



Grade X  
Science  
SET B

Time allowed: 3 Hours  
Maximum Marks: 80

**General Instructions:**

- i. This question paper consists of 39 questions in 5 sections.
- ii. All questions are compulsory. However, an internal choice is provided in some questions. A student is expected to attempt only one of these questions.
- iii. Section A consists of 20 objective type questions carrying 1 mark each.
- iv. Section B consists of 6 Very Short questions carrying 02 marks each. Answers to these questions should be in the range of 30 to 50 words.
- v. Section C consists of 7 Short Answer type questions carrying 03 marks each. Answers to these questions should be in the range of 50 to 80 words.
- vi. Section D consists of 3 Long Answer type questions carrying 05 marks each. Answer to these questions should be in the range of 80 to 120 words.
- vii. Section E consists of 3 source-based/case-based units of assessment of 04 marks each with sub-parts.

**Section A**

- Q.1 Composition of solder is  
a. Pb-Sn                      b. Pb-Cu                      c. Cu-Sn                      d. Cu-Zn
- Q.2 A Metal ribbon 'X' burns in oxygen with a dazzling white flame forming a white ash 'Y'. The correct description of X,Y and the type of reaction is :  
a. X=Ca ; Y = CaO; Type of reaction = Decomposition  
b. X=Mg; Y = MgO; Type of reaction = Combination  
c. X=Al ; Y = Al<sub>2</sub>O<sub>3</sub>; Type of reaction = Thermal Decomposition  
d. X=Zn ; Y = ZnO; Type of reaction = Endothermic Decomposition
- Q.3 Solutions A,B,C,D have pH 3,4,6,8. The solution with the highest acidic strength is  
a. A                      b. B                      c. C                      d. D
- Q.4 The name of the salt used to remove permanent hardness of water is :  
a. Sodium hydrogen Carbonate (NaHCO<sub>3</sub>)  
b. Sodium Chloride (NaCl)  
c. Sodium Carbonate decahydrate (Na<sub>2</sub>CO<sub>3</sub>. 10H<sub>2</sub>O)  
d. Calcium Sulphate hemihydrate (CaSO<sub>4</sub>. 1/2H<sub>2</sub>O)
- Q.5 When aqueous solutions of potassium iodide and lead nitrate are mixed, an insoluble substance separates out. The chemical equation for the reaction involved is :  
a.  $2KI + 2PbNO_3 \longrightarrow PbI + KNO_3$   
b.  $2KI + Pb(NO_3)_2 \longrightarrow PbI_2 + 2KNO_3$   
c.  $2KI + Pb(NO_3)_2 \longrightarrow 2PbI + KNO_3$   
d.  $2KI + PbNO_3 \longrightarrow PbI_2 + KNO_3$

Q.6 The third member of Alkyne series is  
 a. Butyne                      b. Propyne                      c. Ethyne                      d. Hexyne

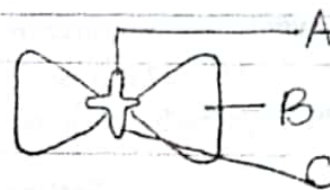
Q.7 The functional group -CHO is called  
 a. Carboxylic acid                      b. Ketone                      c. Aldehyde                      d. Alcohol

Q.8 Wall of small intestine is adapted to absorb food because  
 a. It is richly supplied with blood capillaries  
 b. It has finger like structures called villi  
 c. It has very fine surface for substances to pass through  
 d. All of the above

Q.9 Receptors are usually located in sense organs. Photo receptors are present in  
 a. Tongue                      b. nose                      c. eye                      d. ear

Q.10 The correct sequence of reproductive stages are seen in the flowering plants

- a. gametes, zygote, embryo, seedling
- b. zygote, gamete, embryo, seedling
- c. seedling, zygote, gamete, embryo
- d. gamete, embryo seedling, zygote



Q.11 Variations form basis of evolution. These are created due to which reasons:-

- (i) Accumulated variation over generations
- (ii) Certain traits are higher in number
- (iii) Crossing over chromosomes during fertilization
- (iv) Some traits are dominant others are recessive

- a. both (i) and (ii)
- b. both (i) and (iv)
- c. both (i) and (iii)
- d. both (ii) and (iii)

Q.12 Study the table given below and select the row that has the incorrect information

		Aerobic	Anaerobic
a)	location	Cytoplasm	Mitochondria
b)	End product	CO <sub>2</sub> and H <sub>2</sub> O	Ethanol
c)	Amount of ATP	High	Low
d)	Oxygen	Needed	Not Needed

Q.13 To get an image larger than the object, one can use -

- a) A convex mirror but not a convex lens
- b) A concave mirror and a convex lens
- c) A concave mirror and a concave lens
- d) A convex lens and a concave lens

Q.14 The combination responsible for admitting different amounts of light into the eye is -

- a) Iris and pupil
- b) Ciliary muscles and pupil
- c) Rods and cones
- d) Ciliary muscles and the crystalline lens

Q.15 What will happen if the deer are missing in the following food chain?

