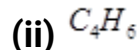
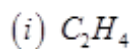


## Section A

**Q1 Write the next homologue of each of the following:**



**Ans:** (i)  $C_2H_4$  is an alkene consisting of two carbon atoms. Its next homologue is obtained by adding

a  $-CH_2-$  unit. Thus, the next homologue is propene ( $C_3H_6$ ).

(ii)  $C_4H_6$  is an alkyne consisting of four carbon atoms. Its next homologue is obtained by adding a  $-CH_2-$  unit. Thus, the next homologue is pentyne ( $C_5H_8$ ).

**Q2 Name the part of *Bryophyllum* where the buds are produced for vegetative propagation.**

**Ans:** Leaves produce buds for vegetative propagation in *Bryophyllum*.

**Q3 List two natural ecosystems.**

**Ans:** Following are the two natural ecosystems:

1. Terrestrial ecosystem
2. Aquatic ecosystem

**Q4 State two positions in which a concave mirror produces a magnified image of a given object. List two differences between the two images.**

**Ans:** (i) The two cases in which a concave mirror produces a magnified image of the given object are when the object is placed between

(a) focus ( $F$ ) and centre of curvature ( $C$ )

(b) focus ( $F$ ) and pole ( $P$ )

(ii) Two differences between these images are that the image formed in case (a) is real and inverted, whereas the image formed in case (b) is virtual and erect.

**Q5 List four advantages of properly managed watershed management.**

**Ans:** The advantages of watershed management are as follows:

- It strictly maintains the water quality.
- It helps in equal and sustainable distribution of water.
- It provides protection from floods by controlling the flow of rainwater.
- It helps in enhancing the level of groundwater.

**Q6 Explain giving example where active involvement of local people lead to efficient management of forest.**

**Ans:** Active participation of local people to save forests is another activity towards the conservation of forests and wildlife. The following are two examples of active participation of people in the conservation and management of forests.

**Khejri tree case** - In 1731, Amrita Devi Bishnoi from Khejrli village, near Jodhpur, established a group of 363 people who sacrificed their lives for the protection of Khejri trees which were ordered to be cut down by the Maharaja of Jodhpur.

**Chipko Andolan** - This movement originated in a remote village called Reni in Garhwal, in the early 1970s. A contractor was given a permission to cut down the trees in a forest near the village. However, the villagers were against the decision. One day, when the menfolk in the village were away at work, the employees of the contractor visited the forest to cut down the trees. The women of the village then reached the forest and each one wrapped her hands around a tree trunk; thereby preventing the workers from destroying the forest.

**Q7 What are covalent compounds? Why are they different from ionic compounds? List their three characteristic properties.**

**Ans:** Covalent compounds are the compounds that are formed by the mutual sharing of valence electrons by the constituent atoms. For example, a molecule of methane ( $\text{CH}_4$ ) is formed when the carbon atom shares one of its four valence electrons with one electron of each of the four H atoms. Ionic compounds, on the other hand, are the compounds that are formed by the complete transfer of valence electrons between the constituent atoms. For example, a molecule of sodium chloride ( $\text{NaCl}$ ) is formed when the

sodium atom donates its one valence electron to the chlorine atom.  
The characteristic properties of covalent compounds are as follows:

- (i) They have low melting and boiling points.
- (ii) They do not conduct electricity.
- (iii) They are not soluble in water, but they dissolve readily in organic solvents.

**Q8** When ethanol reacts with ethanoic acid in the presence of conc.  $H_2SO_4$ , a substance with fruity smell is produced. Answer the following:

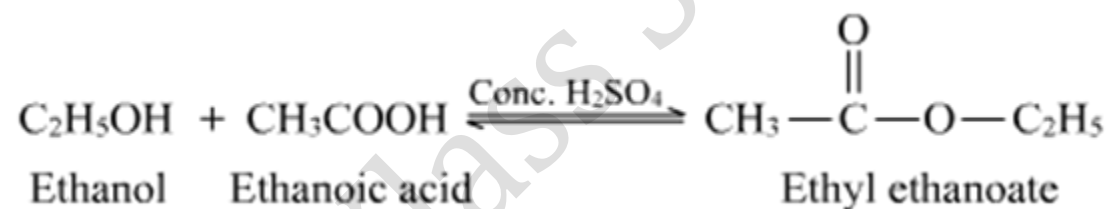
(i) State the class of compounds to which the fruity smelling compounds belong. Write the chemical equation for the reaction and write the chemical name of the product formed.

(ii) State the role of conc.  $H_2SO_4$  in the reaction.

**Ans: i.** An ester is formed when an alcohol reacts with a carboxylic acid in the presence of an acidic medium.

An ester has a fruity smell.

The chemical equation for the reaction between ethanol and ethanoic acid in the presence of conc.  $H_2SO_4$  can be written as follows:



ii. Concentrated sulphuric acid acts as a protonating catalyst during the esterification reaction.

**Q9** Calcium is an element with atomic number 20. Stating reason, answer each of the following questions:

- (i) Is calcium a metal or a non-metal?
- (ii) Will its atomic radius be larger or smaller than that of potassium with atomic number 19?
- (iii) Write the formula of its oxide.

