CLASS X (2019-20)
SCIENCE (CODE 086)
SAMPLE PAPER-17

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. What is the function of iris in human eye?   [1]
Ans :

Iris regulates the amount of light entering the eye by means of involuntary muscles.

2. Name the phenomenon responsible for the reddish appearance of the sun during sunrise and sunset.   [1]
Ans :

Scattering of light

3. **Answer question numbers 3.1-3.4 on the basis of your understanding of the following paragraph and the related studied concepts.**
Ethanol or ethyl alcohol is an important organic compound. It burns in air to form carbon dioxide and water. It is used in industries, hospitals and homes. Ethanol is supplied to hospitals and research laboratories without charging different taxes. Therefore, to prevent its misuse for drinking, it is mixed with some poisonous chemicals. Drinking such an alcohol causes blindness, liver damage and even death.
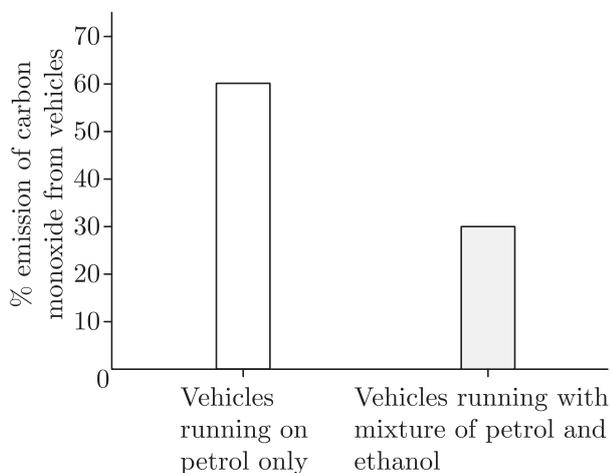
3.1 Which substance is most commonly added to ethyl alcohol to make it unfit for drinking?   [1]
Ans : Methyl alcohol (methanol), a poisonous substance, is added to ethyl alcohol to make it

unfit for drinking.

3.2 Which organ in human body is most affected by the excessive intake of alcoholic drinks?   [1]
Ans : Liver is most affected by the excessive intake of alcoholic drinks.

3.3 Ethanol has no effect on litmus solutions. Why? [1]
Ans : Ethanol does not contain any hydrogen ions, so it is a neutral compound. Thus ethanol has no effect on any litmus solution.

3.4 Based on the data represented in the bar graph given alongside, why is there a reduction in emission of carbon monoxide from vehicles when a mixture of petrol and ethanol was used as fuel? [1]
Ans : Ethanol is a clean fuel because it gives only carbon dioxide and water on burning. It does not produce any poisonous gas like carbon monoxide. So, addition of ethanol to petrol has an advantage of reducing the emission of carbon monoxide from vehicles.

4. **Question numbers 4.1-4.4 are based on the given paragraph and table. On the basis of understanding of the paragraph, table and the related studied concepts, answer the questions that follow.**
Air pollution is the contamination of air with undesirable gases and particulate matter. The substances that cause pollution are called pollutants. These pollutants are either gaseous pollutants like oxides of carbon, sulphur ,nitrogen, etc., or particulate matter in the form of dust, smoke, fumes or mist. Chimneys of industries fossil fuel burning and exhaust of vehicles are responsible for adding oxides of carbon, sulphur and nitrogen in the atmosphere. These oxides get mixed with rain water.

Air pollution is the fifth largest killer in India taking approx. 6.2 lakhs lives per year.
Table: Status of ambient air quality in five Metropolitan cities of India (Year 2011)

S. No.	Name of the city	State	2011		
			SO_2	NO_2	PM10

1.	Delhi	U.T.	6	61	222
2.	Chennai	Tamil Nadu	9	24	92
3.	Hyderabad	Andhra Pradesh	5	28	74
4.	Malappuram	Kerala	2	5	30
5.	Raipur	Chhattis-garh	15	42	310

4.1 List any two ways to minimise air pollution caused by burning of fossil fuels. [1]

Ans : Two ways to reduce air pollution caused by burning of fossil fuels are:

   (i) Use of smokeless appliances.

