CBSE Sample Paper-02
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. What is meant by water table?
2. Name the second member of alkynes family Give its structure?
3. What is the focal length of a lens, whose power is given as +2.0 D?
4. Why does it take some time to see objects in dim light when you enter the room from bright sunlight outside?
5. Explain why atomic number is more important than atomic weight in determining chemical properties?
6. Mention any four details that can be inferred about organisms from their fossils.
7. An object of size '*l*' cm is placed in front of a (i) convex mirror and (ii) concave mirror. With a neat ray-diagram, explain how an erect image is formed.
8. (i) Is the speed of light a constant?
   (ii) Which colour has the greatest speed in the visible region?
   (iii) Is it possible to combine the seven colours in the spectrum to form white?
9. A mother always wants her child to drink milk. As it is a boon for health. If one do not drink milk, he can face severe health problems.
   Answer the following questions on the basis of above text.
   (a) Name the major constituent / nutrient present in the milk.
   (b) Write the chemical symbol, atomic number and valency of that nutrient.

(c) What value do you infer from the given text?

10. What is presbyopia? What causes presbyopia? How is presbyopia corrected?
11. Energy transfer is said to be unidirectional where as biochemical transfer is said be cyclic. Why?
12. List any three measures of the projection of wildlife.
13. What is electron affinity? The electron affinity values of three elements A, B and C of a group are 324, 295 and 333 kJ mol^{-1}. Arrange these in increasing order of their atomic numbers.
14. What were the criteria used by Mendeleev in creating his Periodic Table?
15. Differentiate between 'Self pollination' and 'Cross pollination'. Describe double fertilization in plants.
16. Draw a labeled diagram of the longitudinal section of a flower.
17. How are fossils formed?
18. How has the method of 'artificial selection' by humans helped in the evolution of different vegetables?
19. Explain: (i) Analogous organs (ii) Natural selection

Or

What are homologous organs? How do they differ from analogous organ? How does the study of comparative anatomy provide evidence in favour of Organic Evolution?

20. An object 5 cm in length is held 25 cm away from a converging lens of focal length 10 cm. Draw the ray diagram and find the position, size and the nature of the image formed.

Or

(i) State the basic laws of refraction.
(ii) Describe about refractive index.
(iii) Does the incident and emergent ray coincide in a glass slab refraction? Give reason.

21. Explain how the ray of white light is dispersed. Why does this take place? Which colour deviates more and why?

Or

What is long-sightedness? List two causes for development of long-sightedness. Describe with the ray diagram, how this effect may be corrected by using spectacles.

22. (a) Why does carbon form largest number of compounds?
(b) Why are some of these called saturated and other unsaturated compounds?
(c) Which of these two is more reactive?
(d) Write the names of the following compounds
(i) $CH_2 - CH_2 - Br$ (ii) $CH_3 - CH - CH - CH - C \equiv C - H$

Or

(a) Write the name and symbol of group 17 elements belonging to second period.
(b) Write electronic configuration of K (19). To which group of periodic table does it belong?
(c) What are substitution reactions? Give one example.
(d) What happens when acetic acid reacts with sodium bicarbonate? Give chemical reaction involved.

(e) Why does carbon form covalent bond?

23. (a) Name two elements of group 13.
    (b) Name most electro-negative element in periodic table. Write its atomic number.
    (c) Draw electron dot structures of (i) H2O, (ii) CH4, (iii) NH3, (iv) BF3
    (d) Differentiate between ores and minerals.

Or

(a) Name elements of group 2 belonging to 3rd and 4th period.
(b) Name the element having highest ionization energy in periodic table.
(c) Give limitation of Dobereiner's law of triads.
(d) Why do ionic compounds not conduct electricity in solid state?
(e) Name the chief ore or iron. Give its formula.

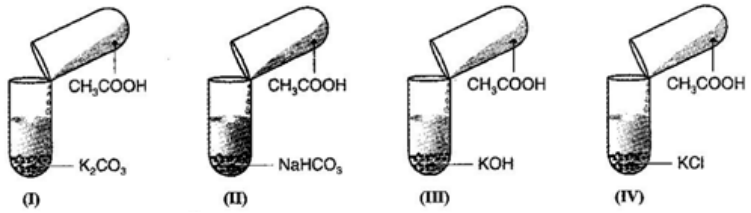
24. Name two bacterial diseases which are sexually transmitted. Name their causal organisms, symptoms and preventive measures.