**Ans:** (i) The atomic number of calcium is 20. Its electronic configuration is 2, 8, 8, 2. The valency of calcium is 2; therefore, it is a metal belonging to the group 2 of the periodic table.

(ii) Atomic numbers of potassium and calcium are 19 and 20, respectively.

Both the elements lie in the third period of the periodic table. Potassium lies to the left of calcium in the period. We know that on moving left to right across a period, the atomic radius of the atom decreases. This happens because of the increase in the force of attraction by the nucleus on going left to right in the period.

(iii) The oxide of calcium is calcium oxide and its chemical formula is CaO.

**Q10 An element 'M' with electronic configuration (2, 8, 2) combines separately with  $(NO_3)^-$ ,  $(SO_4)^{2-}$  and  $(PO_4)^{3-}$  radicals. Write the formula of the three compounds so formed. To which group and period of the Modern Periodic Table does the element 'M' belong? Will 'M' form covalent or ionic compounds? Give reason to justify your answer.**

**Ans:** Electronic configuration of M = 2, 8, 2

Number of valence electrons of M = 2

Valency of M = Number of valence electrons = 2

Valency of the nitrate ion  $(NO_3^-) = 1$

Valency of the sulphate ion  $(SO_4^{2-}) = 2$

Valency of the phosphate ion  $(PO_4^{3-}) = 3$

The formulae of nitrate, sulphate and phosphate formed by M

are  $M(NO_3)_2$ ,  $MSO_4$  and  $M_3(PO_4)_2$ , respectively.

Since the valency of M is 2 and the atomic number of M is 12 (i.e. 2 + 8 + 2), this element belongs to the group 2 and period 3 of the periodic table.

This element will tend to form ionic compounds by losing two valence electrons to achieve a noble gas electronic configuration, that is, a stable octet in the valence shell.

**Q11 How do organisms, whether reproduced asexually or sexually maintain a constant chromosome number through several generations? Explain with the help of suitable example.**

**Ans:** The maintenance of chromosomal number of utmost importance when an organism is reproducing either sexually or asexually. The mechanism is different in both the type of reproductions.

In case of asexual reproduction the whole set of chromosomes is replicated and transferred to the next generation. For example, reproduction

of *Amoeba* by binary fission.

In case of sexual reproduction the chromosome number is halved to form gametes. Then these gametes fuse together to restore the original chromosome number.

For example, in case of human beings, there are 46 chromosomes present in a normal cell but during reproduction gametes are generated which contain half the number of chromosomes i.e 23. Now, when female gamete containing 23 chromosomes is fused with male gamete with 23 chromosomes, the number is restored to original 46 (23+23).

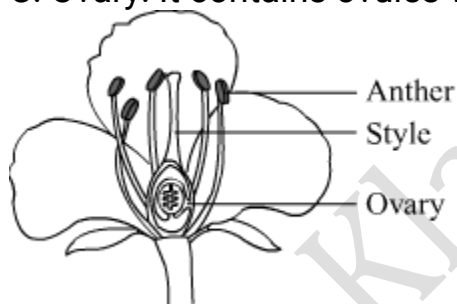
**Q12 Name the parts A, B and C shown in the following diagram and state one function of each.**

**Ans:** The given diagram represents the reproductive parts of a flower. The labelling is as follows:

A: Anther: It produces pollen grains which are the male gametes.

B: Style: It connects the stigma and ovary and helps in transfer of pollen to the ovary.

C: Ovary: It contains ovules which are female gametes.



**Q13 Suggest three contraceptive methods to control the size of human population, which is essential for the health and prosperity of a country. State the basic principle involved in each.**

**Ans: Barrier method:** In this method, the fertilisation of the ovum and the sperm is prevented with the help of barriers such as a condom.

**Oral contraceptive method:** In this method, tablets or drugs are taken orally to prevent fertilisation.

**Implants and surgical methods:** Contraceptive devices, such as a loop and a copper-T rod, are placed in the uterus to prevent pregnancy. However, they can cause side effects to the uterus.

Some surgical methods such as vasectomy (blocking of the vas deferens in the male body to prevent the transfer of sperms) and tubectomy (blocking of fallopian tubes in the female body to prevent the egg from reaching the uterus) can also be used to block the gamete transfer.

**Q14** In one of his experiments with pea plants, Mendel observed that when a pure tall pea plant is crossed with a pure dwarf pea plant in the first generation,  $F_1$ , only tall plants appear.

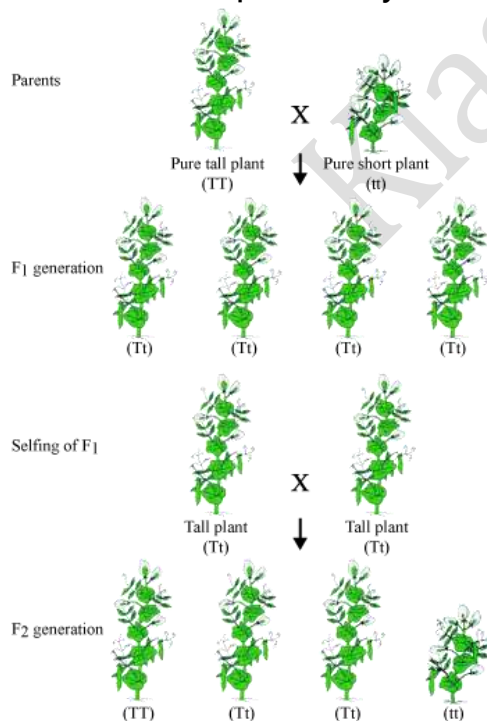
(a) What happens to the traits of the dwarf plants in this case?