   (ii) Promoting and encouraging afforestation.

4.2 Out of the three elements - carbon, nitrogen and sulphur; which element has 4 valence electrons and is placed in group 14? [1]

Ans : Carbon

4.3 In winter season, visibility reduces in heavily polluted cities due to the [1]
   (a) formation of smog.
   (b) reduction in humidity.
   (c) formation of ozone gas.
   (d) excess of burnt hydrocarbons.

Ans : (a) formation of smog.

4.4 Refer to the data represented in the table, select from the following the reason why the people of Raipur are most likely to suffer from respiratory diseases? [1]
   (a) Concentration of particulate matter is higher than the required amount.
   (b) Concentration of NO_2 and SO_2 is less than the required amount.
   (c) Concentration of NO_2 and particulate matter is less than the required amount.
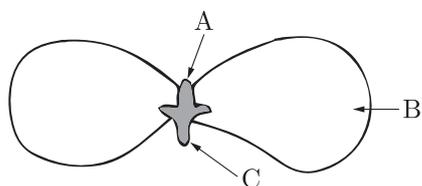   (d) Concentration of NO_2 and SO_2 is very high.

Ans : (a) Concentration of particulate matter is higher than the required amount.

5. The decreasing metallic character of the elements - Na, Al, P, S and Mg is [1]
(a) $Na > Mg > Al > P > S$
(b) $S > P > Al > Mg > Na$
(c) $Na > Al > Mg > P > S$
(d) $Al > Na > Mg > S > P$

Ans : (a) $Na > Mg > Al > P > S$

6. The parts A, B and C shown in the figure are sequentially: [1]

(a) cotyledon, plumule and radicle
(b) plumule, radicle and cotyledon

(c) plumule, cotyledon and radicle
(d) radicle, cotyledon and plumule.

Ans : (c) plumule, cotyledon and radicle

or

The opening at the base of the ovule is known as [1]
(a) style   (b) stigma
(c) micropyle   (d) radicle

Ans : (c) micropyle

7. Which of the following gases can be used for storage of fresh sample of an oil for a longer duration? [1]
(a) CO_2 or O_2 (b) N_2 or O_2
(c) CO_2 or He_2 (d) N_2 or He

Ans : (d) N_2 or He

or

Which one of the following involve a chemical reaction?
(a) Evaporation of water
(b) Storing on nitrogen gas under pressure
(c) Keeping petrol in a China dish in open
(d) Heating magnesium wire in the presence of air at high temperature

Ans : (d) Heating magnesium wire in the presence of air at high temperature

8. A girl standing in a street in front of a large window glass pane of a house sees her own image bigger than herself. The glass pane is [1]
(a) plane   (b) cylindrical outside
(c) concave outside   (d) convex outside

Ans : (c) concave outside

or

Under which one of the following conditions a concave mirror can form a real image larger than the object? 1
(a) When the object is kept at a distance equal to its radius of curvature.
(b) When object is kept at a distance less than its focal length.
(c) When object is placed between the focus and centre of curvature.
(d) When object is kept at a distance greater than its radius of curvature.

Ans : (c)When object is placed between the focus and centre of curvature

9. If a round, green seeded pea plant (RR yy) is crossed with wrinkled, yellow seeded pea plant, (rr YY), the seeds produced in F_1 generation will be [1]
(a) round and yellow   (b) round and green
(c) wrinkled and green   (d) wrinkled and yellow

Ans : (a) round and yellow

10. Consider the following statements about the aqueous solutions of acids and bases:
A. Lower the pH, stronger the base
B. Lower the pH, weaker the base
C. Higher the pH, weaker the acid
D. Higher the pH, stronger the acid.
The correct statements are [1]