Or

What are the advantages and disadvantages of self and cross pollination? Which of them is better and why?

Section B

25. If burning candle is brought near each of the following test tube:

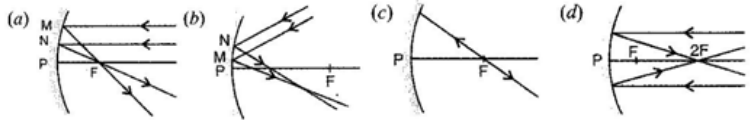


(a) In which of the following candle will get extinguished?
(b) Give the reason for your answer.

26. Watch the diagram given below:

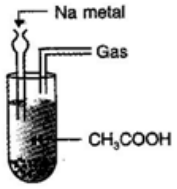
(a) Which process is being shown here?
(b) Give reason for your answer.

27. Watch the given diagrams and answer the following questions:



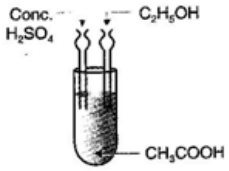
(i) Which of the following is/are correct?
(ii) Justify your answer.

28. The gas evolved in the experiment shown here:



(a) O_2
(b) H_2
(c) CO_2
(d) Cl_2

29. When we put acetic acid in H_2O, the ions formed are



I. CH_3COO^- II. H_3O^+

(a) Only I (b) Only Ii (c) Both I and II (d) Neither I nor II

30. Types of reproduction are:
(a) Asexual (b) Sexual (c) Cloning (d) All of these

31. Meosis, Mitosis and Amitosis are the types of:
(a) Cell division (b) Cytokinesis (c) Karyokinesis (d) All of these

32. How many times the process of budding continuous in the yeast:
(a) 2-3 times (b) 3-4 times (c) 50-70 times (d) 100-500 times

33. The outgrowth of hydra is termed as:
(a) Bulb (b) Bud (c) Daughter hydra (d) Tentacles

34. The light from a distant object on passing through the convex lens (f – focal length):
(a) converges at focus (f). (b) Appears to diverge from focus.
(c) Converges at $2f$. (d) Appears to diverge from $2f$.

35. When red, blue and green light coming parallel to principal axis fall on a convex lens, they will converge on the axis at:
(a) One point (b) Two points (c) Three points (d) Always at one point

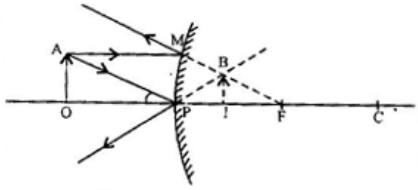
36. The correct formula to calculate the percentage of water absorbed by raisins is:
(a) $\frac{W_2 - W_1}{W_1} = 100$ (b) $\frac{W_1 - W_2}{W_2} = 100$ (c) $\frac{W_1}{W_2 - W_1} = 100$ (d) $\frac{W_2}{W_2 - W_1} = 100$

CBSE Sample Paper-02
SUMMATIVE ASSESSMENT –II
SCIENCE (Theory)
Class – X

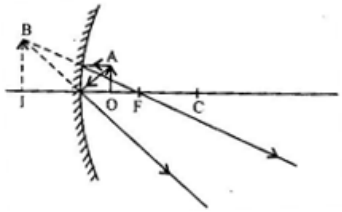
(Solutions)

SECTION-A

1. The level of water under the ground is called water table.
2. The second member of the alkyne family is propyne. Its structural formula is $CH_3 - C \equiv CH$
3. $f = \frac{1}{P} = \frac{1}{+2.0} = +50$ cm
4. In bright sunlight, the iris contacts the pupil to allow less light to enter the eye and in dim light, the iris expands the pupil to admit more light to see the object so it takes some time to increase the size of pupil in dim light.
5. Chemical properties depend upon valence electrons which depend upon electronic configuration. Electronic configuration depends upon atomic number, therefore chemical properties depend upon atomic number and not upon atomic mass.
   Atomic number is equal to number of protons and also equal to number of electrons in case of neutral atom.
6. (i) Phylogeny can be reconstructed from fossils.
   (ii) The habits and behaviour of extinct organism can be inferred from well preserved fossils.
   (iii) Some fossils indicate the connecting link between two groups of organisms.
   (iv) By analysis of distribution of fossils in different states of rocks, the time in history when different species were forms or become extinct can be inferred.
7. (i) Convex mirror

