·95 Bi 208·98	W 183·85		Os 190·2	Ir 192·2	Pt 195·09

(a) Name the element which is in
i) 1st group and 3rd period.
ii) 7th group and 2nd period.
(b) Suggest the formula for the following:
i) Oxide of nitrogen
ii) Hydride of oxygen
(c) In group VIII of the Periodic Table, why does cobalt with atomic mass 58.93 appear before nickel having atomic mass 58.71?

(d) Beside gallium, which two other elements have since been discovered for which Mendeleev had left gaps in his Periodic Table?

(e) Using atomic masses of Li, Na and K, find the average atomic mass of Li and K and compare it with the atomic mass of Na. State the conclusion drawn from this activity.

OR

a) Why do we classify elements?

b) What were the two criteria used by Mendeleev in creating his Periodic Table?

c) Why did Mendeleev leave some gaps in his Periodic Table?

d) In Mendeleev's Periodic Table, why was there no mention of Noble gases like Helium, Neon and Argon?

e) Would you place the two isotopes of chlorine, Cl-35 and Cl-37 in different slots because of their different atomic masses or in the same slot because their chemical properties are the same? Justify your answer.

Sol:- **(a) (i)** Sodium

(ii) Fluorine

(b) (i) N_2O_5

(ii) H_2O/OH_2

(c) In group VIII of the Periodic Table, cobalt appears before nickel so that elements with similar chemical properties may fall in the same group.

(d) Scandium (Sc) and Germanium (Ge)

(e) Atomic mass of lithium = 7

Atomic mass of potassium = 39

So, average of atomic mass = (7 + 39)/2 = 23

Atomic mass of sodium = 23 i.e., both are same hence we can conclude that atomic mass of the middle element is the average of the other two elements.

OR

(a) We classify elements to systematize the study of elements and make the understanding of properties of elements and compounds simpler.

(b) Criteria used by Mendeleev:

i) Atomic mass

ii) Properties of hydrides and oxides of elements.

(c) Mendeleev left some gaps in his Periodic Table to leave scope of search for the yet undiscovered elements.

(d) In Mendeleev's Periodic Table, there was no mention of noble gases since they had not been discovered by that time.

(e) The two isotopes of chlorine, Cl-35 and Cl-37 will be placed in the same slot because their chemical properties are same.

Marks: 5

16. **a)** What is meant by dispersion of white light? Describe the formation of rainbow in the sky with the help of a diagram.

b) What is hypermetropia? Draw ray diagrams to show the image formation of an object by:

i) Hypermetropic eye

ii) Correction made with a suitable lens for hypermetropic eye.

OR

(a) Give reasons for the following:

i) Colour of the clear sky is blue.

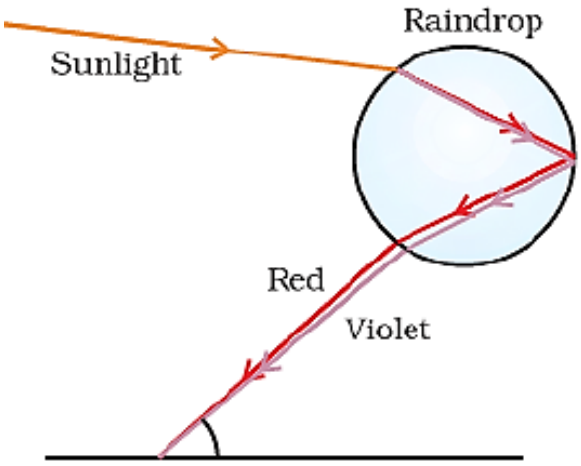
ii) The sun can be seen about two minutes before actual sunrise.

iii) We cannot see an object clearly if it is placed very close to the eyes.

(b) What is Presbyopia? Write two causes of this defect.

Sol:- **(a)** Dispersion - The splitting of white light into its constituent colours.

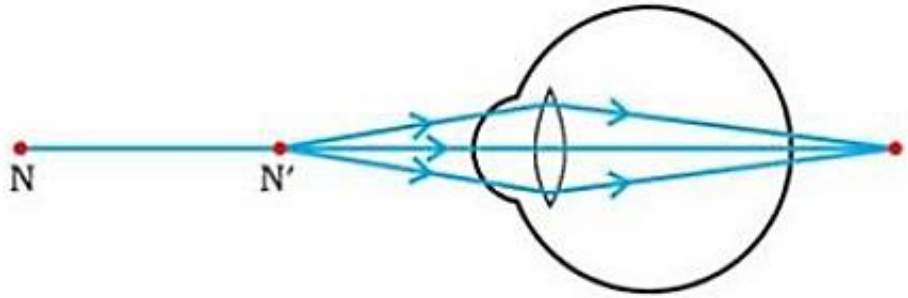
Rainbow formation (figure)