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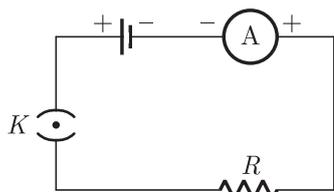
(c) C and D   (d) A and D

Ans : (b) B and C

11. A hypermetropic person with near point 1 m wants to read newspaper keeping it at a distance of 25 cm. The power of the corrective lens should be   [1]
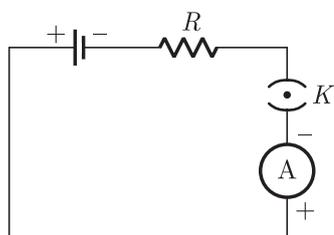
(a) +1.0 D   (b) –1.0 D

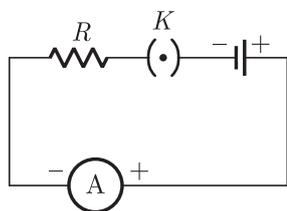(c) –3.0 D   (d) +3.0 D

Ans : (d) +3.0 D

12. Consider the following three circuits in which a cell, a resistor, a key and an ammeter are arranged as shown. The current recorded by the ammeter will be   [1]

(A)

(B)

(C)

(a) maximum in A

(b) minimum in B

(c) maximum in C

(d) same in all the cases

Ans : (d) same in all the cases

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

(a) Both A and R are true and R is correct explanation of the assertion.

(b) Both A and R are true but R is not the correct explanation of the assertion.

(c) A is true but R is false.

(d) A is false but R is true.

13. **Assertion :** Wild cabbage is the ancestor and cauliflower and broccoli are its varieties which have been obtained by evolution.

Reason : Natural selection has played a major role in

the evolution of cauliflower and broccoli.   [1]

Ans : (c) A is true but R is false.

14. **Assertion :** While passing through a glass prism the violet component of white light deviates the most and the red component deviates the least.

Reason : The refractive index of glass for red light is highest and for violet light is lowest.   [1]

Ans : (c) A is true but R is false.

Section B

15. Write the balanced chemical equations for the following reactions and identify the type of reaction in each case.

(a) Magnesium ribbon is burnt in an atmosphere of nitrogen gas to form solid magnesium nitride.

(b) Chlorine gas is passed in an aqueous potassium iodide solution to form potassium chloride solution and solid iodine.   [3]

Ans :

(a) $3Mg(s) + N_2(g) \longrightarrow Mg_3N_2(s)$

Combination reaction

(b) $2KI(aq) + Cl_2(g) \longrightarrow 2KCl(aq) + I_2(s)$

Displacement reaction

16. You have four solutions A, B, C and D. The pH of solution A is 2; B is 9; C is 12 and D is 7.

(a) Identify the most acidic and most basic solution.

(b) Arrange the above four solutions in the increasing order of H^+ ion concentration.

(c) State the change in colour of pH paper on dipping it in solutions C and D.   [3]

Ans :

(a) The most acidic solution is A. The most basic solution is C.

(b) C<B<D<A or C→B→D→A

(c) The colour of pH paper on dipping in solution C will be violet and in solution D it will be green.

17. Two elements P and Q belong to the same period of the Modern Periodic Table and are in Group 1 and Group 2 respectively. Compare their following characteristics in tabular form: [3]

(a) The number of electrons in their atoms

(b) The sizes of their atoms

(c) Their metallic characters

(d) Their tendencies to lose electrons

(e) The formula of their oxides

(f) The formula of their chlorides

Ans :

Comparison of characteristic properties:

	Property	P	Q
(a)	No. of electrons in the atom	3	4
		11	12
		19	20
			(any one pair)
(b)	Size of the atom	Bigger	Smaller

(c)	Metallic character	More metallic	Less metallic
(d)	Tendency to lose electrons	More	Less
(e)	Formula of oxides	P_2O	QO
(f)	Formula of chlorides	PCl	QCl_2

or

Taking the example of an element with atomic number 16, explain how the electronic configuration of the atom of an element relates to its position—group and period in the Modern Periodic Table. Also explain how the valency of an element is calculated on the basis of its atomic number. [3]

