**CBSE Sample Paper-01 (solved)**
**SUMMATIVE ASSESSMENT –II**
SCIENCE (Theory)
**Class – X**

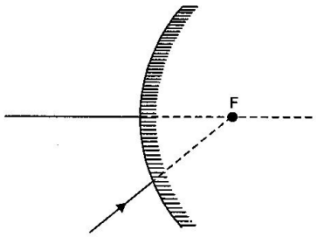
Time allowed: 3 hours Maximum Marks: 90

**General Instructions:**

a) All questions are compulsory.
b) The question paper comprises of two sections, A and B. You are to attempt both the sections.
c) Questions 1 to 3 in section A are one mark questions. These are to be answered in one word or in one sentence.
d) Questions 4 to 6 in section A are two marks questions. These are to be answered in about 30 words each.
e) Questions 7 to 18 in section A are three marks questions. These are to be answered in about 50 words each.
f) Questions 19 to 24 in section A are five marks questions. These are to be answered in about 70 words each.
g) Questions 25 to 27 in section B are 2 marks questions and Questions 28 to 36 are multiple choice questions based on practical skills. Each question of multiple choice questions is a one mark question. You are to select one most appropriate response out of the four provided to you.

## Section A

1. Name the product other than water formed on burning of Ethanol in air
2. Complete the path of the ray of light after reflection in the given diagram.




3. Rearrange the following according to their ascending trophic levels in a food chain:
   Hawk, Grass, Snake, Rabbit
4. A convex mirror used on an automobile has a focal length of 3.00 m. If a vehicle behind is at a distance of 5.00 m, then find the location of the image.
5. Write two essential conditions for total internal reflection to take place in a transparent medium. Give two examples of this phenomenon in daily life situations.
6. Why does atomic size progressively become smaller (atomic radius decreased from Na to Cl)?
7. The near point of a hypermetropic person is 75 cm from the eye. What is the power of lens requires to enable him to read clearly a book held at 25 cm from the eye?
8. What is the meaning of (a) Presbyopia, (b) Astigmatism? Give the cause and remedy for them.

9. Anil and his friends were excited about the news of tomorrow's solar eclipse. Anil convinced his friends to witness the eclipse. Anil told them that looking at the sum directly or even into a mirror reflecting sunlight may damage their eyes. So Anil narrated the method to witness to natural phenomenon in the following ways:
   (i) Hold a concave mirror in hands and direct its reflecting surface towards the sun.
   (ii) Direct the light reflected by the mirror on to a sheet of paper held close to the mirror.
   (iii) Move the sheet of paper back and forth gradually until a bright, sharp spot of light found on the paper sheet, hold the mirror and the paper in the same position for a few minutes.

   Read the above information and answer the following:
   (a) What is the separation between the concave mirror and the paper sheet having a bright, sharp spot of light in hands?
   (b) What value(s) is/are shown by Anil?
   (c) Draw the ray diagram used while observing the bright, sharp spot of light in above activity.

   [Value Based Question]
10. Establish the relationship between object distance, image distance and radius of curvature for a convex mirror.
11. Define ionization energy. First ionization energy of two elements A and B are 500 kJ $mol^{-1}$ and 375 kJ $mol^{-1}$ respectively. Comment about their relative positions in a group as well as in a period.
12. Why did Mendeleev leave some gaps in the periodic table of elements? Give your answer with examples.
13. (a) What is fertilization? Distinguish between external fertilization and internal fertilization.
    (b) What is the site of fertilization in human beings?
14. Define the terms unisexual and bisexual giving one example of each.
15. Define 'Evolution'. Describe Darwin's theory of evolution.
16. Define fossils. Explain briefly any two ways in which the study of fossils helps in understanding about the past life.
17. Suggest three ways to maintain a balance between environment and development to survive.
18. (a) What is 'Environmental Pollution"?
    (b) Distinguish between biodegradable and non-biodegradable pollutants.
    (c) Choose the biodegradable pollutants from the list given below:
    Sewage, DDT, radioactive waste, agricultural waste
19. (a) What is fermentation process?
    (b) What role is played by yeast in the conversion of canesugar ($C_{12}H_{22}O_{11}$) to ethanol?
    (c) How may the following be obtained from pure ethanol? Express chemical reactions by the corresponding chemical equations. (i) Sodium ethoxide, (ii) Ethyl ethanoate, (iii) Ethanal

**Or**

Chemical compound 'A' is produced by reacting 'B' with water in presence of phosphoric acid. 'A' burns in air with blue flame to form $CO_2$ and $H_2O$. On reacting with $K_2Cr_2O_7$ it produces a compound

'C' which turns blue litmus red. Identify the compounds A, B and C. Give their structures. Describe the process of preparation of the compound 'A' from sugar.

