

SAMPLE PAPER

SUBJECT : SCIENCE 'THEORY' (X)

M.M. : 60

TIME : 2½ HRS

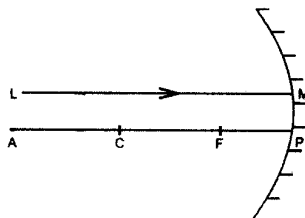
GENERAL INSTRUCTIONS :

1. The question paper comprises of two sections A and B. You have to attempt both the sections.
2. All questions are compulsory.
3. There is no overall choice. However, internal choice has been provided in all the three questions of five marks category. Only one option in such questions is to be attempted.
4. All questions of section A and all questions of section B to be attempted separately.
5. Questions 1 to 6 in section A and 19 to 21 in section B are very short answer questions. These carry one mark each.
6. Questions 7 to 12 in section A and 22 to 24 in section B are short answer type questions and carry two marks each.
7. Questions 13 to 16 in section A and 25 to 26 in section B are also short answer type questions and carry three marks each.
8. Questions 17 and 18 in section A and questions 27 in section B are long answer type questions and carry five marks each.

Section–A

Q.1 Sketch magnetic field lines around a current carry straight conductor.

Q.2 A ray of light LM is incident on a mirror as shown in the figure. The angle of incidence for this ray is the angle between it and the line joining two other points in the figure. Name these two points.



Q.3 The following table gives the values of refractive indices of a few media.

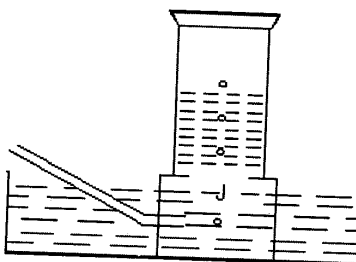
S.No	1	2	3	4	5
Medium	Water	Crown Glass	Rock Salt	Ruby	Diamond
Refractive Index	1.33	1.52	1.54	1.71	2.42

Use this table to give an example of a medium pair so that light speeds up when it goes from one of these media to another.

Q.4 Generally alloys are used in electrical heating devices instead of pure metals. What could be the reason ?

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- Q.5** Tap water conducts electricity whereas distilled water does not. Why ?
- Q.6** Identify the substance oxidized in the chemical reaction.
$$\text{MnO}_2 + 4\text{HCl} \rightarrow \text{MnCl}_2 + \text{Cl}_2 + 2\text{H}_2\text{O}$$
- Q.7** A household uses the following electric appliances :
- (i) Refrigerator of rating 400 W for ten hours each day.
 - (ii) Two electric fans of rating 80 W each for twelve hours each day.
 - (iii) Six electric tubes of rating 18 W each for 6 hours each day.
- Calculate the electricity bill of the household for the month of June if the cost per unit of electric energy is Rs. 3.00
- Q.8** What is meant by the term " frequency' of an alternating current ? What is its value in India ? Why is an alternating current considered to be advantageous over direct current for long range transmission of electric energy ?
- Q.9** Out of two solar cookers, one was covered with a plane glass slab and the other was left open. Which of the two solar cookers will be more efficient and why ?
- Q.10** State two criteria each in the selection of each of the following:
- (i) Good fuel
 - (ii) Good source of energy
- Q.11** A metal is treated with dilute sulphuric acid. The gas evolved is collected by the method shown in the figure. Answer the following



- (a) (i) Name the gas.
 - (ii) Name the method of collection of the gas
- (b) How can you test whether the gas is combustible or not ?
- Q.12** What is meant by reactivity series of metals ? State which of the following chemical reactions will take place giving suitable reason for each.
- $$\text{Zn (s)} + \text{CuSO}_4 \text{ (aq)} \rightarrow \text{ZnSO}_4 \text{ (aq)} + \text{Cu(s)}$$
- $$\text{Fe (s)} + \text{ZnSO}_4 \text{ (aq)} \rightarrow \text{FeSO}_4 \text{ (aq)} + \text{Zn(s)}$$
- $$\text{Zn (s)} + \text{FeSO}_4 \text{ (aq)} \rightarrow \text{ZnSO}_4 \text{ (aq)} + \text{Fe(s)}$$
- Q.13** (i) A concave mirror produces three times enlarged image of an object placed at 10 cm in front of it. Calculate the focal length of the mirror.
- (ii) Show the formation of the image with the help of a ray diagram when the object is placed 6 cm away from the pole of the mirror.

