Sample Question Paper

Fully Solved (Question-Solution)

SCIENCE

A Highly Simulated Practice Question Paper for CBSE Class X
Term II Examination (SA II)

Time : 3 Hours | Max. Marks : 90

General Instructions

1. The question paper comprises of two sections A and B. You are to attempt both the sections. All questions are compulsory.
2. All questions of section A and all questions of section B are to be attempted separately.
3. Question numbers 1 to 3 in section A are 1 mark questions. These are to be answered in one word or one sentence.
4. Question numbers 4 to 7 are 2 marks questions to be answered in about 30 words.
5. Question numbers 8 to 19 are 3 marks questions to be answered in about 50 words.
6. Question numbers 20 to 24 are 5 marks questions to be answered in about 70 words.
7. In section B, question numbers 25 to 42 are multiple choice questions based on practical skills. Each question is a 1 mark question. You are to select one most appropriate response out of the four provided to you.

Section A

Q1. Why the sun appears white at noon?

Sol. At noon, light from the sun overhead would travel relatively shorter distance and the sun appears white as only a little of the blue and violet colours are scattered. (1)

Q2. In an organic compound, which part determines its physical and chemical properties?

Sol. Hydrocarbon part (or alkyl group or carbon chain) determines the physical properties and functional group determines the chemical properties of an organic compound. (1)

Q3. State any two points that you would consider when trying to categorise substances as a good fuel.

Sol. *The following two points, I will consider when trying to categorise substances as a good fuel*

(i) Its ignition temperature should neither be low nor be high.

(ii) It should not produce a lot of smoke. ($\frac{1}{2}\times 2$)

Q4. How are we able to see nearby and also the distant objects clearly?

Sol. We are able to see nearby and also the distant objects clearly, due to the ability of the eye lens to adjust its focal length which is known as power of accommodation. When the muscles are relaxed, the lens becomes thin and its focal length increases. This enables us to see the distant objects clearly and *vice-versa.* (1+1)

STAGE I

Q5. The following table lists a few functions/phrases/statements in column A. Match these items in column A to the corresponding terms in column B. Note that more than one item in column A may match with the same item in column B.

	Column A		Column B
A_1	The blue colour of sky.	B_1	Power of accommodation
A_2	The ability of the eye to focus both nearby and distant objects, by adjusting its focal length.	B_2	Dispersion
A_3	Splitting of white light into its component colours.	B_3	25 cm
A_4	Least distance of distinct vision.	B_4	Scattering of light
A_5	The reddening of the sun at sunrise and sunset.		

Sol. $(A_1 \rightarrow B_4), (A_2 \rightarrow B_1), (A_3 \rightarrow B_2), (A_4 \rightarrow B_3), (A_5 \rightarrow B_4)$

- Scattering of light causes the blue colour of sky and the reddening of the sun at sunrise and sunset.
- The ability of the eye to focus both near and distant objects, by adjusting its focal length, is called the accommodation of the eye.
- Dispersion of light is the phenomenon of splitting of white light into its constituent seven colours, on passing through a glass prism.
- Least distance of distinct vision, for a normal human eye is around 25 cm. ②

Q6. A child is standing in front of a magic mirror. She finds the image of her head bigger, the middle portion of her body of the same size and that of the legs smaller. What is the order of combinations for the magic mirror from the top?

Sol. The order of combinations for the magic mirror from the top is concave, plane and convex.
Concave mirror (of large focal length) can be used to see a larger image of the head, the plane mirror for middle portion to see her body of the same size and convex mirror to see the diminished image of leg. ②

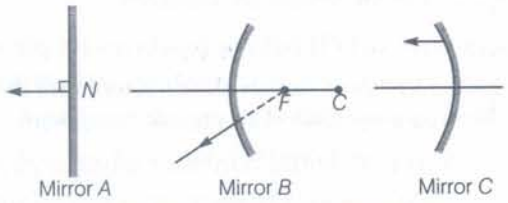
Q7. (a) What were the criteria used by Mendeleev in creating his Periodic Table?

(b) In the Modern Periodic Table, which are the metals among the first ten elements?

