

CLASS X (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-2

Time : 3 Hours**Maximum Marks : 80****General Instructions :**

- (i) The question paper comprises of three sections-A, B and C. Attempt all the sections.
- (ii) All questions are compulsory.
- (iii) Internal choice is given in each sections.
- (iv) All questions in Section A are one-mark questions comprising MCQ, VSA type and assertion-reason type questions. They are to be answered in one word or in one sentence.
- (v) All questions in Section B are three-mark, short-answer type questions. These are to be answered in about 50-60 words each.
- (vi) All questions in Section C are five-mark, long-answer type questions. These are to be answered in about 80-90 words each.
- (vii) This question paper consists of a total of 30 questions.

Section A

1. The pH of a sample of vegetable soup was found to be 6.5. How is this soup likely to taste? [1]

Ans : Sour

2. What is an alkali? [1]

Ans : An alkali is a base that dissolves in water.

3. Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.

Metals occur in nature in the free as well as in the combined state. The less reactive metals are generally found in the free state. Most of the metals, however are found in the combined form as minerals. The minerals from which metals can be obtained on a commercial scale are called ores. In other words, the minerals from which metals can be extracted profitably are called ores. Thus, bauxite ($\text{Al}_2\text{O}_3 \cdot 2\text{H}_2\text{O}$) and clay ($\text{Al}_2\text{O}_3 \cdot 2\text{SiO}_2 \cdot 2\text{H}_2\text{O}$) are minerals of aluminium. However, it is bauxite that is chiefly used to obtain aluminium commercially. So, bauxite, and not clay, is an ore of aluminium.

- 3.1 Which metal occurs in native state? [1]

Ans : Ag

- 3.2 Write the name of the sulphide ore? [1]

Ans : Galena

- 3.3 What is native of Halide ore? [1]

Ans : Horn silver

- 3.4 Which is the most abundant metal on the earth's crust? [1]

Ans : Aluminium

4. Question number 4.1-4.4 are based on the two tables given below study these table related to measurement of voltage and current and answer the question that follow

Ideal measurement (Table – A)

S.N.	Voltmeter reading (mV)	Ammeter reading (mA)
1.	4	2
2.	6	3
3.	8	4
4.	10	5
5.	12	6

Table – B

Student	S.No.	Voltmeter reading (mV)	Ammeter reading (mA)
Student–A	1.	2	1
	2.	4	2
	3.	6	3
Student–B	1.	4	4
	2.	6	3
	3.	8	4

- 4.1 Which student measurement is wrong in the table B? [1]

Ans : Student B

- 4.2 What is the mathematical relation between voltage and current ? [1]

Ans : According to the ohm's Law, current is directly proportional to voltage(V).

- 4.3 In the following measurement of student B. Which measurement is wrong? [1]

- (a) $I = 4, V = 4$ (b) $I = 3, V = 6$
(c) $I = 4, V = 8$ (d) None of these

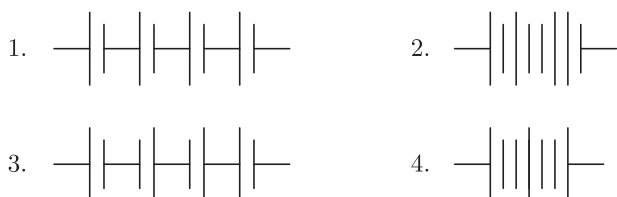
Ans : (a) $I = 4, V = 4$

- 4.4 The value of resistance from the measurement of student A is [1]

- (a) 2Ω (b) 3Ω
(c) 4Ω (d) 1Ω

Ans : (a) 2Ω

5. The proper representation of series combination of cells (Figure) obtaining maximum potential is [1]

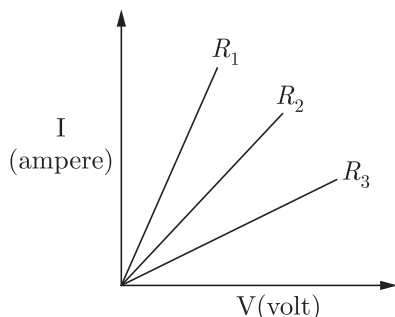


- (a) 1 (b) 2
(c) 3 (d) 4

Ans : (a) 1

or

A student carries out an experiment and plots the V-I graph of three samples of nichrome wire with resistances R_1 , R_2 and R_3 respectively (Figure). Which of the following is true?