Ans :

Electronic configuration of the element with atomic number 16 = 2, 8, 6
Since it has 3 shells, the period number is 3.
Since the number of valence electrons is 6, the group number = 10 + 6 = 16
Valency of the element = (8 – valence electrons) = (8 – 6) = 2

18. How do auxins promote the growth of a tendril around a support? [3]

Ans :

Auxin is a plant hormone synthesised at the shoot tip and it helps the cells to multiply and grow longer. When a tendril comes in contact with a support, more auxin diffuses from the place of synthesis to the side of the tendril away from the support than the side in contact with the support. Due to this, the side away from the support grows faster than the side which is in contact with the support. As a result, this unequal growth leads to coiling of the tendril around the support.

19. What is meant by the feedback mechanism in human beings? Explain by giving one example. [3]

Ans :

In the human body, hormones should be released only at an appropriate time and also in precise or required amount. The mechanism by which the time and amount of hormones to be discharged into blood is controlled is termed as feedback mechanism.

Let us take an example of insulin hormone which is released by the pancreas. When the blood sugar level rises, pancreas releases insulin which lowers the glucose level of blood. Similarly when the blood sugar level is lowered, the pancreas produces less insulin.

20. Explain with an example, how each one of the following provides evidences in favour of evolution in organisms: [3]
(a) Homologous organs
(b) Analogous organs
(c) Fossils

Ans :

(a) **Homologous organs:** These organs have the same structure, but perform different functions. They help in identifying relationship between different species and suggest that they have a common ancestor.
Example: Forelimbs of a frog, lizard, bird and man.

(b) **Analogous organs:** These organs have different structures and components but perform similar functions suggesting an evolution of characteristics in various organisms.
Example: Wings of a butterfly and wings of a bat.

(c) **Fossils:** They are the preserved remains of living organisms. They provide direct evidence of change in characterisitcs of organisms that may no longer be alive.
Example: Fossils of some dinosaurs with feathers providing a connection between reptiles and birds (Avian).

or

Explain the following:
(a) Speciation
(b) Natural Selection [3]

Ans :

(a) **Speciation:** It is the evolution of a new species from pre-existing species. It may occur due to
(i) accumulation of variations;
(ii) processes like genetic drift/geographical barriers like mountains, rivers etc., leading to incapability to reproduce amongst themselves in the population.

(b) **Natural selection:** It is the selection of organisms, by nature, who are fit to live under changing environmental conditions. It occurs due to change in frequency of some genes in a population which gives survival advantage to a species from elimination.
Example - In a population of beetles, a new variation (green colour) get survival benefit, advantage over red beetles whereas other i.e. red bettle perishes.

21. What is scattering of light? Use this phenomenon to explain (a) why the clear sky appears blue and (b) the sun appears reddish at sunrise. [3]

Ans :

Scattering of Light: It is the phenomenon of spreading of light (diffused reflected light) caused by minute particles (dust, smoke, etc.) in the atmosphere.
(a) Sky appears blue because blue colour of sunlight scatters more (due to shorter wavelength) than the red colour by the fine particles in the air.
(b) At sunrise, the blue colour of the sunlight get scattered due to shorter wavelength while passing through the thicker layers of the atmosphere. The red colour (due to longer wavelength) reaches us, giving red appearance of the Sun.