Sol. *(a)* The criteria used by Mendeleev in creating the Periodic Table was that the properties of the elements are periodic function of their atomic masses. ①

(b) Lithium and Beryllium are metals among the first ten elements. ①

Q8. Study the diagrams given below carefully and answer the following questions



(a) Which of the three mirrors is a convex mirror?

(b) Which of the three mirrors always produces an image equal in size, to the size of the object?

(c) Which of the mirrors always produces an image of size smaller than that of the object?

(d) Which mirror is used by doctors to focus light on a particular part of the human body, say inside the nose, throat, etc.

(e) Which of these three mirrors is used as the rear-view mirror in automobiles?

(f) Which of the three mirrors *A*, *B* and *C*, is used by a dentist to observe cavities in the teeth?

Sol. *(a)* Mirror-*B*, *(b)* Mirror-*A*, *(c)* Mirror-*B*,
(d) Mirror-*C*, *(e)* Mirror-*B*, *(f)* Mirror-*C*. $(\frac{1}{2}\times 6)$

Q9. Heeba studies in grade 9 and is a secretary of school's club. As per practice in the school, all members of science club assembles in Physics lab in last two periods on every Friday.

Heeba also extends help to her mother in kitchen. One day, she observed that the apparent random wavering or flickering of objects seen through a turbulent stream of hot air rising above the fire in the kitchen. She discussed about this with her friends and decided to raise the question in school's science club meeting.

Read the above passage and answer the following questions

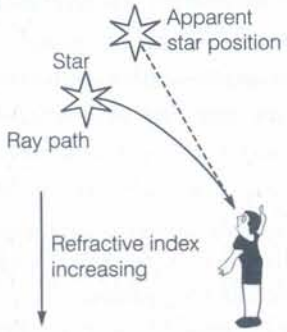
(a) Explain the reason behind the observation.

(b) Name similar phenomenon on a much larger scale. Also, draw the ray diagram.

(c) What values are shown by Heeba?

Sol. *(a)* The air just above the fire becomes hotter than the air further up. The hotter air is lighter (less dense) than the cooler air above it and has a refractive index slightly less than that of the cooler air. Since, the physical conditions of the refracting medium (air) are not stationary, the apparent position of the object, as seen through the hot air, fluctuates. (1)

(b) Twinkling of stars is a similar phenomenon on a much larger scale.
Apparent star position due to atmospheric refraction is shown below



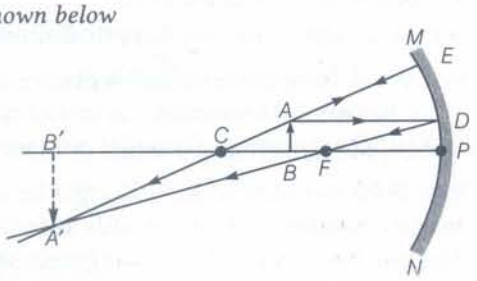
(1)

(c) Values shown by Heeba are friendship, concern for each other, practical mind and cooperative attitude. (1)

Q10. Under what conditions can a concave mirror form an image larger than the actual object? Also, draw the ray diagram.

Sol. A concave mirror can form an image real, inverted and enlarged than the actual object, beyond *C*, when object is placed between the focus and centre of curvature. $(1\frac{1}{2})$

The ray diagram is shown below



$(1\frac{1}{2})$

Q11. How does the electronic configuration of an atom relate to its position in the Periodic Table?

The electronic configuration of an atom relates to its position in the Periodic Table in the following ways

Sol. *(i)* The number of the shells in the electronic configuration corresponds to the period.

For example, the electronic configuration of Mg(12) = $\overset{K\ L\ M}{2, 8, 2}$.

Total number of shells = 3, Hence, it belongs to the 3rd period. (1½)

(ii) The number of electrons in the outermost shell corresponds to the group in the Periodic Table.

For example, magnesium belongs to group 2 because it contains 2 electrons in its outermost shell. (1½)

Q12. (a) Why is atomic number of an element more important than its relative atomic mass for classification of elements in the Periodic Table?

(b) How and why does the atomic size vary as we go down in a group?