(b) When the  $F_1$ -generation plants were self-fertilised, he observed that in the plants of the second generation  $F_2$ , both tall plants and dwarf plants were present. Why it happened? Explain briefly.

**Ans:** (a) Being recessive, the dwarf trait gets masked by the dominant trait in the  $F_1$  generation.

(b) According to the law of segregation, the two alleles of a pair segregate or separate during gamete formation such that the gamete receives only one of the two factors. In heterozygous parents, two kinds of gametes are produced in equal proportions.

This can be explained by the following cross:

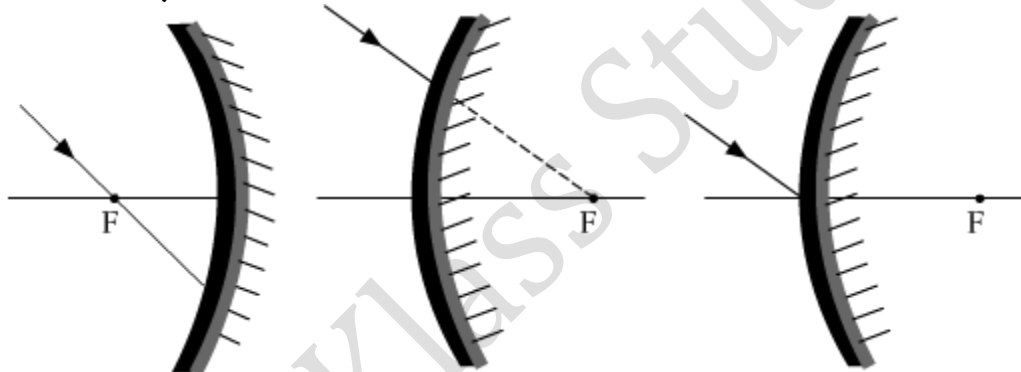


**Q15 List three distinguishing features, in tabular form, between acquired traits and the inherited traits.**

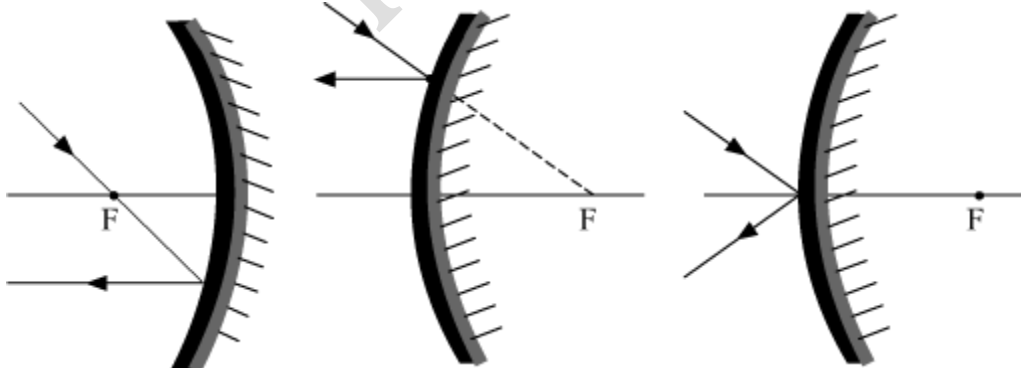
**Ans:**

Acquired Traits	Inherited Traits
Acquired traits are developed by an individual during his/her lifetime.	Inherited traits are distinguishing qualities or characteristics present in an individual since birth.
They are a result of changes in non-reproductive tissues (somatic cells).	They are a result of changes in DNA.
They cannot be passed on to the germ cells or progeny.	They are transmitted to the progeny.

**Q16 Draw the following diagram in which a ray of light is incident on a concave/convex mirror on your answer sheet. Show the path of this ray, after reflection, in each case.**

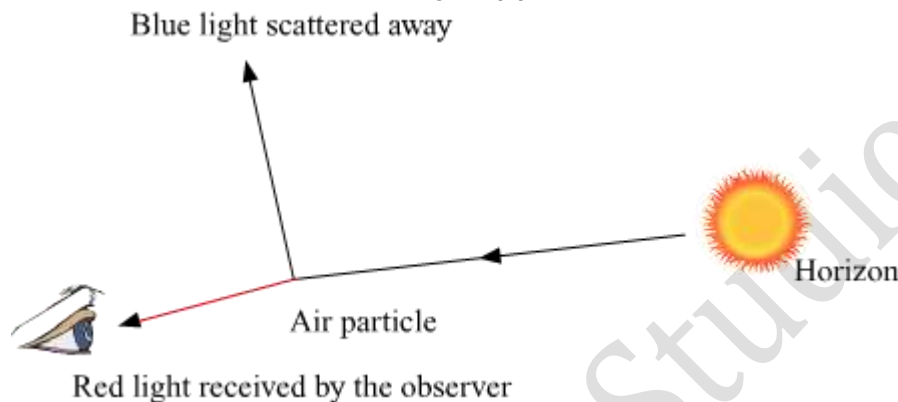


**Ans:**



**Q17 Why does the sun appear reddish early in the morning? Will this phenomenon be observed by an observer on the moon? Justify your answer with a reason.**