- Q.14** (a) How does the atomic radius change as you go
 (i) From left to right in a period ?
 (ii) Down a group in the periodic table
 (b) Two elements X and Y have atomic numbers 12 and 16 respectively. Write the electronic configuration for these elements. To which period of the modern periodic table do these two elements belong ? What type of bond will be formed between them and why?

Or

- (a) How would the tendency to lose electrons change as you go
 (i) From left to right across a period
 (ii) Down a group
 (b) An element X (2, 8) combines separately with $(\text{NO}_3)^{1-}$, $(\text{SO}_4)^{2-}$, and $(\text{PO}_4)^{3-}$ radicals. Write the formulae of the three compounds so formed. To which group of the periodic table does the element 'X' belong ? Will it form covalent or ionic compound ? Why ?
- Q.15** (a) Two lenses have power of (i) + 2D (ii) – 4D. What is the nature and focal length of each lens ?
 (b) An object is kept at a distance of 100 cm from each of the above lenses. Calculate the (i) image distance (ii) magnification in each of the two cases.

Q.16 Answer the following

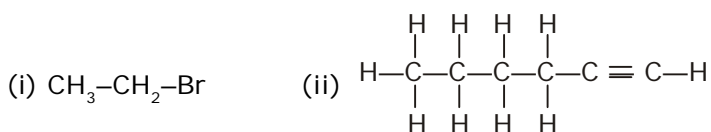
- (a) Why is formula of Plaster of Paris written as $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$? How is it possible to have half a water molecule attached to CaSO_4 ?
 (b) Why is Sodium Hydrogen Carbonate an essential ingredient in most antacids ?
 (c) When electricity is passed through an aqueous solution of sodium chloride, three products are obtained. Why is the process called chlor-alkali process ?

Q.17 An organic compound 'A' is widely used as a preservative in pickles and has a molecular formula $\text{C}_2\text{H}_2\text{O}_2$. This compound reacts with ethanol to form a sweet smelling compound 'B'

- (i) Identify the compound 'A'
 (ii) Write the chemical equation for its reaction with ethanol to form compound 'B'.
 (iii) How can we get compound 'A' back from 'B' ?
 (iv) Name the process and write corresponding chemical equation.
 (v) Which gas is produced when compound 'A' reacts with washing soda ?
 Write the chemical equation.

Or

- (a) Why does carbon form largest number of compounds ? Give two reasons.
 (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 compounds



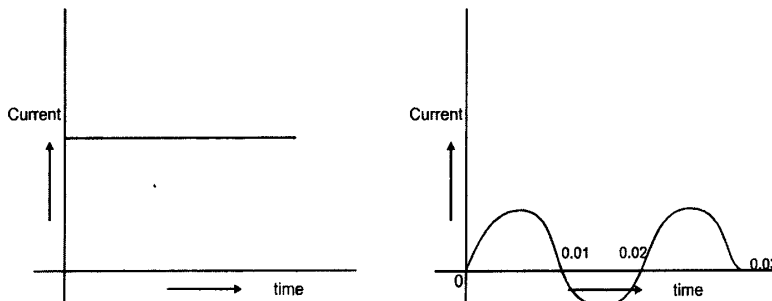
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Q.18 In a household electric circuit different appliances are connected in parallel to one another. Give two reasons.

An electrician puts a fuse of rating 5A in that part of domestic electrical circuit in which an electrical heater of rating 1.5kW, 220 V is operating. What is likely to happen in this case and why ? What change, if any, needs to be made ?