Sol. *(a)* Moseley has shown that the physical and chemical properties of the elements are determined by their atomic number and not by their atomic mass. The atomic number is equal to the number of protons which is also equal to the number of electrons. The properties of elements depend upon the number of electrons present in the valence shell of an atom (valence electrons). Whereas relative atomic mass is less important quantity because it cannot determine the properties of elements. (2)

(b) Atomic size increases down the group due to the addition of new shells. (1)

Q13. Seema have seen advertisements stating that some vegetable oils are healthy. Although saturated fatty acids are said to be harmful for health. She got confused and want to know the reason for this. So she ask this to her science teacher who tell her why unsaturated fats are healthier. From her answer she got satisfied.

Answer the following questions on the basis of the above text

(a) Why vegetable oils are considered healthy than saturated fatty acids (ghee)?

(b) What precautions you would take in selecting a cooking oil?

(c) What values did the learner learn from the above text?

(d) What values are shown by Seema and her teacher?

Sol. *(a)* Vegetable oils contain unsaturated fatty acids which are healthy and decrease the cholesterol level in our blood which may cause heart diseases. That is why we should use vegetable oils for cooking. (1)

(b) Cooking oil should be selected in such a manner that it should contain low cholesterol. (1/2)

(c) The learners will be able to adopt healthy food habits once they understand that animals fats produce more cholesterol than vegetable oil and make us to stay away from doctor and diseases which can be avoided by a little awareness and certain precautive measures. (1)

(d) Seema is a curious child. She has value to learn more and more. Her teacher is helpful and knowledgeable. (1/2)

Q14. Can a plane mirror even form

(a) a real image (b) an inverted image?

Sol. *(a)* Yes, when the object is virtual. A plane mirror forms a virtual image of a real object. So, in accordance with the principle of reversibility of light if the object is virtual, the image will be real. The real image formed is erect and of the same size as that of the object. (1½)

(b) Yes, when an object is placed upright on a plane mirror. This is based on the fact that the image formed by a plane mirror is as far behind the mirror as the object is in front of it. The lower part of the object, being nearest to the mirror, forms an image closer to it while the upper part being farthest from it forms an image further away, thereby resulting in an inverted image of the object. Such a situation arises when we look for our image in water. (1½)

Q15. What is management of resources and what is its need?

Sol. Management of resources is the controlled use of resources in a way so that it can provide sustained and equitable availability of resources. (1)

There is a need for management of resources because

(i) It ensures that natural resources are used judiciously so that they fulfil the needs of present generation and also last for the coming generations.

(ii) It ensures equitable distribution of natural resources so that all the people can take benefit from it, not just a few rich and powerful ones.

(iii) It takes into consideration, the damage caused to the environment during the 'extraction' or 'use' of natural resources.

For example, if some trees are cut for a purpose, then damage to the environment can be minimised by planting new saplings in the same area.

(iv) It takes into consideration long term perspective and prevents their exploitation for short term gains. ($\frac{1}{2}\times 4$)

Q16. Why is variation beneficial to the species but not necessary for an individual?

Sol. Population of organisms reside in a particular niche in the ecosystem. Niche can change because of various reasons that are beyond the control of an organism like temperature changes, water level changes, etc. Due to drastic changes in the niche, the population of organisms can be wiped out which was otherwise suitable for them.

However, if same variations are present in few individuals in these populations, there will be chances of their survival. The surviving individual can further reproduce and develop a population of its kind.

Thus, variation is beneficial to the species but not necessary for an individual. (3)

Q17. (a) Do larger organisms have more number of chromosomes per cell?

(b) Can organisms with fewer chromosomes reproduce more easily than organisms with more number of chromosomes?

(c) More the number of chromosomes per cell, greater is the DNA content. Justify.

Sol. *(a)* No, there is no relationship between size of organism and its chromosome number. (1)

(b) No, process of reproduction follows a common pattern and is not dependent on the number of chromosomes. (1)

(c) Yes, since the major component of chromosomes is DNA. If there are more chromosomes in a cell, the quantity of DNA will also be more. (1)

Q18. Study the given data and answer the questions that follows

Parental plants cross fertilised and seeds collected.	F_1-generation	F_2-generation (self-pollination of F_2)
Male parent always bear red flowers.	330 seed sown and observed.	Out of 44 seeds 33 seeds gave plants with red flowers and 11 seeds gave plants with white flowers.
Female parent always bear white flowers.	All 330 gave red flowers.	