GRASS → DEER → TIGER

- a. The population of tigers will increase
- b. The amount of grass will decrease
- c. The tigers will die
- d. The tigers will start eating grass

Q.16 The decomposers in an ecosystem

- a. Convert inorganic compounds into simple compounds
- b. Convert organic material to inorganic form
- c. Convert inorganic material into organic compounds
- d. Do not breakdown organic compounds

Question No. 17 to 20 consist of two statements – Assertion (A) and Reason (R). Answer these questions selecting the appropriate option given below:

- a) Both A and R are true, and R is the correct explanation of A.
- b) Both A and R are true, and R is not the correct explanation of A.
- c) A is true but R is false.
- d) A is false but R is true.

Q.17 **Assertion:** Aluminium Oxide is an acidic and neutral oxide.  
**Reason:** It reacts with both acid and base to produce salt and water.

Q.18 **Assertion (A):** A geneticist crossed a pea plant having violet flowers with pea plant having white flowers, he got all violet flowers in first generation  
**Reason ( R):** White colour gene is not expressed in the next generation

Q.19 **Assertion:** The fuse is placed in series to the devices/appliances.  
**Reason:** Fuse protects devices /appliances by stopping the flow of unduly high electric current.

Q.20 **Assertion (A):** Food chain is responsible for the concentration of harmful chemicals in our body  
**Reason ( R ):** The length and complexity of food chains vary greatly

### Section B

Q.21 Adya added dilute hydrochloric acid four metals and recorded observations in a table given below

	Metal	Gas evolved
a.	Copper	Yes
b.	Iron	Yes
c.	Magnesium	No
d.	Zinc	Yes

State the correct observation(s) and give balanced chemical equation(s) of the reaction(s) involved.

Q.22

Name the following :-

- a. the kind of respiration that takes place in muscle cells in case of sudden vigorous exercise
- b. the chemical which is produced in the muscles after sudden vigorous exercise and causes pain.
- c. an organ in lungs where exchange of gases takes place this structure helps the trachea from collapsing during breathing.

Q.23

Give one reason for:-

- a. Ventricles have thicker muscular walls as compared to atria.
- b. Rate of breathing in aquatic organisms is much faster than in the terrestrial organisms

OR

Give one reason for :-

- a. In desert plants stomata are closed during the day to conserve water. How will photosynthesis take place in such plants? Explain.
- b. Large air spaces are present between the cells of a leaf. Why?

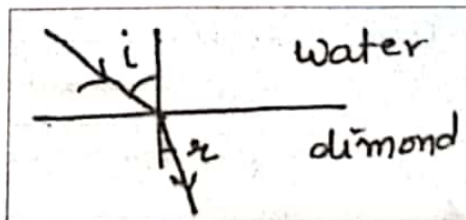
Q.24

The refractive indices of the following transparent materials are given below in the table.

Based on the data answer the following questions.

S. No.	Medium	Refractive index
1.	Water	1.33
2.	Kerosene	1.41
3.	Crown Glass	1.50
4.	Diamond	2.42

- a) Name the pair of medium for which light ray will refract least.
- b) If light ray goes from water to diamond. What is the numeric value of the ratio of velocity of light in water to the velocity of light in diamond?



Q.25

Plot the pattern of the magnetic field lines produced by a current carrying circular loop carrying current  $I$  in the anti-clockwise direction. Name any two methods to increase magnetic field on the centre of a current loop.

OR

$\mu$  In a horizontal wire; 5A current is flowing from West to East direction. What is the direction of magnetic field produced by the current carrying wire at any point P; at a distance of 2m below the wire? Name the law which you used to know the direction of magnetic field.

Q.26 In the following food chain, 100 J is available to the lion. How much energy was available to the producers and deer?

Plants  $\rightarrow$  Deer  $\rightarrow$  Lion

### Section C

Q.27 Compound X decomposes to form compound Y and  $\text{CO}_2$  Gas. Compound Y is used for manufacture of Cement.

- Name the compounds X & Y
- Write Chemical equations for this reaction
- Give a chemical test to identify  $\text{CO}_2$  gas



- Q.28
- Name two metals which evolve hydrogen gas on reaction with dilute nitric acid.
  - What happens when iron is added to a solution of zinc sulphate .
  - Define galvanization. Give its benefit in prevention of corrosion.

OR

- During metal extraction, the metal sulphides and carbonates are converted into oxides. Give reason.
- Write balanced chemical equations occurring during roasting and calcination of zinc ores.