- (a) $R_1 = R_2 = R_3$ (b) $R_1 > R_2 > R_3$
(c) $R_3 > R_2 > R_1$ (d) $R_2 > R_3 > R_1$

Ans : (c) $R_3 > R_2 > R_1$

6. In order to determine the focal length of a concave mirror by obtaining the image of distant object on screen, the position of screen should be : [1]

- (a) parallel to plane of concave mirror
(b) perpendicular to plane of concave mirror
(c) inclined at an angle 60° to plane of mirror
(d) in any direction with respect to the plane of concave mirror

Ans : (a) parallel to plane of concave mirror

7. After observing a permanent slide of binary fission, a student was asked to specify the total number of daughter cells formed from a single parent Amoeba at the end of binary fission. His reply would be : [1]

- (a) one (b) two
(c) many in chains (d) not definite

Ans : (b) two

8. The use of Vaseline in the experiment to show that CO_2 is given out during respiration, is to [1]

- (a) lubricate the joints
(b) make the set-up air-tight
(c) absorb oxygen
(d) absorb carbon dioxide

Ans : (b) make the set-up air-tight

or

A student was provided with a pH chart by the teacher and asked to observe the colour corresponding to pH 1 and 14 respectively. The correct answer would be :

- (a) yellow, green (b) violet, orange
(c) red, blue (d) blue, mustard

Ans : (c) red, blue

9. While preparing a temporary stained mount of a leaf epidermal peel, the extra stain is removed by : [1]

- (a) washing with water
(b) washing with calcium chloride solution
(c) soaking with blotting paper
(d) absorbing with cotton wool

Ans : (c) soaking with blotting paper

10. On adding acetic acid to solid hydrogen carbonate, a student observes the liberation of a : [1]

- (a) greenish yellow gas with a pungent smell
(b) colourless and odourless gas
(c) yellow coloured and odourless gas
(d) colourless gas with the smell of rotten eggs

Ans : (b) colourless and odourless gas

11. If water has magnesium sulphate dissolved in it, for testing its cleaning action, it is to be considered as : [1]

- (a) permanent hard water
(b) hard water
(c) soft water
(d) temporary hard water

Ans : (a) permanent hard water

12. A metal powder was added to dil. HCl and dil. NaOH solutions taken in separate test tubes. On making the contents react in both the test tubes, hydrogen gas was formed in both the cases. The metal used will be: [1]

- (a) Cu (b) Zn
(c) Fe (d) Pb

Ans : (b) Zn

or

Silver articles become black on prolonged exposure to air. This is due to the formation of

- (a) Ag_3N (b) Ag_3O
(c) Ag_3S (d) Ag_3S and Ag_3N

Ans : (c) Ag_3S

For question numbers 13 and 14, two statements are given-one labeled Assertion (A) and the other labeled Reason (R). Select the correct answer to these questions from the codes (a), (b), (c) and (d) as given below.

- (a) Assertion is true and reason is correct explanation of assertion.
(b) Assertion is true but reason is false.
(c) Assertion is false but reason is true.
(d) Both are true but reason is not correct explanation of assertion.

13. Assertion: Magnesium ribbon should be cleaned before burning in air.

Reason: Magnesium ribbon is coated with a thin layer of dust containing moisture. [1]

Ans : (b) Assertion is true but reason is false.

14. Assertion: Green plants are autotrophs.

Reason: Green plants synthesise their own food using sunlight, chlorophyll, carbon dioxide and water [1]

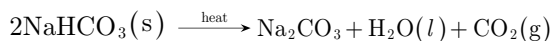
Ans : (a) Assertion is true and reason is correct explanation of assertion.

Section B

- 15.** i. Write the chemical formula for washing soda.
 ii. How may it be obtained from baking soda?
 iii. Name an industrial use of washing soda other than washing clothes. [3]

Ans :

- i. The chemical formula of washing soda is $\text{Na}_2\text{CO}_3 \cdot 10\text{H}_2\text{O}$.
 ii. Baking soda (NaHCO_3) is strongly heated to form soda ash.



The soda ash is dissolved in boiling hot water so as to obtain its saturated solution. The saturated solution so obtained is allowed to cool, when washing soda crystals separate out.



- iii. Washing soda is used in the manufacture of glass.