(a) What is the term used for this type of cross?

(b) What does the data of the column marked F_1 indicate?

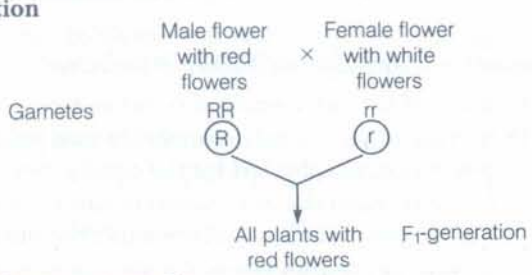
(c) Express the genotypes of (i) Parents, (ii) F_1 progeny and (iii) F_2 progeny.

Sol. *(a)* Parental cross (1/2)

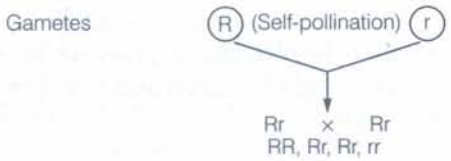
(b) The data of column marked F_1 indicates that red flowers of male parent are dominant trait over the white flowers of female parent (recessive trait). (1)

(c) (i) Parent genotype RR, Rr

(ii) **F_1-generation**



F_1-generation genotype-Rr



(iii) **F_2-generation** Genotypic ratio R R, Rr, rr

1 : 2 : 1

Phenotypic ratio 3 : 1 (½×3)

Q19. How do we know that evolution has occurred?

Sol. *The following evidences show that evolution has occurred*

(i) Fossils of ancient species are simpler in form than modern species. Sequences of fossils have been discovered which shows a gradual series of changes in form.

(ii) Species thought to be related through evolution from a common ancestor showing similar anatomical structure like limbs of amphibians, reptiles, birds and mammals.

(iii) Stages in embryological development are quite similar among very different types of vertebrates. (1×3)

Q20. The image of a candle flame formed by a lens is obtained on a screen placed on the other side of the lens. If the image is three times the size of the flame and the distance between lens and image is 80 cm, at what distance should the candle be placed from the lens? What is the nature of the image at a distance of 80 cm and the lens? Draw appropriate ray diagram.

or

Draw ray diagrams showing the image formation by a convex mirror when an object is placed

(a) at infinity (b) at finite distance from the mirror.

Also, discuss the nature of images formed by convex mirror in above mentioned two cases.

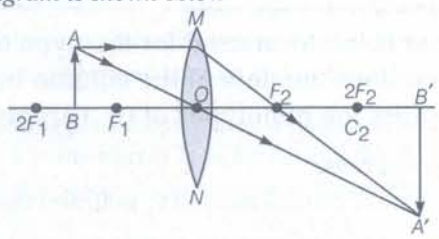
Sol. The image is real as only the real image can be taken on the screen.

Here, Image distance, $v = +80$ cm; Magnification, $m = -3$ and

Object distance, $u = ?$

Since, Magnification, $m = \frac{v}{u} \Rightarrow 3 = \frac{80}{u} \Rightarrow u = -\frac{80}{3}$ cm. (1)

The appropriate ray diagram is shown below



(2)

Now, by lens formula

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

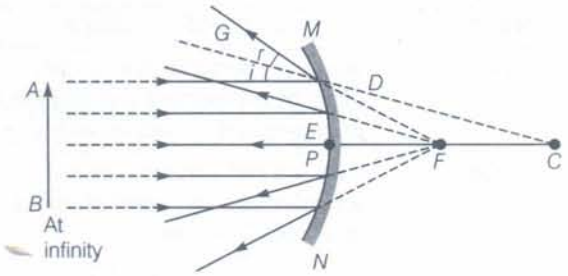
$$\frac{1}{f} = \frac{1}{80} - \frac{3}{-80} = \frac{4}{80} = \frac{1}{20}$$

$$\Rightarrow \quad f = 20 \text{ cm}$$

Positive focal length denotes that lens is convex. (2)