22. Suppose you have a circular loop of copper wire through which a current flows clockwise. If this loop is lying on a table, draw the pattern of magnetic field lines of this current carrying loop. State the rule you can apply to determine the direction of the field lines in this case. [3]

Ans :

The direction of the magnetic field inside and outside the loop is determined by right hand thumb rule as shown in the figure below. Since the current is flowing clockwise through the loop, the front face of the loop is the south pole and back face (the face touching the table) is the north pole.
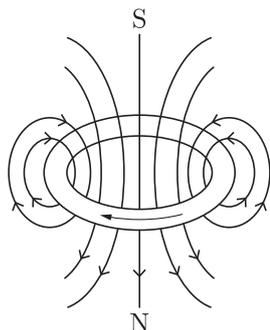
23. Explain the function of fuse in a domestic electric circuit. An electric oven having power rating 2000 W, 220 V is used in an electric circuit, having a fuse of 5 A rating. What is likely to happen when the oven is switched on? Explain. [3]

Ans :

The function of fuse is to protect the domestic circuits and the electrical appliances from the damage due to high current. It works on the principle of heating effect of the current. It easily melts due to overheating and breaks the circuit when excessive current passes through it.

Here,   Power (P) = 2000 W;

     Potential difference (V) = 220 V; I = ?

As   P = VI

or $I = \dfrac{P}{V}$

                 $= \dfrac{2000\text{ W}}{220\text{ V}} = 9.09\text{ A}$

Now as given, the fuse wire has a capacity of bearing current only up to 5 A, therefore it will melt when the oven is switched on.

or

What is the role of fuse used in series with an electrical appliance? Why should a fuse with defined rating not be replaced by one with a larger rating? [3]

Ans :

1. Fuse, a protecting device, is used to protect electrical appliances from higher current due to overloading or short circuiting.
2. A well-defined fuse is rated for a certain maximum current and blows off when a current more than the rated value flows through it. If a fuse is replaced by one with larger rating, the appliance may get damaged due to larger current passing through it, since the protecting fuse will not blow off.

24. (a) Why are solar heating devices painted black?
(b) Name two solar devices and state two limitations of each of these devices. [3]

Ans :

(a) The solar heating devices are painted black in order to increase the absorption of heat.
(b) Solar cookers and solar heaters are solar heating devices.

Limitations of solar heating devices:
(i) These cannot be used on a cloudy day.
(ii) The direction of the solar heating device has to be changed from time to time with the changing position of the sun.

Section C

25. (a) Name the gas which is liberated when an acid reacts with a metal. How will you test the presence of this gas?
(b) Write the chemical equation for the reaction of zinc metal with
  (i) hydrochloric acid
  (ii) sodium hydroxide
  State the chemical name of the salts obtained in each case.
(c) Identify the acid and base for ammonium chloride salt. What would be the nature of this salt? Mention the pH range of this salt. [5]
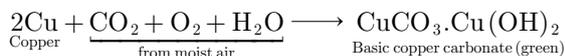
Ans :

(a) (i) Hydrogen gas is liberated when an acid reacts with a metal.
  (ii) The presence of hydrogen could be detected by holding a lit matchstick just above the test tube when the gas bubbles are rising and coming out of the solution. The hydrogen gas burns with a pop sound.
(b) (i) $Zn(s) + 2HCl(aq) \longrightarrow ZnCl_2(aq) + H_2(g)$
  (ii) $Zn(s) + 2NaOH(aq) \longrightarrow Na_2ZnO_2 + H_2(g)$
  The chemical names of salts obtained are (a) zinc chloride $(ZnCl_2)$ and (b) sodium zincate (Na_2ZnO_2).
(c) Ammonium chloride salt is made from ammonium hydroxide (NH_4OH), a weak base and hydrochloric acid (HCl) a strong acid. The nature of this salt is acidic.
  pH range: 4.6 to 6.0

or

(a) What is corrosion of metals? Name a metal which does not corrode and the one which corrodes when exposed to the atmosphere.
(b) Metal M reacts with oxygen to form metallic oxide (MO). This oxide reacts with moisture and carbon dioxide of the atmosphere to form a basic carbonate. Metal M prevents rusting of iron. Identify the metal M and explain how does it prevent rusting of iron. [5]

Ans :

(a) The process of slow wearing away of metals due to their conversion into oxides, carbonates and sulphides, sulphates etc., by the action of atmospheric gas and moisture is called corrosion. Metals which are placed at the top in the activity series corrode easily, e.g. potassium, aluminium etc. and the metals placed at the bottom of activity series like gold and platinum do not corrode easily.
(b) Since the metal M forms the oxide MO, therefore the metal (M) is divalent.
  The metal (M) forms the basic carbonate when exposed to moisture and carbon dioxide, therefore, it must be copper.