- 16.** Out of the elements H(1), Be(4), Na(11) and Mg(12).
 i. Write the pair of elements having similar chemical properties.
 ii. State the group number of each pair,
 iii. Name one another element belonging to each of these groups. [3]

Ans :

- i. Be(4) and Mg(12) have similar chemical properties. H(1) and Na(11) have similar chemical properties.
 ii. Be and Mg belong to group 2, H and Na belong to group 1.
 iii. K belongs to group 1 and Ca belongs to group 2

or

Calcium is an element with atomic number 20. Stating the 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 :

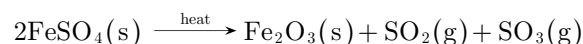
- i. Calcium is a metal because it can lose electrons to form cations.
 ii. Its atomic radius will be smaller due to more number of protons and electrons, more forces of attraction.
 iii. CaO .

- 17.** Write an equation each for decomposition reactions, where energy is supplied in the form of heat, light or

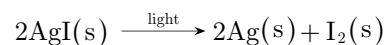
electricity. [3]

Ans :

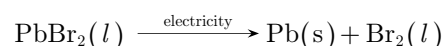
- i. Energy is supplied in the form of heat during the decomposition of ferrous sulphate crystals.



- ii. Energy is supplied in the form of light, when silver iodide decomposes to form silver and iodine.



- iii. Energy is supplied in the form of electricity, when molten lead bromide decomposes to lead and bromine.



- 18.** How does control and coordination take place in plants? [3]

Ans :

The function of control and coordination in plants is performed by chemical substances known as plant hormones or phytohormones.

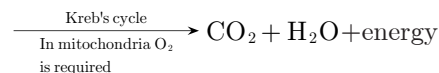
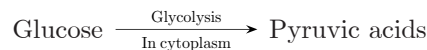
The synthesis and action of phytohormones are greatly influenced by external stimuli. Plants respond to photoperiodic stimulus by specialised pigment present in very small quantity called phytochrome. Thus, phytohormones and phytochromes together are involved in control and coordination between the environment and plant responses.

or

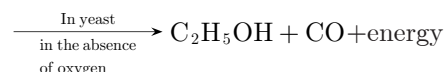
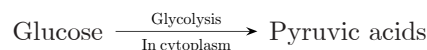
Explain the process of break down of glucose in a cell (i) in the presence of oxygen (ii) in the absence of oxygen.

Ans :

- i. **In the presence of oxygen :** In all the pathways, the first step in break down of glucose, a six carbon molecule, into a three carbon molecule called pyruvate. This process occurs in the cytoplasm of the cell. In aerobic respiration break down of pyruvate using oxygen takes place in mitochondria. It breaks up the three carbon pyruvate molecule to give three molecules of carbon dioxide, water and lots of energy as compared to anaerobic respiration.

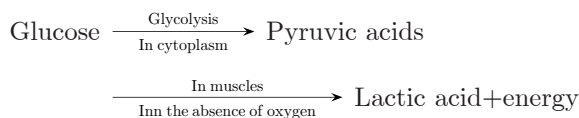


- ii. **In the absence of oxygen :** In the absence of oxygen pyruvate may be converted into ethanol and carbon dioxide which is referred to as fermentation that takes place in yeast.



Sometime anaerobic respiration also occurs in our muscle cells, when there is lack of oxygen, i.e., during vigorous muscular activities. At that time pyruvate is converted into lactic acid which is also a three carbon molecule. This build-up of lactic acid in our muscles

causes fatigue or muscular cramps.



19. What are plant hormones? Give its examples. [3]

Ans :

In plants, certain chemical substances are necessary for the purpose of proper growth and development. These chemical substances are called plant hormones or phytohormones. These are the most important coordinating substances in plants.

Examples : Auxin, gibberellin, cytokinin, ethylene, and abscisic acid.

20. How do Mendel's experiment show that traits are inherited independently? [3]

Ans :

According to Mendel's experiments, traits are inherited independently because :

- i. When a cross was made between a tall pea plant with round seeds and a short pea plant with wrinkled seed, the F1 progeny plants are all tall with round seeds. This indicates that tallness and round seeds are the dominant traits.
- ii. When the F1 plants are self pollinated, the F2 progeny consisted of some tall pea plants with round seeds and some short pea plants with wrinkled seeds which are the parental traits.
- iii. There were also some new combinations like tall pea plants with wrinkled seeds and short pea plants with round seeds.

Thus, it may be concluded that tall and short traits and round and wrinkled seed traits have been inherited independently.