20. (a) Sugar cane juice mixed with yeast was kept in a covered container. After a few days it developed a strong smell. Name the process taking place. What could the strong smell be due to?
(b) What method would you suggest for separating the smelling substance from the final mixture?
(c) State any two uses of the separated smelling product.
(d) Suggest one method for preservation of sugar cane juice.

**Or**

Compound 'A' is obtained from wood-tar distillation. It has specific smell and burning taste. It burns with blue flame to give $CO_2$ and $H_2O$. It is used as a fuel and solvent. It reacts with sodium metal and gives out hydrogen gas. It reacts with acetic acid to form pleasant fruity smelling compound 'B' in presence of conc. $H_2SO_4$. Identify 'A' and 'B' and give equations for all the reactions involved.

21. Draw a diagram to show fertilization in a flowering plant. Label on it:
(i) Stigma, (ii) Ovary, (iii) Polar nuclei, (iv) Egg
Define the term 'double fertilization in plants'. After fertilization name the part in each case which develops into (i) the fruit, (ii) the seeds.

**Or**

Trace the events that would take place in a flower from the time the pollen grains of the same species fall on the stigma up to the completion of fertilization.

22. Give two reasons for avoiding frequent pregnancies of women. Explain the following methods of contraception giving one example of each:
(i) Barrier method (ii) Chemical method (iii) Surgical method

**Or**

Discuss briefly the different types of reproduction.

23. (a) State the relation between object distance, image distance and focal length of a sphericall mirror.
(b) A concave mirror of focal length 15 cm from an image of an object kept at a distance of 10 cm from the mirror. Find the position, nature and size of the image formed by it.
(c) Draw a ray diagram to show the image formed by a concave mirror when an object is placed between pole and focus of the mirror.

**Or**

(a) Explain the following terms used in relation to defects in vision and correction provided by them:
(i) Myopia (ii) Astigmation (iii) Bifocal lenses (iv) Far sightedness
(b) Describe with a ray diagram how a person with myopia can be helped by spectacles.

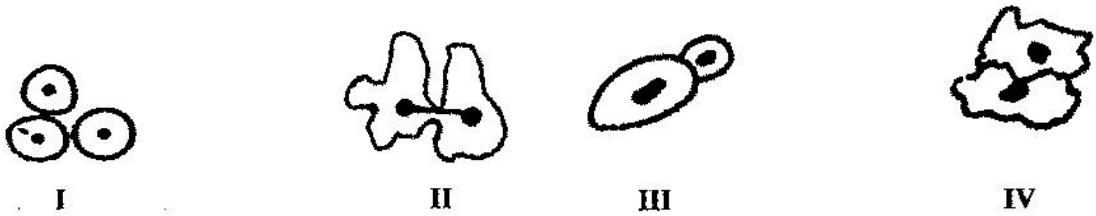
24. A 14-year old student is not able to see clearly the questions written on the blackboard placed at a distance of 5 m from him.
    (a) Name the defect of vision he is suffering from.
    (b) With the help of labelled diagrams show how this defect can be corrected.
    (c) Name the type of lens used to correct this effect.

**Or**

Describe with the neat diagram how near sightedness (myopia) can be corrected by usinf appropriate lenses.