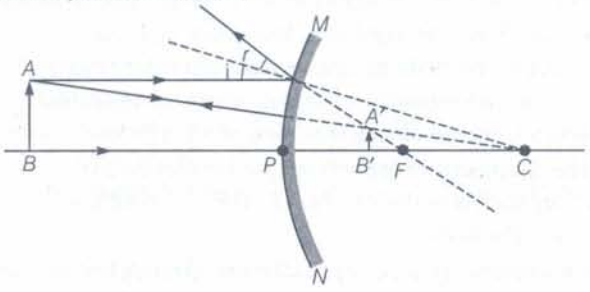
or

(a) The virtual, erect and highly diminished image of the object is formed at focus F behind the mirror, *as shown below*



(2½)

(b) The virtual, erect and diminished image of the object is formed between focus F and pole P behind the mirror, *as shown below*



(2½)

Q 21. Kalawati often blame her daughter-in-law for having only daughters and no son. As being a biology student how will you convince Kalawati that her daughter-in-law has no role in giving birth to girls or boys?

or

Can you think of reasons why more complex organisms cannot give rise to new individuals through regeneration?

Sol. Kalawati can be convinced if she will be made aware of the fact that sex of a child is determined by the sperm which carry gametes from the father. And women are homogametic, *i.e.*, they produce only one type of gamete (22+X) whereas, male are heterogametic. They produce two types of gametes (22+X) and (22+Y) which are formed in equal proportion.

So, it is a by chance factor that your son's (22+X) chromosome is fusing with the daughter-in-law (22+X) chromosome again and again *i.e.*, for the first, second and third time. Thus, father is responsible for the sex of a child more than the mother. (5)

or

Multicellular organisms cannot reproduce by cell because they are not simple random collection of cells. In them, specialised cells are organised as tissues and tissues are organised into organs, which then have to be kept at different positions in the body.

Cell-by-cell division would be impractical. Multicellular organisms, therefore, require to use more complex ways of reproduction.

Moveover, simple multicellular organisms possess special type of tissues which have the potential to grow into a new organism but complex multicellular organisms have no such specialised cells. (5)

Q 22. Differentiate between inherited and acquired characters. Give one example for each type.

or

In evolutionary terms, can we say which among bacteria, spiders, fish and chimpanzees have a 'better' body design? Why or why not?

Sol. *The differences between acquired and inherited characters are*

Characters	Acquired Characters	Inherited Characters
Development	These characters develop during lifetime of an individual.	These characters are transmitted by parent to their offsprings.
Nature	These are somatic variations.	These are genetic variations.
Cause	These are acquired due to direct effect of environment use and disuse of organs and conscious efforts.	These characters develop due to mutations and reshuffling of genetic material.
Future	They are lost with the death of an individual. *e.g.*, good physique of an athlete and intelligence.	These are transferred to the next generation. *e.g.*, fused and free earlobes.

(5)

or

Evolution is the generation of diversity due to environmental selection. More and more body designs have emerged over time. Among bacteria, chimpanzees, spiders and fish, the chimpanzees have a better body design because of a more complex body organisation. Various organisms evolve in their own separate ways to give rise to the current forms and have a basic difference in their body design because of specialisation of all cells and tissues.

The chimpanzees are best adapted to survive in the present day conditions and have proper division of organelles in their body, *i.e.*, they have different organs for performing different vital functions inside the body.

For example, respiratory, excretory, circulatory and nervous system, etc. (5)

Q 23. (a) Why is the testes of males located outside the body?

(b) What are the three parts of a sperm?

(c) What is scrotum?

(d) Point out the difference in male and female urethra.

(e) What is the fertility period of males and females in human beings?

or

Give differences between self-pollination and cross-pollination.

Sol. *(a)* Spermatogenesis or formation of sperm or germ cell takes place in testes which require a little lower temperature than the normal body temperature (2-25°C). Hence, for the formation of sperms, the testes are located outside the abdominal cavity in sac. (1)

(b) Head, middle piece and tail. (1/2)

(c) Scrotum is a sac-like structure located outside the abdominal cavity, which contains the testes. (1)

(d) In male, there is a single opening for the elimination of urine and for the ejaculation of sperms. But in females, there are two separate openings for the elimination of urine and reproductive products. (1)

(e) The fertility period of males in human beings remains throughout the life as they can produce sperms throughout their life.