**Ans:** At sunrise, the Sun is located near the horizon of the Earth and hence, light has to travel a long distance through the Earth's atmosphere. The suspended atmospheric particles have a wavelength similar to that of blue light. When sunlight falls on the atmosphere, the blue light is scattered out by these atmospheric particles. The light that reaches the surface of the Earth is predominantly red. Hence, when this less scattered red light reaches our eyes, the Sun and its surroundings appear reddish.



No, the same phenomenon will not occur on the Moon as there is no atmosphere on its surface to scatter light.

**Q18 Give reason to justify the following:**

**(a) The existence of decomposers is essential in a biosphere.**

**(b) Flow of energy in a food chain is unidirectional.**

**Ans: a)** Decomposers are the animals that break down dead plants and animals. They are essential for the proper functioning of an ecosystem. They help in the recycling of minerals by decomposing dead plants and animals and releasing their components into the environment.

**b)** Food chain is a linear relationship of 'eating' and 'being eaten' between the organisms present in an ecosystem. According to the energy transfer law, only 10% energy is transferred from one trophic level to another. The energy that is captured at one trophic level cannot move back to the previous trophic level. That is why, the flow of energy in a food chain is always unidirectional.



**Q19 (a) Give a chemical test to distinguish between saturated and unsaturated hydrocarbons.**

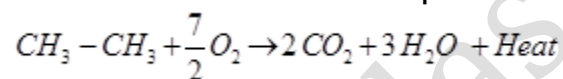
**Ans: Chemical test:** Bromine water test, if unsaturated hydrocarbons are added to it then the solution turns colourless. The unsaturated hydrocarbon decolourise bromine water. Whereas no change takes place to the solution when saturated hydrocarbons are added to bromine water.

**Physical test:** Distinction between saturated and unsaturated hydrocarbons: Saturated hydrocarbons burn in the air with clear (blue) flame, whereas burning of unsaturated hydrocarbons (alkenes and alkynes) gives sooty (yellowish) flame. Saturated hydrocarbons contain less percentage of carbon as compared to unsaturated hydrocarbons; therefore, they get completely oxidised by the oxygen present in the air on burning. Unsaturated hydrocarbons require lot of oxygen for complete oxidation whose demand is not fulfilled by air. Due to this reason, unsaturated hydrocarbons burn with a sooty flame. The sooty flame contains partially burnt carbon in the form of soot.

**(b) Name the products formed when ethane burns in the air. Write a balanced chemical equation for the reaction showing the types of energies liberated.**

**Ans:** When ethane ( $\text{CH}_3\text{-CH}_3$ ) is burned in air (oxygen), it forms carbon dioxide and water.

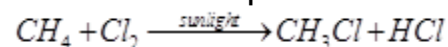
The balanced chemical equation is written as follows:



This reaction is called an exothermic reaction due to evolution of heat.

**(c) Why is the reaction between methane and chlorine in the presence of sunlight considered a substitution reaction?**

**Ans:** When methane reacts with chlorine in the presence of light, the following reaction takes place:



It is considered a substitution reaction because in this reaction, replacement of hydrogen with chlorine occurs.

**Q20 (a) Write the functions of the following parts in human female reproductive system:**

**(i) Ovary**

**(ii) Oviduct**

### (iii) Uterus

**Ans:** The functions of given parts of female reproductive system are as follows:

**Ovary:** The ovaries are located on each side of the lower abdomen. They produce thousands of eggs in the female body. They also produce a hormone called oestrogen, which brings about the development of secondary sexual characteristics in the female body. The eggs produced in the ovary start maturing on reaching puberty.

**Oviduct:** One egg from each ovary grows and matures and is carried from the ovary to the uterus by a thin oviduct or the fallopian tube. Fertilisation of the egg also takes place in the oviduct.

**Uterus:** It is also known as the womb, as the developing embryo gets implanted in the uterus.

### (b) Describe the structure and function of placenta.

**Ans:** Placenta is the connecting link between the mother's body and the baby. It is a disc embedded in the uterine wall. This special tissue contains villi on the embryo's side of the tissue and on the mother's side are blood spaces, which surround the villi. Placenta provides a large surface area for glucose and oxygen to pass from the mother to the baby. The developing embryo generates certain waste substances that can be removed through placenta.

### Q21 What is meant by speciation? List four factors that could lead to speciation. Which of them cannot be a major factor in the speciation of a self-pollinating plant species. Give reason to justify your answer.

**Ans:** The formation of a new species by evolution or any genetic modification of the previously existing species in a population is called speciation.