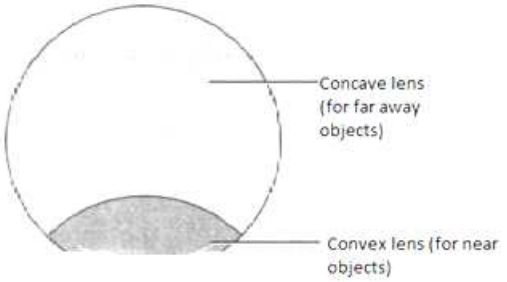


   (ii) Concave mirror



8. (i) Yes, speed of light is constant in free space.
   (ii) In free space all colours will travel with same speed.
   (iii) Yes, by keeping a prism inverted after a prism to split the white light, it is possible to re-unite the colours to form white light.

9. (a) Placenta is mainly responsible for providing nutrition to growing embryo.
   (b) The measures to maintain a woman's health during pregnancy care:
      (i) Mother should eat healthy, balanced and nutritious diet and should be stress free.
      (ii) She should not take any medicine without doctor's advice.
   (c) The learner will appreciate the idea that it is very important for all of us to help somebody in need and cooperate them. It is also inferred that mutual benefits are the spine of a healthy and successful society. Moreover, the nutritional rights for a healthy life should be provided to everyone.
10. The power of accommodation of the eye decreases with ageing. For most people, the near point gradually recedes and the far point comes closer. This defect is called presbyopia.
    It arises due to the gradual weakening of the ciliary muscles and diminishing flexibility of the eye lens.
    Such a person may suffer from myopia and hypermetropia. This defect is then corrected by using bi-focal lenses of suitable focal lengths. The upper part of the lens is concave lens which corrects myopia
    to see the distant objects clearly, while the lower part of the lens has convex lens which corrects the hypermetropia to see the nearby objects clearly.



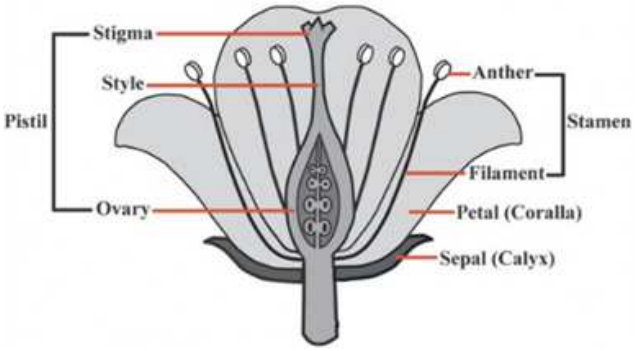
11. Energy flow is unidirectional because as it transfers from one trophic level to next trophic level, it reduces only 10% is available at Successive level from previous level. Nutrient flow is cyclic because nutrients returned back into nutrient pool from the dead bodies of plants and animals by the decomposition of micro- organisms from nutrient pool. They are utilized again by plants.
12. Three measures for protection of wildlife:
    (i) **Controlling the deforestation of forest**: Forests provide natural habitat to the wildlife.
    (ii) **Controlling the unlawful poaching (hunting of the animals)**: Because of this, many species of wildlife have become endangered and some have even become extinct.
    (iii) **By developing Wildlife Parks and Sanctuaries** in which wild animals could be kept protected in their natural habitat.
13. Electron Affinity: Affinity is the energy change when an electron is gained by a gaseous atom. Itdepends on atomic size and electronic configuration.
    It decreases down a group. C (333) > A (324) > B (295) are in increasing order of atomic numbers.
14. When Mendeleev started his work, 63 elements were known. He tried putting the elements in order of their atomic mass. He also examined the relationship between the atomic masses of the elements and their physical and chemical properties. Among chemical properties, Mendeleev concentrated on the compounds formed by elements with oxygen and hydrogen only. He selected hydrogen and oxygen as they are very reactive and formed compounds with most

elements. The formulae of the oxides and hydrides formed by an element were treated as one of the basic properties of an element for its classification. He then took 63 cards and on each card, he wrote down the properties of one element. He selected out the elements with similar properties and pinned the cards together on a wall. He observed that most of the elements got a place in a Periodic Table and were arranged in the order of their increasing atomic masses.