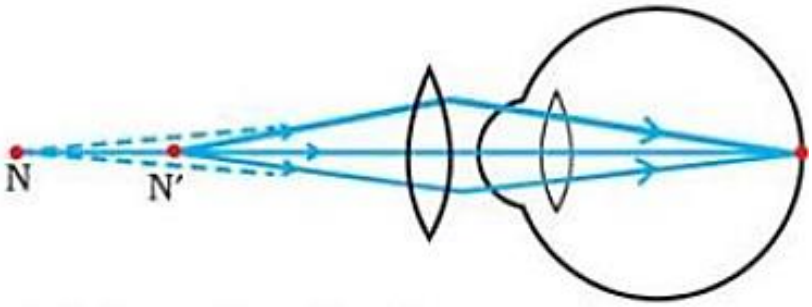
Water droplets in air refract and disperse the incident sunlight. Then, reflect it internally and finally refract it again when it comes out of the droplet. Due to the dispersion of light and internal reflection, different colours of sunlight reach the observer's eye and are visible in the form of a rainbow.

(b) Hypermetropia - The defect of vision due to which a person clearly sees distant objects but cannot clearly see nearby objects.

(i)



(ii)



OR

(a) (i) Due to scattering of light

(ii) Due to atmospheric refraction

(iii) At the near point of eye, curvature of eye lens is maximum and focal length is minimum. If object is placed nearer than it, eye lens cannot adjust its curvature.

(b) Presbyopia - The defect of vision in which the eye is unable to see nearby as well as far off objects clearly.

Causes:
--- weakening of ciliary muscles
--- diminishing flexibility of the eye lens.
Marks: 5

SECTION-B

17. Which one of the following is a renewable resource?
Natural gas, Petroleum, Ground water, Coal
Sol:- Ground water.
Marks: 1

18. What is the effect of DNA copying which is not perfectly accurate on the reproduction process?
Sol:- Imperfect DNA copying in the reproduction process leads to variations or evolution.
Marks: 1

19. How do autotrophs obtain CO_2 and N_2 to make their food?
Sol:- CO_2 is obtained from the environment and N2 is obtained from the soil and environment.
Marks: 1

20. List any four characteristics of biogas on account of which it is considered an ideal fuel.
Sol:- Biogas is considered as an ideal fuel because of the following:
(i) High Calorific Value
(ii) Produces no smoke on burning
(iii) Burns smoothly (without explosion)
(iv) No residue on combustion.
Marks: 2

21. Discus one limitation each for the extracting of energy from:
a) Winds
b) Tides
Sol:- (a) From wind:
(i) Wind energy cannot be harnessed at places where wind does not blow at a minimum speed of 15 km/h.
(ii) Wind is not a dependable source as sometimes air is still and at other times there are storms.
(b) From tides:
(i) There are only few sites suitable for building tidal dams.
(ii) The rise and fall of sea water during high and low tides are not enough to generate electricity on a large scale.
Marks: 2

22. Write one function each of the following components of the transport system in human beings:
a) Blood vessels
b) Blood platelets
c) Lymph
d) Heart

Sol:- **(a)** Blood Vessels: Transport of blood.
(b) Blood Platelets: Clotting of blood.
(c) Lymph: Carries digested fats.
(d) Heart: Helps to circulate blood in the whole body by acting as a pump.
Marks: 2

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

Sol:- **(i)** Bacterial: Gonorrhea or syphilis.
Viral: Warts or AIDS.
(ii) These can be prevented by the use of condoms.
Marks: 2

24. What are fossils? What do they tell about the process of evolution?

Sol:- Fossils are the remains or traces of animals and plants of the past on rocks.
Fossils give information about evolutionary relationships between different species.
Marks: 2

25. How is ozone formed in the upper atmosphere? Why is damage to ozone layer a cause of concern to us? What causes this damage?

Sol:- **(i)** UV rays in the atmosphere split some molecular oxygen (O_2) into free oxygen (O) atoms.
(ii) These atoms combine with molecular oxygen to form O_3.

OR

$O_2 \xrightarrow{\text{UV rays}} O + O$

$O + O_2 \longrightarrow O_3$

Damage to ozone layer will allow UV rays to reach on the surface of earth causing skin cancer, cataract and damage to crops.
Release of chlorofluoro carbons in the atmosphere which are used as refrigerants or in fire extinguishers damages the ozone layer.
Marks: 3

26. How are oxygen and carbon dioxide transported in human beings? How are lungs designed to maximize the area for exchange of gases?