Following are the factors responsible for speciation:

1. Genetic drift
2. Natural selection
3. Reproductive isolation
4. Geographical isolation

Reproductive isolation is not a major factor in the speciation of a self-pollinating plant species because reproductive isolation refers to the absence of other reproductively compatible plants in the same area. A self-pollinating plant species is not dependent on other compatible plants for pollen transfer.

**Q22 (a) Define the following terms in the context of spherical mirrors:**

**(i) Pole**

**(ii) Centre of curvature**

**(iii) Principal axis**

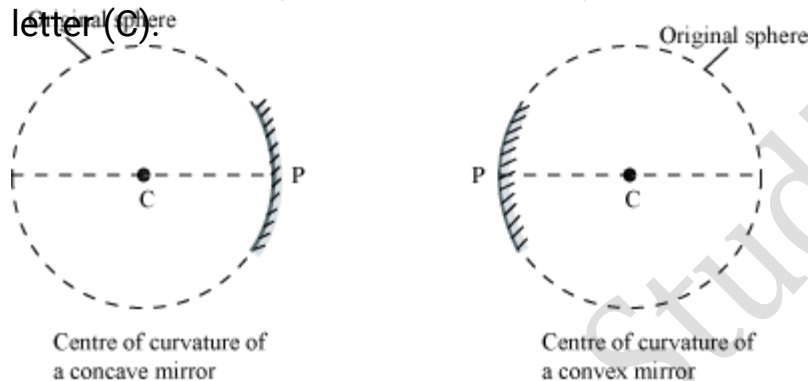
**(iv) Principal focus**

**Ans: (i) Pole of a spherical mirror**

The central point of the reflecting surface of a spherical mirror is termed as the pole. It lies on the mirror and is denoted by the letter (P).

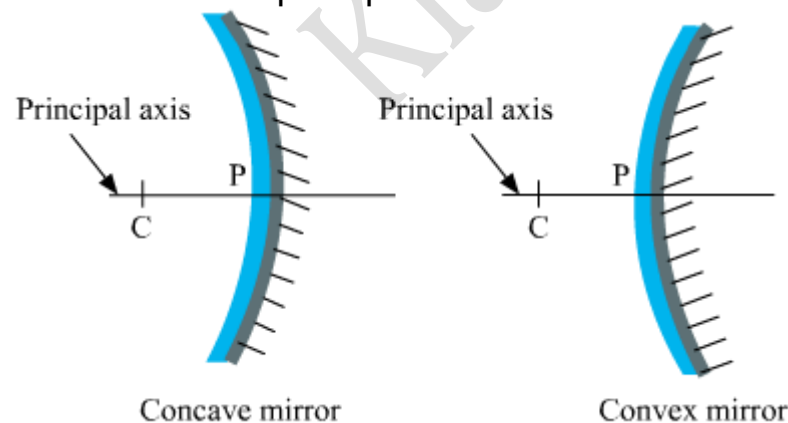
**(ii) Centre of curvature**

The centre of curvature is the centre of a sphere from which the given spherical mirror (convex or concave) is obtained. It is denoted by the letter (C).



**(iii) Principal axis of a spherical mirror**

The imaginary straight line joining the pole (P) and the centre of curvature (C) is termed as the principal axis.



**(iv) Principal focus of a spherical mirror**

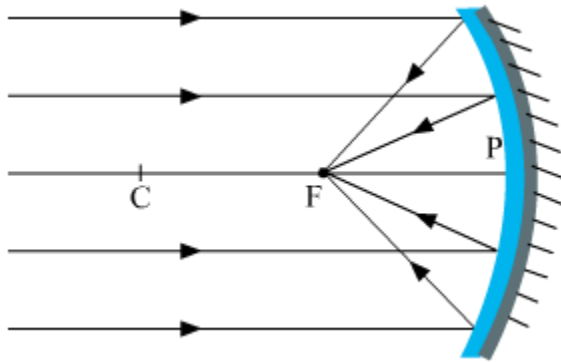
The focus (F) is the point on the principal axis of a spherical mirror where all the incident rays parallel to the principal axis meet or appear to diverge from after reflection.

(b) Draw ray diagrams to show the principal focus of a

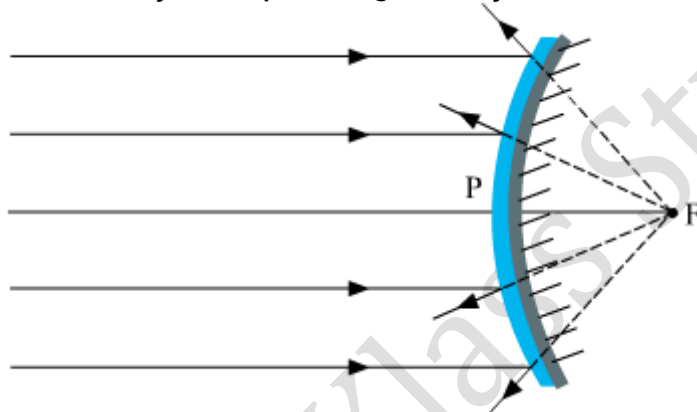
(i) concave mirror

(ii) convex mirror

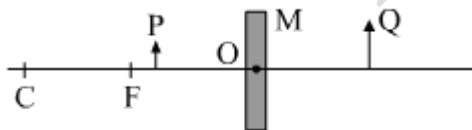
**Ans:** For concave mirrors, the focus lies on the same side of the reflecting surface.