Or

You are given following current-time graphs from two different sources :



- Name the type of current in two cases.
- Identify any one source for each type of these currents.
- What is the frequency of current in case II in India ?
- Use above graphs to write two difference between the current in two cases.
- What is the advantage of AC over DC ?

Section-B

Q.19 What will be the impact on ecosystems if Bacteria, fungi/microorganism are remove from the environment ?

Q.20 Why do aquatic animals breath faster that the terrestrial animals ?

Q.21 The human hand, cat paw and the horse foot, when studied in detail show the same structure of bones and point towards a common origin.

- What do you conclude from this ?
- What is the term given to such structures ?

Q.22 Write one feature which is common to each of the following pairs of terms/ organs

- | | |
|-------------------------|---------------------------------|
| (i) Glycogen and starch | (ii) Chlorophyll and hemoglobin |
| (iii) Gills and lungs | (iv) Arteries and veins |

Q.23 From the set of figures given below, make a pair of homologous and analogous organs each and give one reason in case of both, to justify your answer.



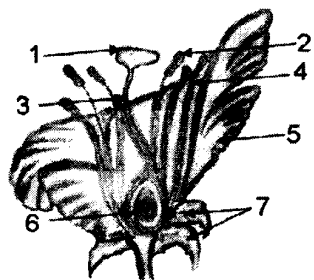
Human forelimb



Bat Wing



Bird Wing

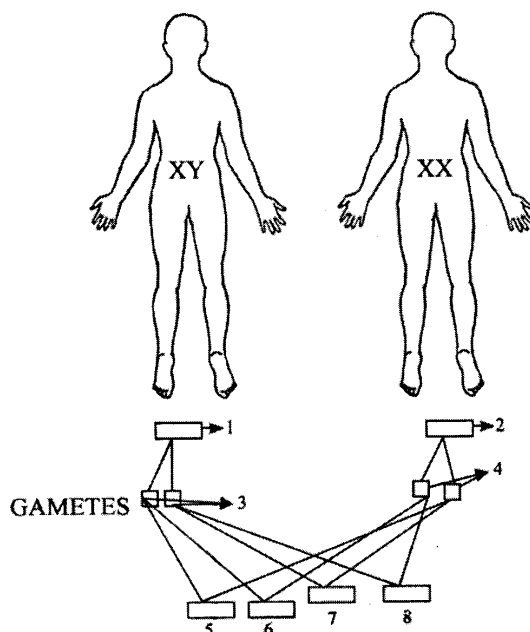


Q.24

(i) Label any four parts.

Q.25 Mrs. Joshi is a house wife and wants to contribute for conservation of natural resources. List any six activities that she can do on her own.

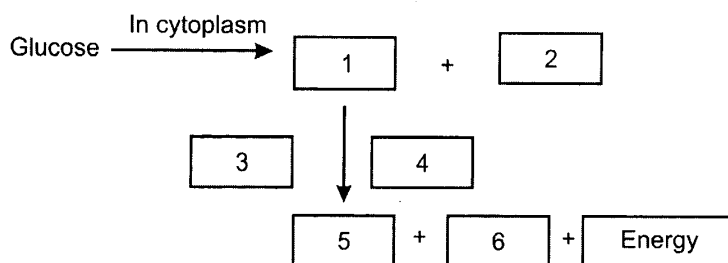
Q.26 Identify male and female in the figures given below. Also fill in the blanks 3 to 8 and then clarify about the misconception that mother and not father is responsible for bearing daughters and not sons.



Q.27 Plants absorb water from the soil. How does this water reach the tree tops ? Explain in detail.

Or

Complete the glucose breakdown pathway in case of aerobic respiration by filling the blanks.

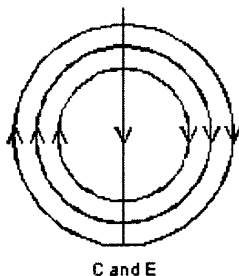


(a) Name the molecule in the cell which stores the energy produced at the end of the path way.