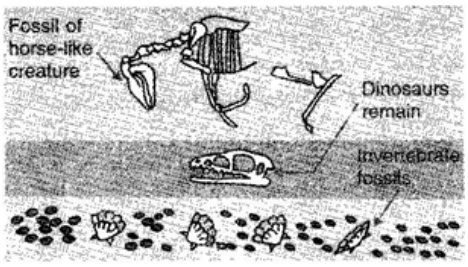
15. Difference between Self-pollination and Cross-pollination:

Self – pollination	Cross – pollination
(i) Self-pollination occurs within a flower or between two flowers of the same plants.	(i) Cross-pollination occurs between two flowers borne on different plants of the same species.
(ii) Flowers do not depend on other agencies for pollination.	(ii) Agents such as insects, water and wind are required for pollination.
(iii) Pollen grains are produced in small numbers.	(iii) Pollen grains are produced in large numbers.
(iv) No wastage of pollen grains occur and thus economical.	(iv) Wastage of pollen grains occurs and hence not economical.
(v) Flowers are not attractive nor do they produce nectar.	(v) Flowers attract insects by various means like coloured petals, scent and nectar.
(vi) The offsprings produced are of the same genetic makeup, so purity of the race is maintained.	(vi) The offsprings produced may show variations and differ in genetic make up.

16.



17. Fossils are formed layer by layer in the earth's crust.
    - 100 millions ago invertebrates that were dead on the sea bed were buried in the sand and with time more sands accumulated and sandstones are formed.
    - After million years, the dinosaurs living in the area die and get buried in mud which are compressed into rocks above the earlier invertebrate fossils.
    - Eventually again million years later, the bodies of horse-like creature dies and their fossils are found in rocks above the earlier rocks.
    - But much later, due to erosion, the water flow wears some of the rocks and the horse-like fossils are exposed and as we dig into deeper layers the older fossils are found.



Layer by Layer fossil formation beneath the earth's crust

18. A wild variety of a plant may show different variations. Humans have selected some such variants and grown them for generations and during the course of time, they have become totally different species.

    For example, variants in wild cabbage were selected on the basis of certain features to generate different vegetables.

    (i) Short distances between leaves, led to formation of green leaf buds—the common cabbage.

    (ii) Arrested flower development has bred broccoli.

    (iii) The variant with sterile flowers has made the cauliflower.

    (iv) Variant with swollen leaf parts—kohlrabi.

    (v) Variant with larger leaves—kale.

19. (i) **Analogous organs** are those organs which have different basic structural design and developmental origin but have similar appearance and perform similar functions.

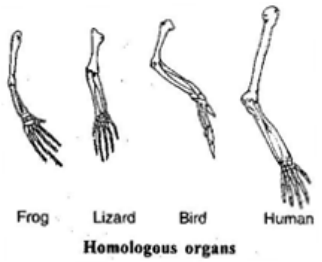
    Example: The wings of the birds and bats look similar but have different design in their structure. Wings of the bats are skin folds stretched between elongated fingers but wings of birds are covered by feathers all along the arm.

    (ii) **Natural selection** is the process, according to Darwin, which brings about the evolution of new species of animals and plants.

    - It was noted that the size of any population tends to remain constant despite the fact that more offsprings are produced than are needed to maintain.
    - Darwin found that variations existed between individuals of the population and concluded that disease, competition and other forces acting on the population eliminated those individuals less well adapted to their environment.
    - The surviving population would pass the hereditary advantageous characteristics to their offsprings.
    - But with time this process would give rise to organisms different from the original population and new species are formed.

Or

Homologous organs are those organs which have the same basic structural design and developmental origin but have different functions and appearance.



Homologous organs

Example: The forelimb of a frog, a lizard, a bird and a man seem to be built from the same basic design of bones, but they perform different functions.