For convex mirrors, the focus is obtained on the opposite side of the reflecting surface by extrapolating the rays reflected from the mirror's surface.



(c) Consider the following diagram in which M is a mirror and P is an object and Q is its magnified image formed by the mirror.

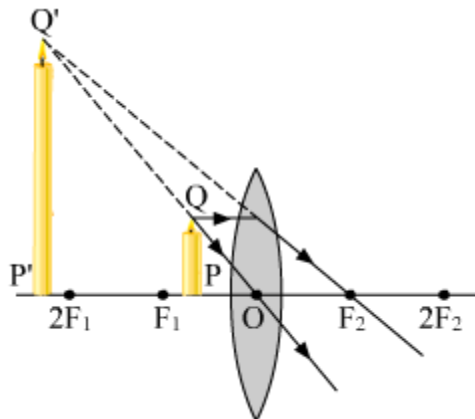


**State the type of the mirror M and one characteristic property of the image Q.**

**Ans:** The given mirror M is a concave spherical mirror. The characteristic property of the image Q is that it is virtual.

**Q23 (a) Draw a ray diagram to show the formation of an image by a convex lens when an object is placed in front of the lens between its optical centre and principal focus.**

**Ans:**



**(b) In the above ray diagram, mark the object distance ( $u$ ) and the image distance ( $v$ ) with their proper signs (+ve or -ve as per the new Cartesian sign convention) and state how these distances are related to the focal length ( $f$ ) of the convex lens in this case.**

**Ans:** The object distance ( $u$ ) and the image distance ( $v$ ) are indicated in the figure given below. Since both the image and the object lie in the direction opposite to the direction of the incoming ray, both of them will be negative. The relation between ( $u$ ), ( $v$ ) and ( $f$ ) given by the lens formula is

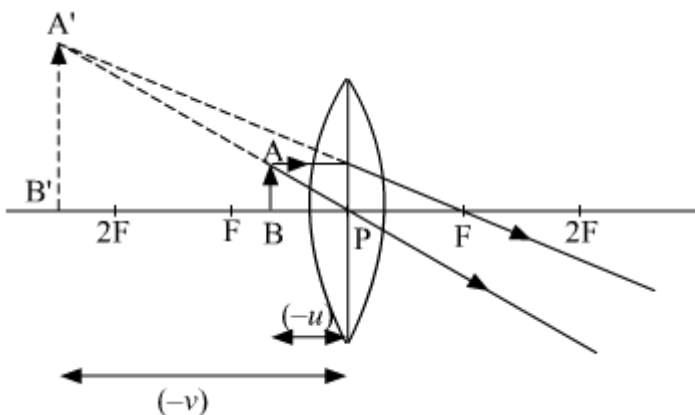
$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$$

As both ( $u$ ) and ( $v$ ) are negative, the above equation will be changed to

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

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

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



(c) Find the power of a convex lens which forms a real and inverted image of magnification  $-1$  of an object placed at a distance of  $20\text{ cm}$  from its optical centre.

**Ans:** Given:

$$u = -20\text{ cm}$$

$$m = -1$$

Since magnification is given as

$$m = \frac{v}{u}$$

$$\Rightarrow v = mu = (-1) \times (-20) = 20\text{ cm}$$

Focal length can be calculated as

$$\frac{1}{f} = \frac{1}{v} - \frac{1}{u} = \frac{1}{20} - \frac{1}{(-20)} = \frac{1}{10}$$

$$\Rightarrow f = 10\text{ cm}$$

Thus, the power of the convex lens is

$$p = \frac{1}{f(m)} = \frac{100}{10} = 10D$$

**Q24 (a) Write the function of each of the following parts of the human eye: Cornea; iris; crystalline lens; ciliary muscles**

**Ans:** The function of cornea: Most of the refraction for the light rays entering the eye occurs at the outer surface of the cornea.

The function of iris: It is a dark, muscular diaphragm that controls the size of the pupil.

The function of crystalline lens: It merely provides the finer adjustment of the focal length required to focus objects at different distances on the retina.

The function of ciliary muscles: When these muscles are relaxed, the lens becomes thin. Thus, its focal length increases. This enables us to see distant objects clearly. When you are looking at the objects closer to the eye, the ciliary muscles contract. This increases the curvature of the eye lens. The eye lens then becomes thicker. Consequently, the focal length of the eye lens decreases. This enables us to see nearby objects clearly.

**(b) Millions of people in the developing countries of the world are suffering from corneal blindness. These persons can be cured by replacing the defective cornea with the cornea of a donated eye. A charitable society of your city has organised a campaign in your neighbourhood in order to create**

awareness about this fact. If you are asked to participate in this mission, how would you contribute in this noble cause?

- (i) State the objective of organising such campaigns.
- (ii) List two arguments which you would give to motivate the people to donate their eyes after death.
- (iii) List two values which are developed in the persons who actively participate and contribute in such programmes.