$$\underset{\text{Copper}}{2Cu} + \underset{\text{from moist air}}{\underline{CO_2 + O_2 + H_2O}} \longrightarrow \underset{\text{Basic copper carbonate (green)}}{CuCO_3.Cu(OH)_2}$$

Since copper is less electro-positive than iron, so when iron is covered with a thin layer of copper, it gets prevented from rusting.

26. Both soap and detergent are some type of salts. What is the difference between them? Describe in brief the cleansing action of soap. Why do soaps not form lather in hard water? List two problems that arise due to the use of detergents instead of soaps. [5]

Ans :

1. Soaps are sodium or potassium salts of long chain carboxylic acids, while detergents are ammonium or sulphonate salts of long chain carboxylic acids.

2. **Cleansing action of soap:** One part of soap molecule is ionic/hydrophilic and dissolves in water. The other part is non-ionic/carbon chain/ hydrophobic part which dissolves in oil. Thus the soap molecules arrange themselves in the form of a micelle. On rinsing with water, soap is washed off, lifting the oily dirt particles with it.
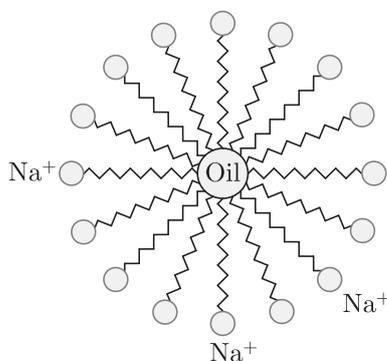

3. Soaps do not form lather in hard water because of their reaction with Ca and Mg ions present in hard water, which form insoluble precipitate called scum.

4. Problems due to the use of detergents:
   (a) Detergents are non-biodegradable (do not easily decompose).
   (b) Use of detergents leads to water and soil pollution.
   (c) Detergents can also cause skin problems. (Any two)

27. (a) Draw a neat diagram of cross-section of human heart. Name and label the following on the diagram:
   (i) structure/part that divides heart into right and left halves and prevents mixing of oxygenated and deoxygenated blood;
   (ii) the main artery that carries blood away from the heart;
   (iii) chamber that receives deoxygenated blood from various parts of the body;
   (iv) chamber from where oxygenated blood is pumped out to various parts of the body.
   (b) Write the function of valves present in between atria and ventricles.
   (c) Write one structural difference between the composition of artery and veins. [5]

Ans :

(a) Diagram of cross-section of Human Heart
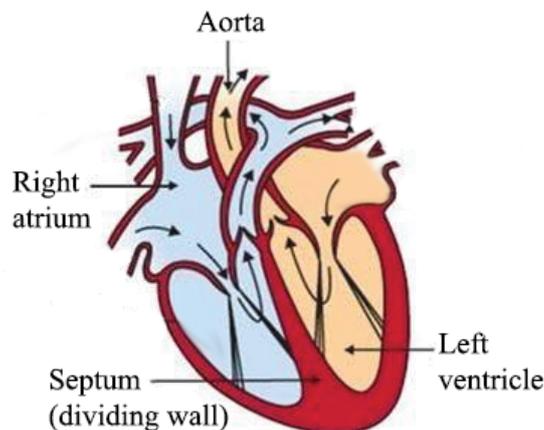
(i) Septum (ii) Aorta (iii) Right atrium (iv) Left ventricle
(b) Valves prevent the back flow of blood.
(c) Artery is thick walled and vein is thin-walled. Valves are present in the veins and not in arteries.