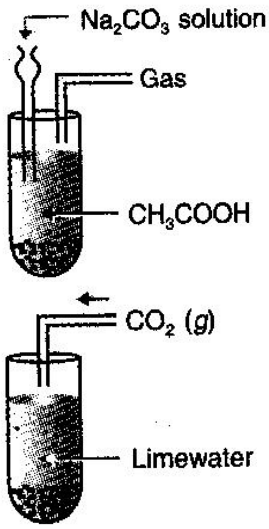
**Section B**

25. Three students performed experiment by adding Na metal, $Na_2CO_3$ and $NaHCO_3$, solution in acetic acid in test tube A, B, C.
    (a) Which gas(es) is/are evolved?
    (b) Give chemical reactions.
26. Out of four slides, I, II, III, IV whose details are shown below:



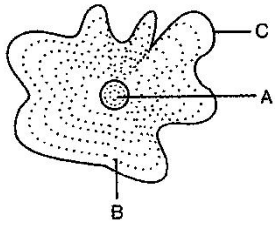

    (a) Which one should be focused under the microscope for showing budding in yeast:
    (b) Justify your answer.
27. A student obtained a blurred image of an object on a screen by using a concave mirror. In order to obtain a sharp image of the same object on the screen:
    (a) Where will he have to shift the mirror?
    (b) Why will he do so?

28. The gas formed in the given reaction is:
    (a) $O_2$
    (b) $CO_2$
    (c) CO
    (d) $CH_4$



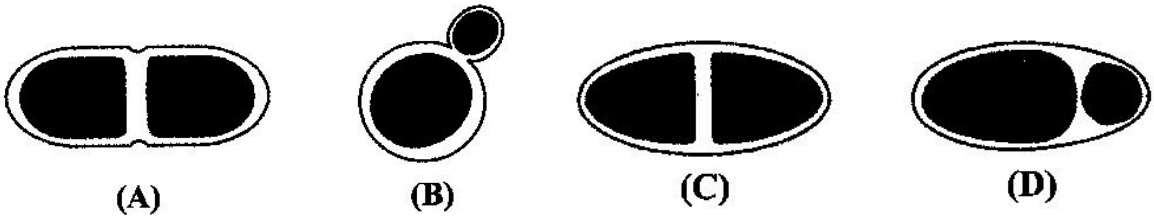

29. The observation in the test tube will be:
    (a) White ppt is formed
    (b) No ppt is formed
    (c) The colour changes to green
    (d) The colour becomes pink.

30. Which of the following in the figure represents pseudopodia:




(a) A (b) B (c) C (d) Both A and B

31. The budding in yeast is illustrated by the diagram:




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

32. Which of the following are not Sexually Transmitted Diseases (STDs):
(I) Typhoid (II) AIDS (III) Gonorrhoea (IV) Cataract
The correct option is:
(a) Only I (b) II and IV (c) II and III (d) I and II

33. In human males, all the chromosomes are paired perfectly except one. This/these unpaired chromosomes is/are:
I. Large chromosome II. Small chromosome III. Y-chromosome IV. X-chromosome
The correct option is:
(a) I and II (b) Only III (c) III and IV (d) II and IV

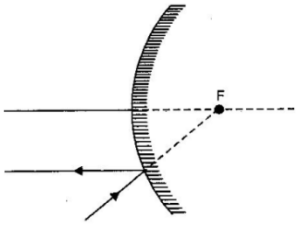
34. The character that will remain unaltered as light moves from one medium to another is:
(a) Velocity (b) Wavelength (c) Frequency (d) None of these

35. A concave mirror is distinguished from a convex mirror using the property of:
(a) Convergence (b) Divergence (c) Magnification (d) Linear propagation

36. Raisins are:
(a) Dehydrated graps (b) Hydrated grapes
(c) Hydrated Chilgoza (d) Dehydrated Chilgoza

**CBSE Sample Paper-01 (solved)**
**SUMMATIVE ASSESSMENT –II**
SCIENCE (Theory)
**Class – X**
(Solutions)

**SECTION-A**

1. Carbon dioxide
2. 

3. Grass → Rabbit → Snake → Hawk
4. $f$ = +3 m, $u = -5$ m

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

   $\Rightarrow \frac{1}{v} = \frac{1}{3} - \frac{1}{(-5)} = \frac{1}{3} + \frac{1}{5} = \frac{8}{15}$ $\Rightarrow$ $v = \frac{15}{8} = 1.875$ m = 1.9 m

   $v$ is positive. Image is therefore virtual.
5. Light should move from denser to rarer medium and the incident angle should be more than critical angle.
   Examples: (a) Fibre optic communication, (b) Totally reflecting prism
6. It is due to increase in number of protons and electrons successively in the same shell due to which force of attraction between valence electrons and nucleus increases, therefore atomic size decreases.
7. Near point of hypermetropic person is 75 cm. So focusing for objects closer than 75 cm is not possible. The person is far-sighted and so can be corrected by convex lens of proper focal length.