**Ans:** (i) The objective of organising such campaigns will be stated as "One pair of eyes gives vision to TWO CORNEAL BLIND PEOPLE"

or "By donating our eyes after we die, we can light the life of a blind person".

(ii) Argument 1: As we have got the gift of vision, why not pass it on to somebody who does not have it.

Argument 2: Eye donors can belong to any age group or sex. People who use spectacles or those operated for cataract can still donate their eyes. People who are diabetic, have hypertension, are asthma patients and those without communicable diseases can also donate eyes.

(iii) The values developed in the persons who actively participate and contribute in such programmes are social welfare and awareness.

### Section B

**Q25 Which of the following sets of materials can be used for conducting a saponification reaction for the preparation of soap?**

- (a)  $Ca(OH)_2$  and neem oil
- (b) NaOH and neem oil
- (c) NaOH and mineral oil
- (d)  $Ca(OH)_2$  and mineral oil

**Ans:** Soaps are sodium or potassium salts of long-chain fatty acids. They are prepared by the reaction of a long-chain fatty acid with either NaOH or KOH.

This reaction is known as the saponification reaction. Among the given sets of materials, a soap can be prepared by the reaction between NaOH and *neem* oil (long-chain fatty acid).

Hence, the correct answer is option (b).

**Q26** A student takes four test tubes marked P, Q, R and S of 25 mL capacity and fills 10 mL of distilled water in each. He dissolves one spoon full of four different salts in each as – KCl in P, NaCl in Q,  $\text{CaCl}_2$  in R and  $\text{MgCl}_2$  in S. He then adds about 2 mL of a sample of soap solution to each of the above test tubes. On shaking the contents of each of the test tubes, he is likely to observe a good amount of lather (foam) in the test tubes marked

- (a) P and Q
- (b) R and S
- (c) P, Q and R
- (d) P, Q and S

**Ans:** Scum is formed by the reaction of soap with calcium and magnesium salts in water. Test tubes R and S contain calcium chloride and magnesium chloride, respectively. Therefore, scum will be formed in these two tubes. Test tubes P and Q contain potassium chloride and sodium chloride, respectively. Thus, a good amount of lather is likely to be formed in them. Hence, the correct answer is option (a).

**Q27** Consider the following comments about saponification reactions:

**I. Heat is evolved in these reactions.**

**II. For quick precipitation of soap, sodium chloride is added to the reaction mixtures.**

**III. Saponification reactions are a special kind of neutralisation reactions.**

**IV. Soaps are basic salts of long-chain fatty acids.**

The correct comments are

- (a) I, II and III
- (b) II, III and IV
- (c) I, II and IV
- (d) Only I and IV

**Ans:** Soaps are sodium or potassium salts of long-chain fatty acids. Since sodium and potassium hydroxides are bases, their solutions in water are alkaline.

Dissolution of sodium or potassium hydroxide in water evolves a large amount of heat. Thus, saponification reactions are exothermic in nature.

Common salt is added in a saponification reaction, as it helps in the precipitation of a soap by decreasing the solubility of the soap.

Thus, statements I, II and IV are correct.



**Q28 A student has to perform the experiment "To identify the different parts of an embryo of a dicot seed." Select from the following an appropriate group of seeds:**

- (a) Pea, gram, wheat**
- (b) Red kidney bean, maize, gram**
- (c) Maize, wheat, red kidney bean**
- (d) Red kidney bean, pea, gram**

**Ans:** Red kidney bean, pea and gram seeds are from dicot plants. Hence, the correct answer is option (d).

**Q29 Which of the following is a correct set of homologous organs?**

- (a) Forelimbs of frog, bird and lizard**
- (b) Spine of cactus and thorn of bougainvillea**
- (c) Wings of bat and wings of butterfly**
- (d) Wings of a bird and wings of a bat**

**Ans:** Homologous organs are the organs that have a similar internal structure (similar origin). Forelimbs of a frog, bird and lizard are homologous organs. Hence, the correct answer is option (a).

**Q30 A student obtained a sharp image of a candle flame placed at the distant end of the laboratory table on a screen using a concave mirror to determine its focal length. The teacher suggested him to focus a distant building, about 1 km away from the laboratory, for getting more correct value of the focal length. In order to focus the distant building on the same screen, the student should slightly move the**

- (a) mirror away from the screen**
- (b) screen away from the mirror**
- (c) screen towards the mirror**
- (d) screen towards the building**

**Ans:** In order to focus the distant building, which is 1 km from the laboratory, which means for the given concave mirror, the object (building) is at infinity, and to obtain the sharp building's image, the student should slightly move the screen towards the mirror.

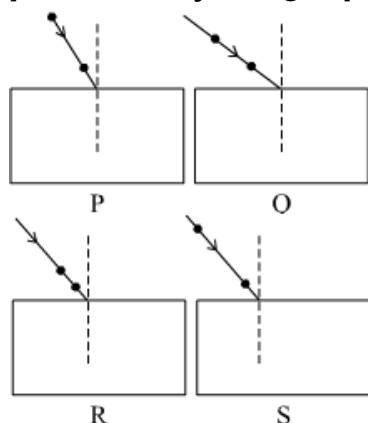
Hence, the correct answer is option (c).