28. (a) Name the human male reproductive organ that produces sperms and also secretes a hormone. Write the functions of the secreted hormone.
   (b) Name the parts of the human female reproductive system where
   (i) fertilization takes place;
   (ii) implantation of the fertilized egg occurs.
   (c) What happens when egg is not fertilised? [5]

Ans :

(a) Testis – secretes sperms and male hormone testosterone.
   Functions of the hormone testosterone:
   (i) Formation of sperms
   (ii) Development of secondary sexual characters
(b) (i) Fallopian tube (oviduct)
   (ii) Uterus
(c) If the egg is not fertilised, the uterine wall ruptures and the egg is shedded off along with blood and mucous.

or

Draw a labelled diagram of the longitudinal section of a flower exhibiting germination of pollen on stigma and write the function of (a) stigma, (b) pollen tube and (c) female germ cell. [5]

Ans :

1. Diagram of longitudinal section of a flower exhibiting germination of pollen on stigma
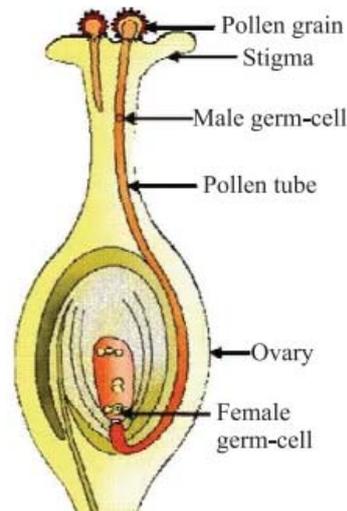
2. Function of :
  (a) stigma : To receive pollen grains
  (b) pollen tube : To grow within the style and reach the ovary
  (c) female germ cell : To help in the formation of zygote.

29. One half of a convex lens of focal length 10 cm is covered with a black paper. Can such a lens produce a complete image of an object placed at a distance of 24 cm from the lens? Draw a ray diagram to justify your answer. [5]

A 4 cm tall object is placed perpendicular to the principal axis of a convex lens of focal length 20 cm. The distance of the object from the lens is 15 cm. Find the nature, position and size of the image.

Ans :

1. Yes, the image formed by such a lens is always complete.
2. Ray diagram
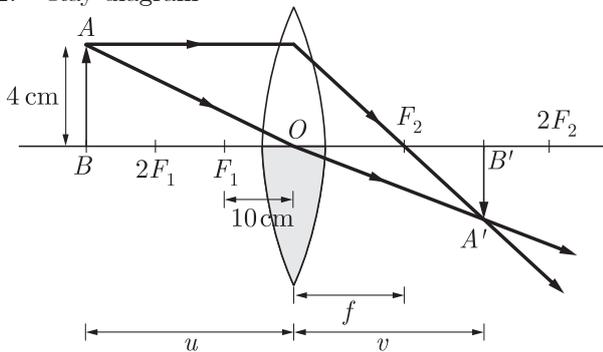
3. Here,

$$h_o = 4 \text{ cm};$$
$$f = +20 \text{ cm};$$
$$u = -15 \text{ cm};$$
$$v = ?;$$
$$h_i = ?$$

Using the lens formula, $\dfrac{1}{v} = \dfrac{1}{f} + \dfrac{1}{u}$;

we have $\dfrac{1}{v} = \dfrac{1}{f} + \dfrac{1}{u} = \dfrac{1}{(+20 \text{ cm})} + \dfrac{1}{(-15 \text{ cm})}$

$$= \dfrac{3-4}{60 \text{ cm}} = \dfrac{-1}{60 \text{ cm}}$$

$\therefore$ $v = -60$ cm (–ve sign of v suggests that the image is on the same side of the lens as the object, hence it is virtual).

$$h_i = \dfrac{v}{u} \times h_o = \dfrac{-60 \text{ cm}}{-15 \text{ cm}} \times (+4 \text{ cm})$$

$$= +16 \text{ cm}$$

Nature of the image: Virtual, erect, image is formed at 60 cm from the optical centre on the same side of the lens as the object is placed.

or

To construct ray diagrams, two rays of light are generally so chosen that it is easy to determine their directions after reflection from a mirror. Choose two such rays and state the path/direction of these rays after reflection from a concave mirror. Use these two rays to find the position and nature of the image of an object placed at a distance of 8 cm from a concave mirror of focal length 12 cm.