(b) Why do we get cramps during sudden muscular activity ?

SOLUTIONS

Section–A



Sol.1

Sol.2 M and C

Sol.3 Any pair of media from higher refractive index to lower refractive index say medium 2 to 1.

Sol.4 Alloys have high melting point/do not oxidize (burn) readily at high temperature.

Sol.5 Tap water contains dissolved salts and minerals which ionise in water and hence conducts electricity. Distilled water is a covalent compound so it does not conduct electricity.

Sol.6 HCl is oxidized

Sol.7 Electric Energy consumed per day
 $= 400 \times 10 + 2 \times 80 \times 12 + 6 \times 18 \times 6$
 $= 6568 \text{ wh}$

Total Energy per month $= \frac{6568 \times 30}{1000} = 197.040 \text{ kWh}$

Total Cost $= 197.040 \times 3 = \text{Rs } 591 \text{ (Approx)}$

Sol.8 The frequency of an alternating current is the no. of times the direction of electric current changes in one second. 50 cycles/second

At very high voltage, the transmission losses are minimized. At the receiving station, the voltage is stepped down for use.

Sol.9 The solar cooker with the glass slab : as the heat gets trapped within the cooker and the temperature of the cooker rises. It rises more than the uncovered cooker/green house effect.

Sol.10(i) Good Fuel :

- (1) High amount of heat released on combustion.
- (2) Easily available
- (3) Produces less smoke (Any two)

(ii) Good source of energy :

- (1) Easily accessible
- (2) Easy to store and transport
- (3) High efficiency. (Any two)

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Sol.11 (a) (i) The gas is hydrogen.

(ii) The method is downward displacement of water.

(b) By bringing a burning splinter near the mouth of the gas jar filled with the gas, if the gas burns with a flame, it is combustible.

Sol.12 Reactivity series is a list of metals arranged in the order of their decreasing activities

(a) Reaction will take place because Zn is above Cu in the activity series

(b) Reaction will not take place as Fe is below Zn in the activity series and cannot displace Zn from its compound.

Sol.13 (i) $\frac{1}{v} = \frac{1}{u} = \frac{1}{f}$

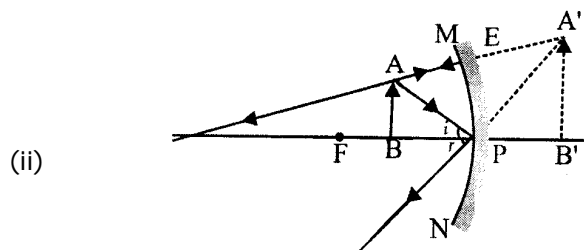
$$\frac{-v}{-u} = 3$$

$$\frac{1}{-30} + \frac{1}{-10} = \frac{1}{f}$$

$$\frac{-1 - 30}{30} = \frac{1}{f}$$

$$\frac{-4}{30} = \frac{1}{f}$$

$$f = \frac{30}{4} = \frac{-15}{2} \text{ cm} = 7.5 \text{ cm}$$



Sol.14 (a) (i) Atomic radius decreases

(ii) Atomic radius increases

(b) Atomic number

X, Z = 12 2, 8, 2

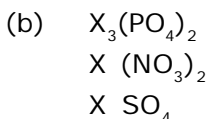
Y, Z = 16 2, 8, 6

They belong to the third period.

They will form ionic bond because X is a metal and Y is a non-metal. X loses 2 electrons which will be gained by Y.

Or

- (a) (i) Tendency to lose electrons decreases
(ii) Increases



X belongs to Group II in the periodic table.

It will form ionic compounds because it will readily lose 2 electrons.