Difference between Homologous organs and Analogous organs:

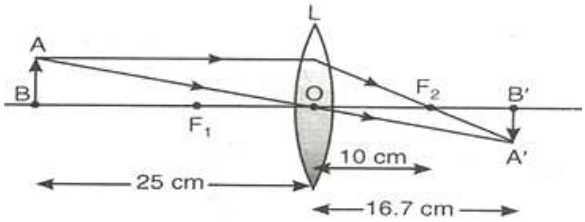
Homologous Organs	Analogous Organs
(i) These organs have similar embryonic origin and basic structure. (ii) These may look different and may perform different function, e.g. forelimb of man and flipper of a whale.	(i) These organs have different embryonic origin and basic structure. (ii) These look alike and perform same functions, e.g. wings of birds and insects.

The study of comparative anatomy provide evidence in favour of Organic Evolution in the following ways:

(i) Presence of vestigial organs, the organs which are rudimentary and functionless in the evolved form but are complete and functional in the ancestral forms, provides evidence for evolution of organisms, e.g. presence of vestige of pelvic girdle in python and porpoises indicates that they have evolved from four-footed organisms.

(ii) Presence of homologous and analogous organs also provides evidence for common ancestory of organisms.

20.



f= +10 cm, u= -25 cm and h_o= 5cm

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

$$\frac{1}{v}=\frac{1}{10}-\frac{1}{15}$$

$$\frac{1}{v}=\frac{3}{50}$$

$$v = \frac{50}{3}cm$$

The image is real and inverted at a distance of 16.7 cm from the lens on opposite side.

Magnification (m) = h_i/h_0= v/u

h_i /5 =16.7/-25

h_i = -10/3 cm. image is inverted and diminished.

Or

Laws of Refraction:

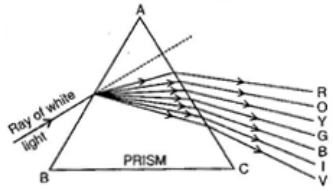
(i) The incident ray, the normal and the refracted ray all lie in a plane.

(ii) The ratio of the 'sine' of the angle of the incidence to the 'sine' of the angle of refraction is a constant, i.e. $\frac{\sin i}{\sin r}$ = constant, for the light of a given colour and for the given pair of media. This law is also known as Snell's law of refraction.

Refractive Index: $\frac{\sin i}{\sin r}$ is called refractive index (μ) of one medium with respect to another

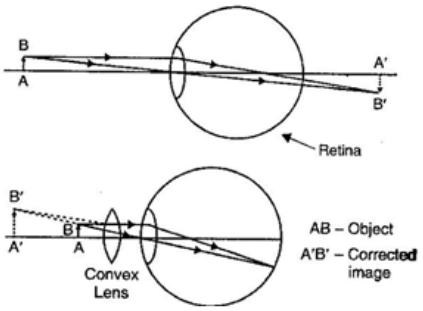
(iii) No, since the velocity of light in the two media differ the ray of light after refraction bends. This causes a shift laterally. The emergent ray will be parallel to the incident ray and do not coincide.

21. **Dispersion**: The splitting of white light into its constituent colours is called Dispersion. The colour sequence is given by the acronym V I B G Y O R – Violet, Indigo, Blue, Green, Yellow, Orange and Red. This colour pattern is called spectrum.
Dispersion occurs because refraction of bending differs with the colour. The speed of light of different colours in a medium like glass, water etc. is different. Varying speed for different colours leads to different refractive indices for different colours. It has been observed that the refractive index of glass for violet colour is more than that of red colour. So red colour deviates less and violet colour deviates more.



Or

Hypermetropia or Long sightnedness: The inability of eye in viewing the nearby objects. The image in this case falls beyond the retina. For hypermetropic eye, there exists a near point. Long sightedness is caused due to (i) greater focal length of the lens or (ii) eye-ball becoming smaller. It is corrected by using a convex lens, which converges and shifts the image to the retina from beyond.