   $u = -25$ cm, $v = -75$ cm

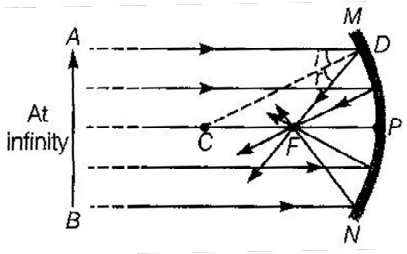
   Using $\frac{1}{f} = \frac{1}{v} - \frac{1}{u}$, we get $\frac{1}{f} = \frac{1}{-75} + \frac{1}{25} = \frac{-1+3}{75} = \frac{2}{75}$

   $\Rightarrow$ $f = \frac{75}{2}$ =37.5 cm

   $\therefore$ Power of lens = P = $\frac{200}{75}$ = 2.67 D
8. (a) With age, the power of accommodation of our eye decreases. Generally the near point moves away. This makes the person not to read clearly, the nearby objects. This defect is called Presbyopia.

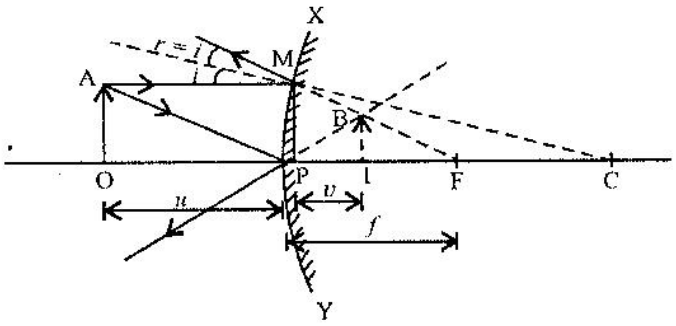
(b) Inability of the eye is focusing the horizontal and vertical lines at the same time is called Astigmatism. There is distortion or blurred image formation of any one line.
Astigmatism is caused due to different curvature of eye lens in two perpendicular lines. It can be corrected by using cylindrical lens.

9. (a) Here, the rays coming from the sum are coming parallel to the principal axis of the concave mirror, so it will focus the image on its principal focus. Hence the separation between the concave mirror and the paper sheet will be equal to the focal length of the concave mirror.
(b) Values shown by Anil are:
(i) Togetherness, (ii) Friendship, (iii) Positive attitude
(c) Necessary ray diagram:




10. Consider a convex mirror XPY. From $\Delta$ OAP and $\Delta$ PIB, we get, $\frac{OA}{IB}=\frac{u}{v}$ .....(i)

From $\Delta$ MBF and $\Delta$ BIF, we get, $\frac{MP}{IB}=\frac{f}{f-v}$ .....(ii)




From eq. (i) and (ii), we get, $\frac{u}{v}=\frac{f}{f-v}$ $\Rightarrow$ $uf-uv=vf$

Dividing by $uvf$, we get, $\frac{1}{v}-\frac{1}{f}=\frac{1}{u}$ $\Rightarrow$ $\frac{1}{f}=\frac{1}{v}-\frac{1}{u}$

Applying sign convention, $\frac{1}{f}=\frac{1}{v}-\frac{1}{(-u)}$ $\Rightarrow$ $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$

11. Ionization energy is the energy is the energy required to remove an electron from an isolated gaseous atom.
A will be above B in a group because ionization energy decreases down a group. A will on the right side of B because ionization energy increases along a period from left to right.