In human females, the process of ovulation stop at the age of 45-55, which is called as menopause. So, the fertility period is from puberty to around 55 years. About 400 eggs reach the uterus in her total fertility period. (1½)

or

The differences between self-pollination and cross-pollination are

S.No.	Self-pollination	Cross-pollination
(i)	It occurs within a same flower or between two flowers of the same plant.	It occurs between two flowers borne on different plants of the same species.
(ii)	Flowers do not depend on other agencies for pollination.	Agents such as insects, water and wind are required for pollination.
(iii)	Pollen grains are produced in small number.	Pollen grains are produced in large numbers.
(iv)	Flowers are not attractive and do not produce nectar.	Flowers attract insects by various modifications and means like large, coloured petals, scent and nectar.
(v)	The offsprings produced are of the same genetic make up. The purity of race is maintained.	Offsprings so produced show variation. They differ in their genetic make up.

(1×5)

Q 24. (a) Write the possible isomers of the compound with molecular formula C_3H_6O and also give their electron dot structures.

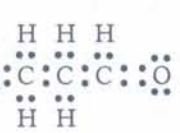
(b) Distinguish between addition and substitution reactions.

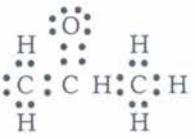
or

(a) With a labelled diagram describe an activity to show the formation of an ester.

(b) Distinguish between esterification and saponification reactions of organic compounds.

Sol. *(a) Possible isomers of the compound with molecular formula* C_3H_6O *are*

(i) CH_3CH_2CHO (Propanal) $\Rightarrow$ 

(ii) $CH_3-C(=O)-CH_3$ (Propanone) $\Rightarrow$ 

(1×2)

(b) The differences between addition and subsitution reaction are

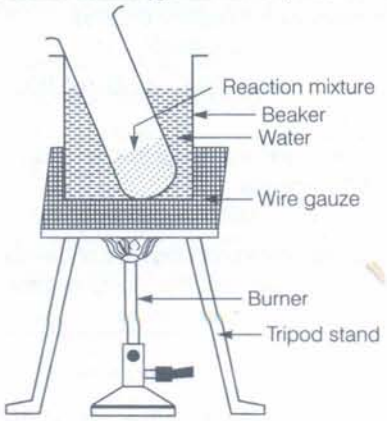
S.No.	Addition Reaction	Substitution Reaction
(i)	Atoms are added to multiple bonds in unsaturated compounds and give a single product.	A more reactive one type of atom or group of atoms takes place of other.
(ii)	Addition reaction is the characteristic property of unsaturated hydrocarbons.	Substitution reaction is the characteristic property of saturated hydrocarbons.
(iii)	*Example,* Addition of hydrogen to ethene. $CH_2=CH_2$ (Ethene) $+ H_2 \xrightarrow{Ni} CH_3-CH_3$ (Ethane)	*Example,* Substitution of H-atom by a Cl atom. $CH_4 + Cl_2 \xrightarrow{Sunlight} CH_3Cl$ (Chloromethane) $+ HCl$

(1×3)

or

(a) **Activity** Formation of ester.

Take 1 mL of ethanol (absolute alcohol) and 1 mL of glacial acetic acid alongwith a few drops of conc.sulphuric acid in a test tube. Warm it in a water-bath for atleast five minutes. Pour the reaction mixture into a beaker containing some water and smell the resulting mixture. *The diagram demonstrating the activity is shown below* (1)



Formation of ester (1)

A sweet smell indicates the formation of an ester.

$$\underset{\text{Acetic acid}}{CH_3COOH} + \underset{\text{Ethanol}}{CH_3CH_2OH} \xrightarrow[\text{Warm}]{\text{Conc. } H_2SO_4} \underset{\text{Ester}}{CH_3COOC_2H_5} + H_2O$$ (1/2)

(b) The reaction in which a carboxylic acid combines with an alcohol to form an ester is known as esterification.