You have two lenses A and B of focal lengths +10 cm and –10 cm respectively. State the nature and power of each lens. Which of the two lenses will form a virtual and magnified image of an object placed 6 cm from the lens?

Ans :

1. The candidate may choose any two of the following rays:
  (a) A ray parallel to the principal axis, after reflection, passes through the principal focus of a concave mirror.
  (b) A ray passing through the principal focus of a concave mirror after reflection emerges parallel to the principal axis.
  (c) A ray passing through the centre of curvature of a concave mirror after reflection gets reflected back along the same path.
  (d) A ray incident obliquely to the principal axis towards the pole of a concave mirror is reflected obliquely, making equal angle with the principal axis.
  Using two rays (c) and (d), we can draw the required ray diagram as:
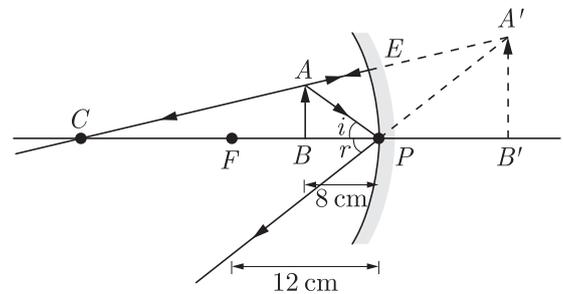
In this case a virtual and magnified image is formed behind the mirror.

2. For lens A

$$f_A = +10 \text{ cm} = 0.1 \text{ m}$$

Converging/Convex lens ($\because$ focal length is +ve)

$$P_A = \dfrac{1}{f_A} = \dfrac{1}{+0.1 \text{ m}} = +10 \text{ D}$$

3. For lens B

$$f_B = -10 \text{ cm} = -0.1 \text{ m}$$

Diverging/Concave lens ($\because$ focal length is –ve)

$$P_B = \dfrac{1}{f_B} = \dfrac{1}{-0.1 \text{ m}} = -10 \text{ D}$$

4. In this case, since the object distance is 6 cm and image formed by the lens is virtual and magnified, the object is in between the optical centre and principal focus of the lens. Hence, the convex lens, i.e. lens A of focal length +10 cm will form a virtual and magnified image of the object.

30. Find out the following in the electric circuit given in the figure.
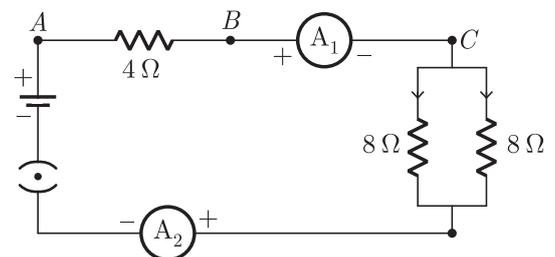
(a) Effective resistance of two $8 \, \Omega$ resistors in the combination.

(b) Current flowing through $4\,\Omega$ resistor.
(c) Potential difference across $4\,\Omega$ resistance.
(d) Power dissipated in $4\,\Omega$ resistor.
(e) Difference in ammeter readings, if any.   [5]

Ans :

(a) $R = \dfrac{R_1 R_2}{R_1 + R_2} = \dfrac{8\,\Omega \times 8\,\Omega}{8\,\Omega + 8\,\Omega} = 4\,\Omega$

(b) $I = \dfrac{8\,\text{V}}{4} = 1\,\text{A}$

(c) Potential difference across $4\,\Omega$ resistor $= 4\,\Omega \times 1\,\text{A} = 4\,\text{V}$

(d) Power dissipated $= I^2 R = (1\,\text{A})^2 \times 4\,\Omega = 4\,\text{W}$

(e) No difference in the readings of ammeter A_1 and ammeter A_2.

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