21. Name the hormones secreted by the following endocrine glands and specify one function of each: [3]

- (a) Thyroid (b) Pituitary (c) Pancreas

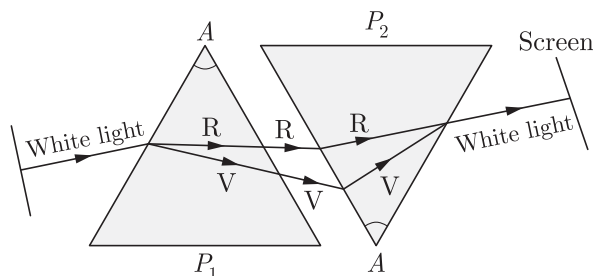
Ans :

- a. **Thyroid** : Secretes Throxine. It regulates metabolism of carbo-hydrates, fats and proteins.
- b. **Pituitary** : Secretes growth hormone. Growth hormone regulates growth and development of body.
- c. **Pancreas** : Secretes insulin. Insulin lowers blood sugar level.

22. Describe an activity to show that the colours of white light splitted by a glass prism can be recombined to get white light by another identical glass prism. Also draw ray diagram to show the recombination of the spectrum of white light. [3]

Ans :

When a glass prism is used to obtain a spectrum of sunlight and a second identical prism in an inverted position with respect to the first position then it will allow all the colours of spectrum to recombine. Thereby a beam of white light will emerge from the other side of the second prism.



23. i Name and define SI unit of resistance.
 ii. Calculate the resistance of a resistor if the current flowing through it is 200 mA, when the applied potential difference is 0.8 V. [3]

Ans :

- i. SI unit of resistance is ohm (Ω)

$$1 \Omega = \frac{1 \text{ V}}{1 \text{ A}}$$

The resistance of a conductor is said to be 1 ohm if a current of one amp flows through it when a potential differences of 1 volt is applied across it.

- ii. Given,

$$\begin{aligned} \text{Current, } I &= 200 \text{ mA} \\ &= 200 \times 10^{-3} \text{ A} \end{aligned}$$

$$\text{Potential difference, } V = 0.8 \text{ V}$$

As we know that,

$$\begin{aligned} R &= \frac{V}{I} = \frac{0.8}{200 \times 10^{-3}} \\ &= 4 \Omega \end{aligned}$$

24. i. List the factors on which the resistance of a conductor in the shape of a wire depends.
 ii. Why are metals good conductors of electricity whereas glass is a bad conductor of electricity? Give reason.
 iii. Why are alloys commonly used in electrical heating devices? Give reason. [3]

Ans :

- i. Factors on which resistance of a wire depends:
 (a) Resistance is directly proportional to length i.e.,

$$R \propto l$$

- (b) Resistance is inversely proportional to area of cross-section i.e.,

$$, R \propto \frac{1}{A}$$

$$\text{Now, } R \propto \frac{l}{A} \text{ or } R = \rho \frac{l}{A}$$

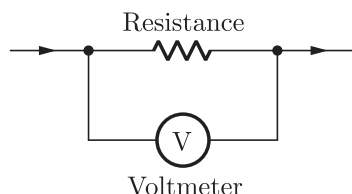
- ii. Metal are good conductor due to having large number of free electrons and their low resistivity. Glass is a bad conductor because it has no free electrons and its resistivity is higher.
 iii. Alloys are commonly used in electrical heating devices due to their high resistivity and high melting point which produces more heat.

or

Name an instrument used for measuring electric potential difference by drawing a diagram. Show how this instrument is connected in an electric circuit. Why does this instrument practically not consume any electric energy from the electric circuit?

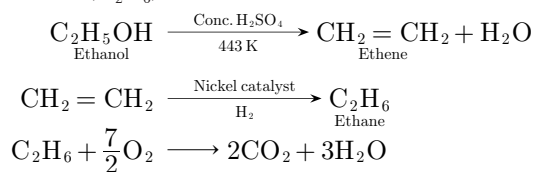
Ans :

Voltmeter is the instrument used for measuring potential difference. Voltmeter is an extremely high resistance instrument. Thus, when connected in parallel, practically extremely small current flows through it. Hence, voltmeter is not consume any electric energy from the electric circuit.



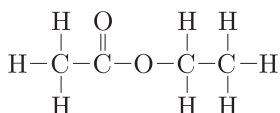
Section C

25. A carbon compound 'P' on heating with excess conc. H_2SO_4 forms another carbon compound 'Q' which on addition of hydrogen in the presence of nickel catalyst forms a saturated carbon compound 'R'. One molecule of 'R' on combustion forms two molecules of carbon dioxide and three molecules of water. Identify P, Q and R and write chemical equations for the reactions involved. [5]

Ans :P = Ethanol ($\text{C}_2\text{H}_5\text{OH}$)Q = Ethene ($\text{CH}_2=\text{CH}_2$)R = Ethane (C_2H_6)**or**

Answer the following:

- i. The structural formula of an ester is :

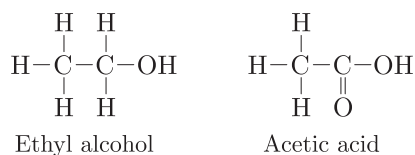


Write the structural formulae of the corresponding alcohol and the acid.