Whereas, the alkaline hydrolysis of an ester to give acid salt and alcohol is known as saponification. This reaction is used for the preparation of soaps. (1½)

The examples of reactions are

(i) **Esterification** $\underset{\text{Ethanoic acid}}{CH_3COOH} + \underset{\text{Ethanol}}{C_2H_5OH} \xrightarrow[\text{Warm}]{\text{Conc. } H_2SO_4} \underset{\substack{\text{Ethyl ethanoate}\\(\text{ester})}}{CH_3COOC_2H_5} + \underset{\text{water}}{H_2O}$

(ii) **Saponification** $\underset{\text{Ethyl ethanoate}}{CH_3COOC_2H_5} + \underset{\text{Sodium Hydroxide}}{NaOH} \longrightarrow \underset{\text{Sodium ethanoate}}{CH_3COONa} + \underset{\text{Ethanol}}{C_2H_5OH}$ (½×2)

Section B

Q25. Twinkling of stars is due to atmospheric

(a) dispersion of light by water droplets

(b) refraction of light by different layers of varying refractive indices

(c) scattering of light by dust particles

(d) internal reflection of light by clouds

Sol. *(b)* Twinkling of stars is due to atmospheric refraction of starlight of varying indices. Because, the starlight, on entering the earth's atmosphere, undergoes refraction *i.e.*, by varying slightly from apparent position continuously before it reaches the earth. Hence, the amount of starlight entering the eye flickers the star which sometimes appears brighter and sometimes fainter, which thus, gives us the twinkling effect.

Q26. No matter how far you stand from a mirror, your image appears erect. The mirror is likely to be

(a) plane (b) concave

(c) convex (d) Either (a) or (c)

Sol. *(d)* A plane mirror forms an erect image of equal size while convex mirror forms an erect image of smaller size irrespective of the distance of the object from the mirror.

Q27. Which of the following statements is correct regarding the propagation of light of different colours of white light in air?

I. Red light moves fastest.

II. It does not depend on the characteristic of wave.

III. All the colours of the white light move with the same speed.

IV. Yellow light moves with the mean speed as that of the red and the violet light.

The correct options are

(a) I and II (b) I and III

(c) II and III (d) I and IV

Sol. *(c)* All colour moves with the same speed in air/vaccum and does not depend on characteristic of wave *i.e.*, its frequency, polarisation, etc.

Q28. Three students measured the focal length of a convex lens using parallel rays from a distant object. All of them measured the distance between the lens and the inverted image on the screen.

Student *A* saw a sharp image on the screen and labelled the distance as f_1.
Student *B* saw a slightly larger blurred image on the screen and labelled the distance as f_2.
Student *C* saw a slightly smaller blurred image on the screen and labelled the distance as f_3.

The relation between the three measurements would most likely be

(a) $f_1 = f_2 = f_3$ (b) $f_1 < f_2$ and f_3

(c) $f_3 < f_1 < f_2$ (d) $f_1 < f_2$ and $f_1 = f_3$

Sol. *(c)* The image gets blurred and enlarged/shortened when the screen is pushed farther/nearer from the focus of the convex lens.

Q29. Which of the following is the correct formulae for the magnification produced by lenses in terms of height of image and object?

I. $m = \dfrac{\text{height of image}}{\text{height of object}}$ II. $m = \dfrac{\text{height of object}}{\text{image distance}}$

III. $m = \dfrac{\text{height of image}}{\text{object distance}}$ IV. $m = \dfrac{\text{Image distance}}{\text{Object distance}}$

The correct options are

(a) I and II (b) I and III

(c) I and IV (d) II and IV

Sol. *(c)* Magnification is always calculated by the ratio of image height to object height *i.e.*, $m = \dfrac{h'}{h}$.

Q30. Carbon forms four covalent bonds by sharing its four valence electrons with four univalent atoms such as chlorine. After the formation of four bonds

I. Carbon attains the electronic configuration of argon.

II. Carbon attains the electronic configuration of neon.

III. Carbon becomes inert.

IV. Carbon becomes more reactive.

The correct statements are

(a) I and III (b) I and IV (c) II and III (d) II and IV

Sol. *(b)* After the formation of four covalent bonds, carbon attains the electronic configuration of nearest noble gas, *i.e.*, neon (10 electrons). So, it becomes inert.