12. He left some gaps for the discovery of undiscovered elements. He could predict the properties of undiscovered elements i.e. properties of element 'Eka-aluminium' predicted were similar to the new element 'Gallium'.

| Property | Eka-aluminium (Predicted) | Gallium (Actual) |
|---|---|---|
| Atomic mass | 68 | 69.7 |
| Formula of oxide | $E_2O_3$ | $Ga_2O_3$ |
| Formula of chloride | $ECl_3$ | $GaCl_3$ |

13. (a) **Fertilization** is defined as the fusion of a male gamete (sperm) with a female gamete (an ovum or egg) to form a zygote during sexual reproduction.

Difference between External fertilization and Internal fertilization

| External Fertilization | Internal Fertilization |
|---|---|
| (i) The fusion of male gamete (sperm) and female gamete (ovum) occurs outside the body. | (i) The fusion of gametes occurs inside the body. |
| (ii) Both individuals discharge their gamete outside the body. | (ii) Only the male discharges sperms into female genital tract. |
| (iii) Development occurs outside the body. | (iii) Development occurs inside the body. |
| (iv) Example : Frog | (iv) Examples : Humans, Birds, Cattle etc. |

(b) The site of fertilization in human beings is in the fallopian tube of female reproductive system.

14. **Unisexual** is the plant whose flowers contain either stamens or carpels but not both. Example: Papaya, Water melon

**Bisexual** is the plant whose flowers contain both stamens and carpels. Examples: Hibiscus, Mustard

15. **Evolution** is the sequence of gradual changes which take place in the primitive organisms over millions of years and new species are produced. Since the evolution is of the living organisms, so it is called 'Organic Evolution'.

**Darwin's theory of evolution**: Charles Robert Darwin gave the theory of evolution in his famous book "The Origin of Species".

The theory of evolution proposed by Darwin is known as "The Theory of Natural Selection". It is also called "Darwinitism".

According to Darwin's theory of evolution,

(i) There is natural variation within any population and some individuals have more favourable variations than others.

(ii) Population remains fairly constant even though all species produce a large number of offsprings.

(iii) This is due ot competition or struggle for existence between same and different species.

(iv) The struggle for survival within population eliminates the unfit individuals and those with 'favourable variations' survive and pass on these variations to their progeny to continue. This is called **natural selection**.

(v) The favourable variations are accumulated over a long time period leading to the origin of a new species.

16. Fossils are all the preserved traces or remains of living organisms of geological past.

- When organisms die, their dead bodies decompose and get lost.
- But some part of the body may be in the environment that does not let it decompose.

- Example, a dead insect will not decompose in hot mud. It will harden and retain the impression of the insect body parts and thus preserved as fossils.
- Evolution can be worked out by the study of not only living species but also fossils.

17. The three ways to maintain a balance between environment and development to survive are as follows:
    (i) Forest resources should be used in an environmentally and developmentally sound manner.
    (ii) The benefits of controlled exploitation of resources go to the people and the environment is also preserved.
    (iii) If the exploitation is too high, economic and social development will be faster but the environment will further deteriorate.
    We should use natural resources cautiously so that economic growth and ecological conservation go hand in hand.

18. (a) Environment pollution is an undesirable change in the physical, chemical or biological characteristics of the natural environment brought about by man's activities. This pollution may affect the soil, rivers, seas or the atmosphere.
    (b) Differences:

| Biodegradable Pollutants | Non-biodegradable Pollutants |
|---|---|
| (i) These pollutants can be broken down into non-poisonous substance in nature by the action of micro-organisms. | (i) These pollutants cannot be broken down into non-poisonous substance in nature by the action of micro-organisms. |
| (ii) They get recycled thus do not need any dumping sites. | (ii) They cannot be recycled thus require any dumping sites. |
| (iii) These are obtained from living things. | (iii) These are obtained from non-living things. |
| (iv) They cause minimum environmental pollution. | (iv) They cause environmental pollution. |

    (a) Biodegradable pollutants are sewage and agricultural waste.