Sol:- **(i)** Respiratory pigment haemoglobin takes up O_2 from the air in the lungs and carries it to tissues.
(ii) CO_2 is being transported from various tissues into the alveoli by blood and is released during exhalation.
Within the lungs, the trachea divides into smaller and smaller tubes which finally terminate in balloon like structures called alveoli. These alveoli increase the surface area for the exchange of gases.
Marks: 3

27. **(a)** Draw the structure of a neuron and label the following on it:
Nucleus, Dendrite, Cell body and Axon
(b) Name the part of neuron:
i) Where information is acquired.
ii) Through which information travels as an electrical impulse.

OR

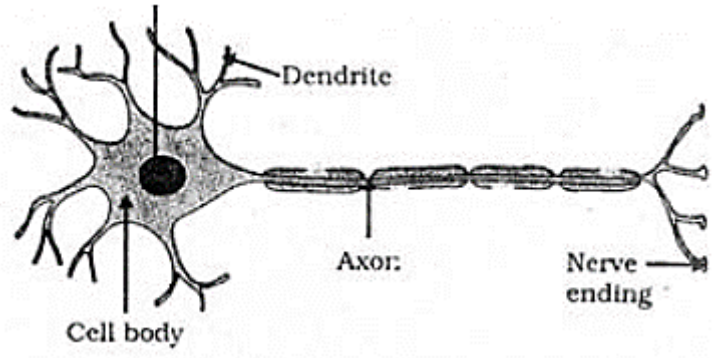
(a) What is **(i)** photoropism and **(ii)** geotropism? With labelled diagrams describe an activity to show that light and gravity change the direction that plant parts grow in.

(b) Mention the role of each of the following plant hormones:

i) Auxin

ii) Abscisic acid

Sol:- (a)



(i) Information is acquired through dendrite.

(ii) From the dendrite to the cell body and then along the axon to it's end.

OR

(a) (i) Phototropism: The movement of a plant or it's part in response to light is called phototropism.

(ii) Geotropism: The movement of a plant or it's part in response to gravity is called geotropism.

Activity to show that light and gravity change the direction that plant part grows in:

i. Fill a conical flask with water.

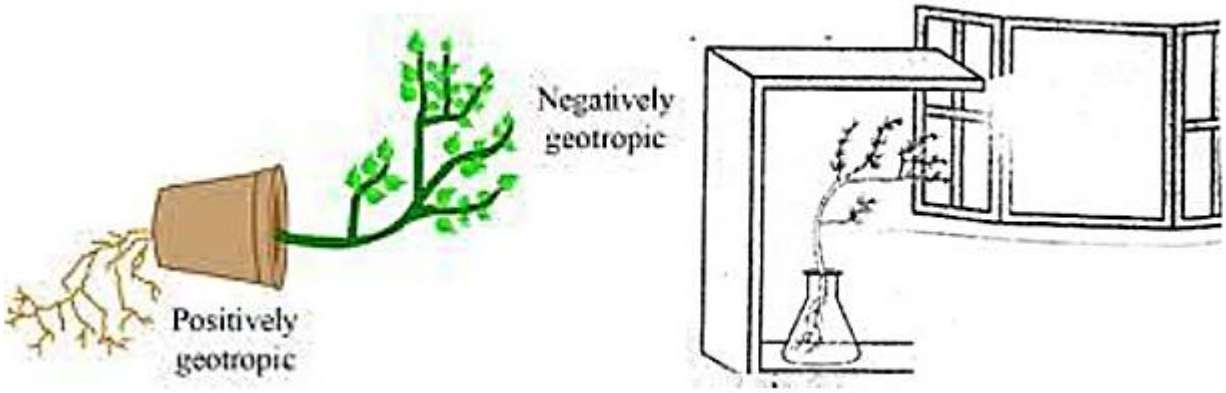
ii. Cover the neck of the flask with a wire mesh.

iii. Keep two or three freshly germinated bean seeds on the wire mesh.

iv. Take a cardboard box which is open from one side.

v. Keep the flask in the box in such a manner that the open side of the box faces light coming from a window.

vi. After two or three days, you will notice that the shoots bend towards light and roots away from light.



(b) (i) Auxin: - It promotes growth and cell elongation.

(ii) Abscisic acid: It inhibits growth and causes wilting of leaves.

Marks: 5