Q31. Chlorine reacts with saturated hydrocarbons at room temperature in the

(a) absence of sunlight (b) presence of sunlight

(c) presence of dark (d) presence of water

Sol. *(b)* Chlorination of saturated hydrocarbons takes place in the presence of sunlight (substitution reaction).

Q32. Which of the following are the examples of alkynes?

I. Acetylene II. Ethylene

III. Butyne IV. Ethane

The correct options are

(a) I and III (b) I and II

(c) II and III (d) III and IV

Sol. *(a)* Unsaturated hydrocarbons containing triple bond are called alkynes.

Q33. The hydrophilic end of a synthetic detergent is

I. $CH_3(CH_2)_{10}—CH_2—$ II. $NH_4^+Cl^-$

III. $SO_3^-Na^+$ IV. $—COO^-Na^+$

The correct options are

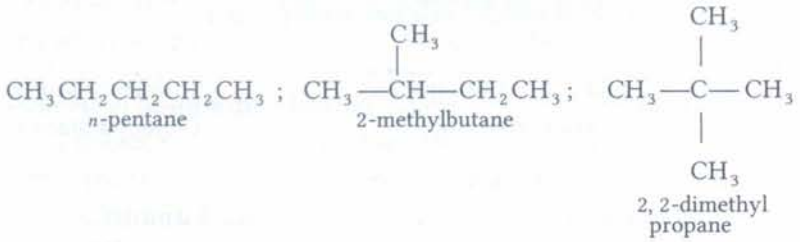
(a) I and II (b) I and III (c) II and III (d) II and IV

Sol. *(c)* Synthetic detergents are the ammonium or sodium sulphonate salts of long chain carboxylic acids.

Q34. The number of isomers of pentane are

(a) 2 (b) 3 (c) 4 (d) 5

Sol. *(b) Isomers of pentane are*



Q35. Researcher observed a slide of *Amoeba* with elongated nuclei, it would represent

(a) binary fission (b) multiple fission

(c) budding (d) vegetative propagation

Sol. *(a)* During binary fission when the *Amoeba* cell has reached its maximum size of growth, then its nucleus lengthens and divide into two parts.

Q 36. Which of the following diagrams illustrates budding in yeast?

The correct option (s) is/are

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

Sol. *(c)* During budding in yeast, a bud appears on the outside of the cell wall and elongates in the form of a chain.

Q 37. In evolutionary terms, we are more related to

(a) a chinese school boy (b) a chimpanzee
(c) a spider (d) a bacterium

Sol. *(b)* Chimpanzees and human beings had a common ancestor long time ago.

Q 38. In a food chain, the total amount of living material is depicted by

(a) pyramid of numbers (b) pyramid of biomass
(c) pyramid of energy (d) All of these

Sol. *(b)* Biomass is the amount of living matter present in an ecosystem and it is depicted by pyramid of biomass. It may be upright or inverted.

Q 39. The principles which bind all living system together are

(a) laws of thermodynamics (b) law of heredity
(c) mechanism of photosynthesis (d) modes of germination

Sol. *(b)* Heredity maintains the continuity of features from one generation to next and hence bind the all living system together.

Q 40. Embryo of seed has

I. one radicle II. two plumule
III. one plumule IV. only one radicle

The correct option (s) is/are

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

Sol. *(a)* Seed contain one plumule which develop into shoot with leaves and one radicle which develop into root.

Q 41. Which of the following are not a natural resource?

I. Parks II. Water
III. Wooden house IV. Pine forest

The correct option (s) is/are

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

Sol. *(c)* Parks and wooden house are man-made and do not occur naturally.

Q 42. Methanal is a one-carbon compound with the functional group

(a) carboxylic acid (b) aldehyde
(c) ketone (d) alcohol

Sol. *(b)* HCHO is methanal. Its functional group is aldehyde, *i.e.*, —CHO.