**Q31** To determine the approximate focal length of the given convex lens by focussing a distant object (say, a sign board), you try to focus the image of the object on a screen. The image you obtain on the screen is always

- (a) erect and laterally inverted
- (b) erect and diminished
- (c) inverted and diminished
- (d) virtual, inverted and diminished

**Ans:** The image formed by the lens will be inverted and diminished.  
Hence, the correct answer is option (c).

**Q32** Select from the following the best experimental setup for tracing the path of a ray of light passing through a rectangular glass slab.

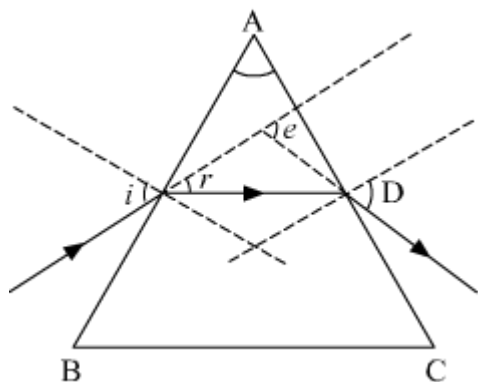


- (a) P
- (b) Q
- (c) R
- (d) S

**Ans:** Among the given options, S will be the most suitable setup for tracing a ray of light passing through a rectangular glass slab.

Hence, the correct answer is option (d).

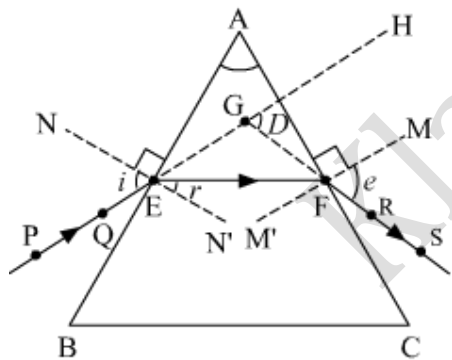
**Q33** Study the following figure in which a student has marked the angle of incidence ( $\angle i$ ), angle of refraction ( $\angle r$ ), angle of emergence ( $\angle e$ ), angle of prism ( $\angle A$ ), and the angle of deviation ( $\angle D$ ). The correctly marked angles are



- (a)  $\angle A$  and  $\angle i$
- (b)  $\angle A$ ,  $\angle i$  and  $\angle r$
- (c)  $\angle A$ ,  $\angle i$ ,  $\angle e$  and  $\angle D$
- (d)  $\angle A$ ,  $\angle i$ ,  $\angle r$  and  $\angle D$

**Ans:** The correctly marked angles in the given figure are the angle of prism ( $A$ ) and the angle of incidence ( $i$ ).

All the angles are correctly marked in the figure shown below.



Hence, the correct answer is option (a).

**Q34** What do you observe when you drop a few drops of acetic acid to test tubes containing

- (a) phenolphthalein
- (b) distilled water
- (c) universal indicator
- (d) sodium hydrogen carbonate powder

**Ans:** Acetic acid is a weak acid. The following changes occur when a few

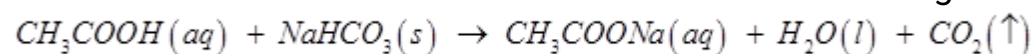
drops of acetic acid are added to the given solutions:

(i) Phenolphthalein remains colourless, as acetic acid shows a change in colour in basic substances.

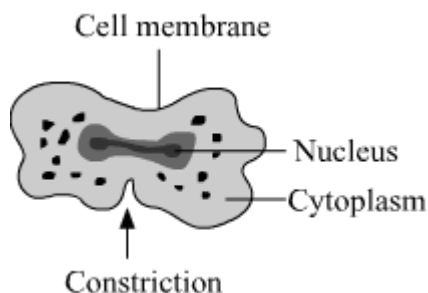
(ii) Acetic acid dissolves in distilled water.

(iii) Acetic acid turns the colour of the universal indicator to pale orange.

(iv) When added to sodium hydrogen carbonate powder, acetic acid causes effervescence because of the evolution of carbon dioxide gas in the process.



**Q35 Draw a labelled diagram to show that particular stage of binary fission in amoeba in which its nucleus elongates and divide into two and a constriction appears in its cell membrane.**



**Ans:**

**Q36 A student focuses the image of a well-illuminated distant object on a screen using a convex lens. After that, he gradually moves the object towards the lens and each time focuses its image on the screen by adjusting the lens.**

(i) In which direction, towards the screen or away from the screen, does he move the lens?

(ii) What happens to the size of the image? Does it decrease or increase?

(iii) What happens to the image on the screen when he moves the object very close to the lens?

**Ans:** (i) As the object is moved towards the lens, the image distance increases. Thus, the student moves the lens away from the screen to focus the image.

(ii) The size of the image increases when the object is moved towards the lens.

(iii) When the object is moved very close to the lens, no image is formed on the screen. A virtual image is formed behind the object on the same side of the screen.