19. (a) It is process in which organic substance is oxidized slowly in absence of air and in presence of enzymes.

$$\underset{\text{Sucrose}}{C_{12}H_{22}O_{11}} + H_2O \xrightarrow{\text{Invertase}} C_6H_{12}O_6 + C_6H_{12}O_6$$

    (b) Yeast contains enzymes, invertase and zymase.
    (c) (i) $2C_2H_5OH + 2Na \longrightarrow 2C_2H_5ONa + H_2$
    (ii) $CH_3COOH + C_2H_5OH \xrightarrow{\text{Conc. } H_2SO_4} CH_3COOC_2H_5 + H_2O$
    (iii) $CH_3CH_2OH \xrightarrow[CH_3COOH]{CrO_3} CH_3CHO + H_2O$

**Or**

$$\underset{\text{'B'}}{CH_2 = CH_2} + H_2O \xrightarrow{H_3PO_4} \underset{\text{'A'}}{CH_3CH_2OH}$$

    'A' burns with blue flame.

$$C_2H_5OH + 3O_2 \longrightarrow 2CO_2 + 3H_2O$$

$$CH_3CH_2OH \xrightarrow[H_2SO_4]{K_2Cr_2O_7} CH_3COOH$$

'C'

'C' turns blue litmus red because it is acid.

20. (a) The process is called fermentation. The smell is of ethanol.

(b) Distillation.

(c) It is used in cough syrups and tonics.

**Or**

'A' is methanol $(CH_3OH)$ as it obtained from wood-tar distillation. It burns with blue flame.

$$2CH_3OH(l) + 3O_2(g) \longrightarrow 2CO_2(g) + 4H_2O(l)$$

It is soluble in water. It is used as fuel and solvent.

$$2CH_3OH + 2Na \longrightarrow 2CH_3ONa + H_2(g)$$

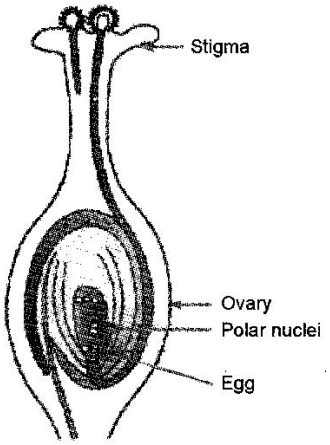
$$CH_3COOH + CH_3OH \xrightarrow{\text{Conc. } H_2SO_4} H_2O + CH_3COOCH_3$$

'B'

'B' is methyl ethanoate.

21. The fusion of one male gamete with egg to form embryo and other male gamete with two polar nuclei to form endosperm is called double fertilization.

After fertilization (i) ovary develops into the fruit and (ii) ovules develop into the seeds.




Fertilization in flowering plant

**Or**

The events that would take place in a flower from the time the pollen grains of the same species fall on the stigma up to the completion of fertilization are as follows:

(i) The pollen grains deposited on the stigma are held by the sticky secretion of stigma and start their germination.

(ii) A short cytoplasmic outgrowth called germ tube emerges through a germ pore and continues to grow as a pollen tube.

(iii) The vegetative nucleus first move to the tip of the tube followed by the generative nucleus.

(iv) The pollen tube secretes enzymes that hydrolyse the reserved food materials in the tissues of stgma and style and utilize them.

(v) The generative nucleus divides mitotically into two male nuclei.

(vi) The pollen tube enters the ovule through the micropyle and discharges the two male gametes into the embryo sac.

(vii) One of the male gametes fuses with the egg nucleus to form a zygote and the other fuses with the secondary nucleus (triple fusion) primary endosperm nucleus; the two fusions are termed as **double fertilization**.

22. Two reasons for avoiding frequent pregnancies by women are:

(i) It adversely affects the health of a woman.

(ii) It also adds to the exploding population.

**Method of Contraception**:

(i) **Barrier methods**: In this method, physical devices such as condoms, diaphragms and cervical caps are used. These devices prevent the entry of sperm in the female genital tract during copulation, thus acting as a barrier between them.

(ii) **Chemical method**: In this method, specific drugs are used by females which are of two types – oral pills and vaginal pills.

Oral pills contain hormones which stop the ovaries from releasing ovum into the fallopian tube. These pills are also called oral contraceptives (OCs). The use of Intrauterine Contraceptive Devices (IUCDs) prevents implantation in the uterus. This device is a copper-Y, placed safely inside the uterus by a doctor or nurse.

(iii) **Surgical method**: In this method, a small portion of vas deferens in male and the fallopian tube in female is surgically removed or tied. It is called vasectomy in males and tubectomy in females.