- Sol.15** (a) (i) + 50cm, convex lens
(ii) – 25cm, concave lens

(b) (i) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$v = + 100 \text{ cm}, m = 1$

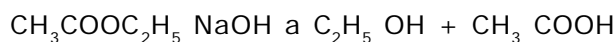
(ii) $\frac{1}{v} - \frac{1}{u} = \frac{1}{f}$

$v = - 20\text{cm}, m = \frac{+1}{5}$

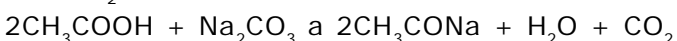
- Sol.16** (a) It is written in this form because two formula units of $CaSO_4$ share one molecule of water.
 (b) Being alkaline, it neutralizes excess acid in the stomach and provides relief.
 (c) Because of the products formed (Sodium hydroxide, chlorine and hydrogen) Chlor stands for chlorine and alkali stands for sodium hydroxide.

- Sol.17** (i) Ethanoic acid/Acetic acid
 (ii) $CH_3COOH + C_2H_5OH \rightarrow CH_3COOC_2H_5 + H_2O$

(iii) Saponification



(iv) CO_2 GAS



Or

- (a) Due to the property of Catenation. Carbon has unique property to form bonds with other carbon atoms.
 (b) Saturated compounds are those in which all the valencies of carbon atoms are satisfied by single bond between them.
 In unsaturated compounds, the valency per carbon atom remains unsatisfied. Thus there is a double bond between carbon atoms.
 (c) Unsaturated hydrocarbon
 (d) (i) Bromoethane
 (ii) Hexyne

- Sol.18** (i) The appliances can be operated independently
(ii) They get the same applied voltage

The fuse will not blow off even if the current in these devices were to exceed their safe current value.

This could damage these devices and even cause fire.

Any fuse of lower amperage needs to put in the circuit.

Or

- (i) I : Direct current ; II : Alternating current
(ii) I : Dry cell ; II : Alternating current generator
(iii) I : Zero ; II : 50 cycles per second
(iv) I : Direction remains constant and value of current remains same.
II : In case of AC both the value as well as the direction of the current changes.
(v) Power can be transmitted over long distances without much loss of energy.

Section–B

Sol.19 Complex organic molecules will not breakdown in to simple inorganic substances, Preventing replenishment of soil.

Sol.20 Because the dissolved oxygen is fairly low in water compared to the amount of oxygen in the air.

Sol.21 (i) In course of evolution they have modified to perform different function.
(ii) Homologous organ.

Sol.22 (i) Carbohydrates/storage products
(ii) Pigments/found in living organisms.
(iii) Respiratory organs/for exchange of gases.
(iv) Vessels (blood) part of the circulatory system.

Sol.23 Bird wing and Bat wing–Analogous,
Structures different but functions same,
Human forelimb and Bird wing-Homologous,
structure same but functions different.

Sol.24 1. Stigma 2. Anther 3. Style 4. Filament 5. Petal 6. Ovary
7. Sepal(any 4)

Sol.25 1. Using solar cooker
2. Collecting waste separately
3. Using public transport
4. Using CFL
5. Avoid using lift or AC
6. Getting leaking taps repaired immediately
7. Use of pressure cooker
8. Switching off engine at traffic light (any other suitable examples).

Sol.26 1. Male 2. Female 3. X and Y 4. X and X 5. XX 6. XX 7. XY 8. XY

A child who inherits 'X' chromosome from father will be a girl and the one who inherits 'Y' chromosome from father will be a boy.

Sol.27 Xylem (vessels) of roots, stems and leaves are interconnected to form a continuous column. Roots also take up mineral salts actively, water moves in as a result creating pressure-the root pressure that pushes the water up. Stomatal transpiration creates suction force, pulling up the water from root xylem/transpiration pull.

Or

1. Pyruvate (3 carbon molecules)
 2. Energy
 3. Presence of oxygen
 4. In mitochondria
 5. Carbon dioxide
 6. Water
- (a). ATP
- (b) Lactic acid accumulation, in the absence of oxygen (anaerobic respiration)