22. (a) Carbon forms large number of compounds called organic compounds due to the self linking property called catenation.
    (b) Compounds which has only C-C (single bond) present are saturated compounds whose as those compounds which has C=C (double bond) or C≡C (triple) bond is present are called unsaturated compounds.
    (c) Unsaturated compounds are more reactive than saturated compounds
    (d) (i) Bromoethane
    (ii) Hex-1-yne

Or

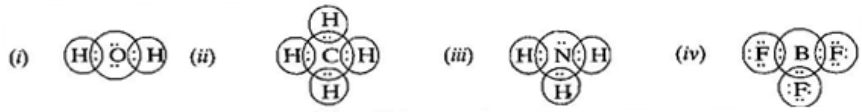
(a) The element is Fluorine. Its symbol is F.
(b) K (19), 2, 8, 8, 1. It belongs to group 1 of periodic table.
(c) Substitution reaction: These reactions in which an atom or group of atoms are replaced by another atom or group of atoms are called substitution reactions. e.g.

$$CH_4(g) + Cl_2(g) \xrightarrow{\text{Sunlight}} CH_3Cl(g) + HCl(g)$$

(d) Brisk effervescence due to CO_2 will be observed and sodium acetate (CH_3COONa) salt is formed.

$$CH_3COOH + NaHCO_3 \longrightarrow CH_3COONa + H_2O + CO_2$$

(e) Carbon has four valence electrons. It can neither lose 4 electrons nor gain four electrons because high energy will be needed. Therefore it can share four electrons forming covalent bonds.

23. (a) Boron and Aluminium.
    (b) Fluorine is the most electronegative element in periodic table. Its atomic number is 9.
    (c) 

    (d) Ores are rocky materials which contain sufficient quantity if mineral that metal can be extracted profitably. Minerals are naturally occurring substances from which metal may or may not be extracted profitably.

Or

(a) Element belonging to group 2 and 3rd period is Magnisium (Mg) and 4th period is Calcium (Ca).
(b) Helium is element which has highest ionization energy in periodic table.
(c) He could not classify all the elements discovered at that time. He could classify only few element into triads.

(d) It is because in solid state, ions are not free to move, therefore it does not conduct electricity.

(e) The chief ore of iron is haematite. Its formula is Fe_2O_3.

24. Two bacterial diseases which are sexually transmitted are Syphilis and Gonorrhoea.

Syphilis is caused by bacterium Treponema palladium.

Symptoms: It affects the mucus membrane in genital, rectal and oran region and causes lesions.

Prevention: This disease can be easily cured by the use of antibiotic. Intercourse with the diseased person should be prevented.

Gonorrhoea: It is caused by bacterium Neisseria gonorrhoeae.

Symptoms: (i) Inflammation of mucus membrane in urinogenital tract.
(ii) Burning sensation during urination.

Prevention: (i) It may be cured by antibiotic.
(ii) By avoiding prostitution.
(iii) By avoiding homosexuality.
(iv) Penicillin and antibiotic injections can also be used.

Or

Self-pollination is the transfer of pollen grain from the anther if a flower to the stigma of the same plant. It is seen in Pea and China rose plant.

Advantages:

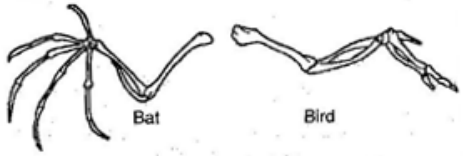
(i) Self pollination is bisexual flowers ensures continuity of the race.
(ii) It helps to preserve the parental characters as the gametes from the same flower are involved.
(iii) It is not necessary for flowers to produce nectar or scent or be colourful.

Disadvantages:

(i) New varieties cannot be obtained by self pollination.
(ii) The genetic defects of the breed cannot be removed.
(iii) Repeated self pollination leads to loss of vigour and vitally of the species.

Better method: In nature cross pollination is a better method because:

(i) It avoids recessive lethal or harmful genes to become homozygous.
(ii) It produces healthier plants due to the phenomenon of hybrid vigour.



Analogous organs : The wing of a bat and the wing of a bird

(iii) It keeps the variability and hence adaptability of race intact.

Section B

25. (a) I and II candles will get extinguished.

(b) In, candle I and II gas evolved will be CO_2 which is non-supporter of combustion, therefore candle will get extinguished.

26. (a) Binary fission in Amoeba.
    (b) Because in binary fission, the nucleus elongates first.
27. (i) (a) and (b) are correct.
    (ii) Both are correct since parallel beams converge at focus. If parallel to axis, the convergence is on the axis, while for lines not parallel to axis, the convergence will be away from principal axis.
28. (b)
29. (c)
30. (d)
31. (c)
32. (b)
33. (b)
34. (a)
35. (c)
36. (a)