**Or**

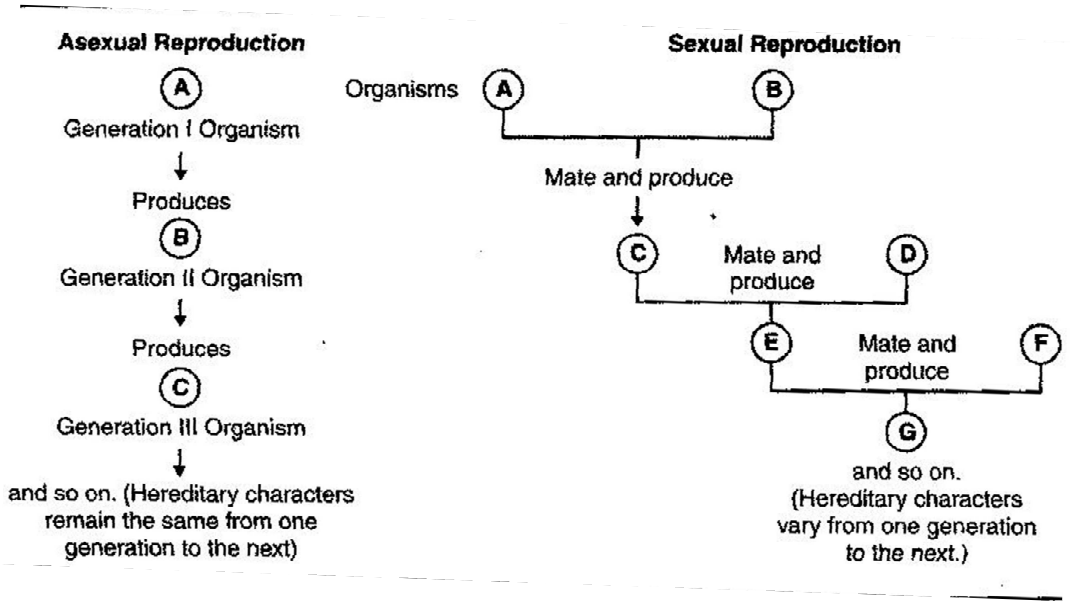
Types of Reproduction: There are two main methods in which organisms give rise to new individuals:

(i) Asexual Reproduction: It is the process of producing new organism from a single parent without the involvement of sex cells or gametes.

Examples: Binary fission in Amoeba. Budding in Hydra. Spore formation in Rhizopus fungus. Regeneration in Planaria..

(ii) Sexual Reproduction: It is the process of producing new organism from two parents by making use of their sex cells or gametes.

Examples: Humans, fish, frogs, cats, dogs and most flowering plants.




23. (a) $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$ where $f$ = focal length of spherical mirror, $v$ = image distance and $u$ = object distance

This relation is called mirror equation.

(b) For a concave mirror, $f=-15$ cm, $u=-10$ cm, $v$ =?

From mirror equation, $\frac{1}{f}=\frac{1}{v}+\frac{1}{u}$ $\Rightarrow$ $\frac{1}{v}=\frac{1}{f}-\frac{1}{u}$

$\Rightarrow$ $\frac{1}{v}=\frac{1}{-15}-\frac{1}{-10}=\frac{-1}{15}+\frac{1}{10}=\frac{-10+15}{150}=+\frac{1}{30}$ $\Rightarrow$ $v=+30$ cm

Also, Magnification $(m)=\frac{-v}{u}=-\frac{+30}{-10}=3$

Hence the image is formed at a distance of 30 cm behind the mirror.

Nature of image : Virtual, erect

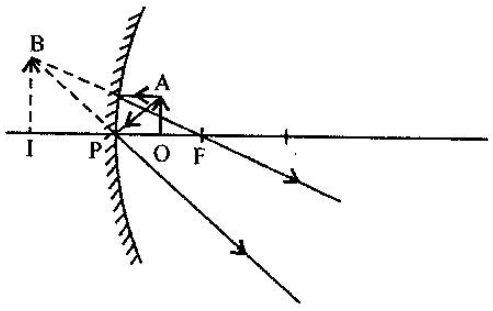
Size of image : Magnified i.e. thrice the size of object.