- ii. (a) Mention the experimental conditions involved in obtaining ethene from ethanol.
(b) Write the chemical equation for the above reaction.
- iii. Explain the cleansing action of soap.

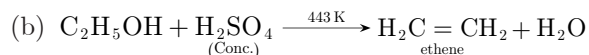
Ans :

i.

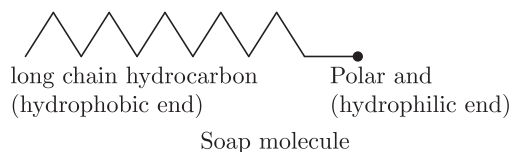


ii.

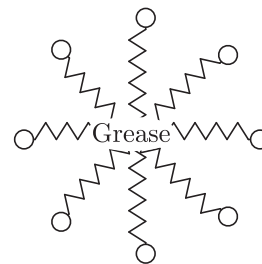
- (a) When ethanol is heated with excess of concentrated sulphuric acid at 443 K, it gets dehydrated to form ethene.



- iii. A molecule of soap is made up of two parts:
(a) An ionic part which is hydrophilic, i.e., water soluble.
(b) A hydrocarbon chain which is hydrophobic i.e., water-repelling and oil soluble.



When soap is at the surface of water, the hydrophobic tail protrudes out of water while the ionic end remains inside water. Inside water, the molecules form clusters with the hydrophobic tails in the interior of the cluster and the ionic ends on the surface of the cluster. This formation is called a micelle. Soap, in the form of micelle collects the oily dirt in the centre of the micelle. The micelles stay in solution as a colloid and do not precipitate due to ion-ion repulsion. Thus, the dirt suspended in water is washed away during rinsing.



A micelle entrapping grease particle

26. Answer the following: [5]

- How is zygote formed?
- State the function of placenta in the mother's body.
- At what interval the egg is formed in human female ovary?
- Name two STDs caused by bacterial infection.
- Why is prenatal sex determination prohibited?

Ans :

- Zygote is formed by the fusion of male and female gamete.
- Placenta is a special tissue through which the developing embryo/foetus gets nutrition from mother's blood. It also transports wastes of the embryo into mother's blood.
- Ovulation releases mature ovum from the ovary. It happens once during a menstrual cycle that is for roughly 28 days.
- STDs caused by bacterial infection are Gonorrhoea and Syphilis.
- Prenatal sex determination is misused and it may be the reason for female foeticide.

27. i. What is galvanised iron?
ii. How is iron galvanised?
iii. What is the advantage of galvanised iron?
iv. How does galvanised iron get its name? State its two uses. [5]

Ans :

- i. The iron whose surface is coated with a thin layer of zinc is called galvanised iron.
- ii. The iron sheets are passed through molten zinc, when the zinc sticks to the surface of iron. These sheets are then passed through heavy steel rollers, heated to 300°C, when the thin layer of zinc gets compacted with iron.
- iii. Galvanised iron does not rust because the surface of the iron is not exposed to moist air.
- iv. It is because of the similarity of the electrochemical process involved in the galvanic cell and coating of zinc with iron, that the product is called galvanised iron.

Uses of galvanised iron are following:

- (a) It is used for making iron roofing.
- (b) It is used for making suitcase, trunks, drain pipes, etc.

28. How does an artificial kidney or a dialysis machine work? [5]

Ans :

The working of a dialysis machine is

- i. An artificial kidney contains a number of tubes. Each tube contains a semi-permeable lining suspended in a tank filled with dialysing fluid having the same osmotic pressure as blood.
- ii. The patient's blood is passed through these tubes. The waste products from the blood pass into the dialysing fluid.
- iii. The purified blood is sent back into the patient's body. In an adult 180 litre of blood is filtered by the kidneys daily.

or

Give stepwise detail of the working of human kidneys leading to the formation of urine.