(c) Position of object: Between the pole and focus.

Mirror : Concave

Position of image : Behind the mirror

Nature of image: Virtual, enlarged and erect.




**Or**

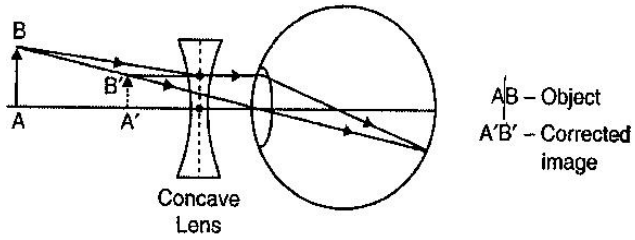
(a) (i) Myopia: Short-sightedness is caused due to excessive curvature in cornea or elongation of eye ball. Image falls short of the retina.

(ii) Astigmation: The inability to focus the light in both vertical and horizontal lines is called astigmatism. It is caused due to varying curvature in lens – horizontally and vertically. It is corrected using cylindrical lens.

(iii) Bi-focal lenses: Used to correct presbyopic eye. It contains a lens with upper concave and lower convex lens. This problem appears with age.

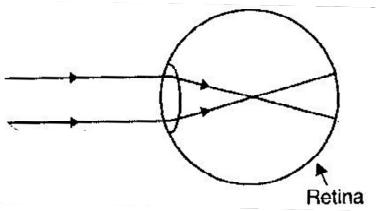
(iv) Far-sightedness: Caused due to greater focal length and/or eye-ball becoming smaller. Image falls beyond the retina and can be corrected by using a convex lens.

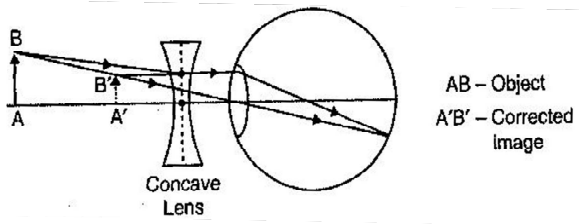
(b)




24. (a) Short sightedness (myopia)

(d)




(e) Concave lens

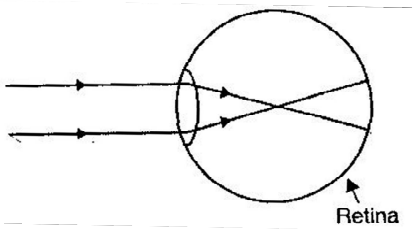
**Or**

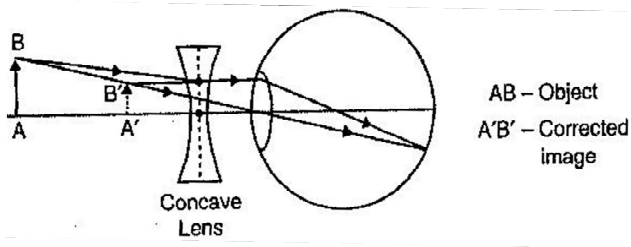
Myopia or Short sightedness: Inability of the eye in viewing long distance objects. The image in this case falls before the retina. For every myopic eye, there exists a far point beyond which clear image cannot be seen. Short sightedness is caused due to:

(i) Excessive curvature in cornea (or)

(ii) Elongation of eye-ball

The short sightedness is corrected by using a concave lens which diverges and shifts the image to the retina.




**Section B**

25. (a) $H_2$, $CO_2$, $CO_2$

(b) $2CH_3COOH + 2Na \longrightarrow 2CH_3COONa + H_2O + H_2(g)$

$2CH_3COOH + Na_2CO_2 \longrightarrow 2CH_3COONa + H_2O + CO_2$

$CH_3COOH + NaHCO_2 \longrightarrow CH_3COONa + H_2O + CO_2$

26. (a) III
    (b) Because yeast cells are usually oval or spherical in shape.
27. (a) He will have to shift the mirror either towards or away from the screen depending upon the position of the object.
    (b) Because concave mirror forms image based on the position of the object.
28. (b)
29. (a)
30. (c)
31. (b)
32. (d)
33. (c)
34. (c)
35. (a)
36. (a)