Ans :

Each kidney is made up of excretory units called nephrons. Each nephron has a cup shaped upper end called Bowman's capsule containing a bundle of capillaries called glomerulus. The various steps in blood purification are :

- i. Waste materials are brought by the renal arteries to the kidneys.
- ii. Blood is filtered, from the blood capillaries into the Bowman's capsule.
- iii. This filtrate is passed through tubular parts of the nephron where useful products such as glucose, amino acids, etc., are absorbed by the blood capillaries surrounding the nephron.
- iv. The nephrons drain the waste into a space inside the kidney leading to the ureter.
- v. Human urine contains water and nitrogenous substances most of which is urea. From the ureter, urine is passed to the urinary bladder, where it is stored till thrown out of the body.

29. i. What is a magnetic field? How can the direction of magnetic field lines at a place be determined ?
- ii. State the rule for the direction of the magnetic field produced around a current carrying conductor. [5]

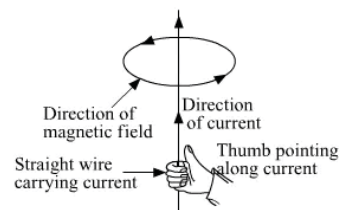
Ans :

- i. The space surrounding a bar magnet in which its

influence in the form of magnetic force can be detected, is called magnetic field.

The direction of magnetic field at a point is the direction of the resultant force acting at that point. The north end of a compass needle indicates the direction of the magnetic field at a particular point.

- ii. **Right hand thumb rule :** Imagine you are holding the conductor with the palm of your right hand, such that the fingers encircle the conductor and the thumb points in the direction of the current. Then the direction of the fingers encircling the conductor, gives the direction of the magnetic lines of force around it.



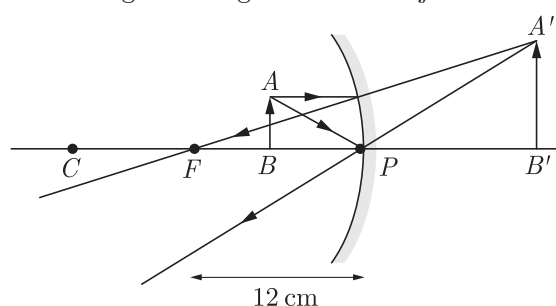
30. It is desired to obtain an erect image of an object, using concave mirror of focal length of 12 cm.

- i. What should be the range of distance of an object placed in front of the mirror?
- ii. Will the image be smaller or larger than the object. Draw ray diagram to show the formation of image in this case.
- iii. Where will the image of this object be, if it is placed 24 cm in front of the mirror? Draw ray diagram for this situation also to justify your answer.

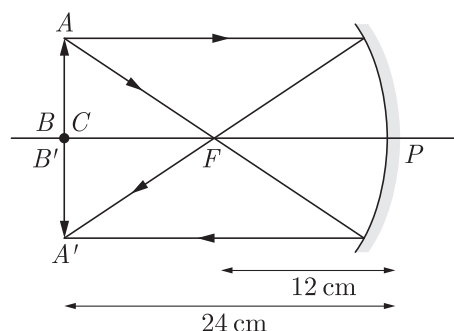
Show the positions of pole, principal focus and the centre of curvature in the above ray diagrams. [5]

Ans :

- i. Range of distance of an object – between pole (0 cm) and focus (<12 cm).
- ii. The image will larger than the object.



- iii. Image also at 24 cm in front of the mirror.

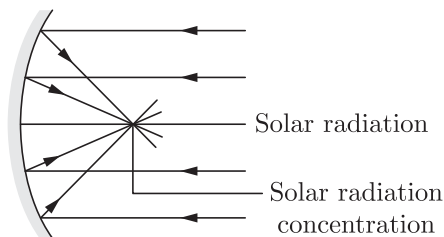


or

- i. Define real image of an object.
- ii. Name the mirror that
 - (a) can give real as well as virtual image of an object.
 - (b) will always give virtual image of same size of an object.
 - (c) will always give virtual and diminished image of an object.
 - (d) is used by a doctor in examining teeth.
- iii. With the help of a ray diagram explain the use of concave mirror as solar concentrators.

Ans :

- i. Real image of an object is the image formed due to actual intersection of light rays coming from object through an optical device. It can always be taken on screen.
- ii.
 - (a) concave mirror
 - (b) plane mirror
 - (c) convex mirror
 - (d) concave mirror
- iii. Concave mirrors can concentrate parallel light ray (from distant objects e.g. sun) at the focus as shown in figure.



This property of the concave mirror is used in solar contractors (for e.g. solar cookers) as high concentration of sun rays generate high amount of heat which farther can used as a heat source.

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