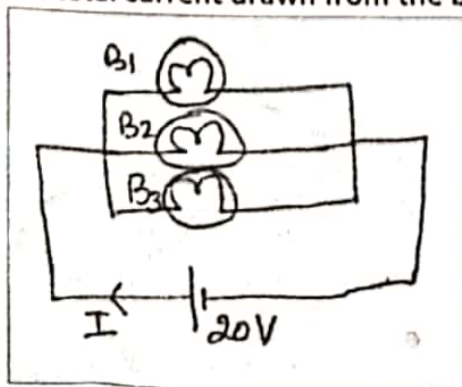
Q.29 Why is chemical co ordination considered better than electrical ( nervous) means of communication between cells in a multicellular organism? Give at least three points.

- Q.30
- Give two difference between homozygous traits and heterozygous traits.
  - State the law of dominance given by Mendel?
  - What is the phenotypè and genotype ratio of monohybrid cross.

- Q.31
- What is hypermetropia?
  - Write any two causes of the hypermetropia.
  - With the suitable ray diagram explain how hypermetropia is corrected.

- Q.32
- A wire of given material having length L and area of cross- section A has a resistance of  $16\Omega$ . What would be the resistance of another wire of same material having length L/4 and area of cross – section 2A?
  - Why alloys are commonly used as filament in designing of heating elements while copper and aluminum wires are used for electrical power transmission.

Q.33 Three identical bulbs of rating (40W-20V) are connected in parallel with a battery of 20V .The current drawn from the battery is 6A .If one of the bulb gets fused ,what will be the total current drawn from the battery and what is resistance of a bulb?



## Section D

- Q.34
- Carbon prefers to share its valence electrons with other atoms rather than gaining or losing electrons in order to attain noble gas configuration. Justify.
  - Draw electron dot structure of ethyne.
  - Name and draw the structure formed by soap which helps in dissolving dirt in water and washes clothes clean.
  - Write the chemical formulae of two consecutive members of homologous series having functional group -OH.
  - Write an equation when sodium is dropped in ethanol.

OR

- What happens to boiling point and solubility of organic compounds of homologous series as the molecular mass increases.
  - Write the name and draw the structure of a saturated compound having four carbon atoms.
  - Detergents are better than soaps. Justify
  - Give reason that covalent compounds are poor conductors of electricity.
  - Differentiate between saturated and unsaturated carbon compounds on the basis of their general formula.
- Q.35
- Give two functions of each (i) Medulla (ii) Hypothalamus
  - Identify the following parts of nervous system
    - a gap between two neurons
    - seat of intelligence and memory in brain
    - part of nervous system which controls involuntary actions
    - part of central nervous system which controls reflex action
  - How is communication between central nervous system and other parts of body facilitated ?

OR

- What is the future of
  - zygote in an ovary of pistil
  - embryo in a seed
  - ovule of a pistil
  - ovary of pistil
- Identify the parts of reproductive system in humans:-
  - part which carries eggs from ovary to uterus
  - special tissue which provides nourishment to the baby in the womb
  - loose fold of the skin in which testes is present.
  - long tube which delivers sperms to urethra
- Why are testes located outside the abdominal cavity?

Q.36

An object of height 2.0cm is placed on the principal axis of a concave lens at a distance of 30cm from its optical centre. If the focal length of the concave lens is also 30cm find –

- (i) The position of the image.
- (ii) Magnification produced by the lens.
- (iii) Power of lens.
- (iv) Size and nature of the image formed by lens and
- (v) Draw the ray diagram for the image so formed by concave lens.

OR

Draw ray diagrams showing the image formation of a 4.0 cm long object by a concave mirror of focal length 20 cm when it is placed-

- (a) At 30 cm from the pole of the mirror.
- (b) At 10 cm from the pole of the mirror.
- (c) Calculate the position and magnification of image for the case – (a) & (b).

### Section E

Q.37

NaCl, LiCl, CaO and K<sub>2</sub>O are ionic compounds. The transfer of electrons takes place from a metal to a non-metal. The electron transfer in such compounds is controlled by an electronic configuration of the elements involved. Each element tends to attain as completely filled valence shell of its nearest noble gas for a stable octet.

- a. Show the electron transfer in the formation of magnesium chloride.
- b. List two properties of ionic compounds
- c. (A) Name the cation and anion present in calcium chloride. Also identify the closest noble gas.

OR

- (B) Explain the conduction of electricity in ionic compounds with respect to solid, aqueous and molten states.

Q.38

Gregor Mendel (1822-1884) was an Austrian monk is considered as father of genetics. He studied inheritance patterns in a plant to give us laws of inheritance. These laws formed the basis of study of genetics in the modern world.

Answer the following question based on Mendelian laws :-

- a. Give the scientific name of the plant on which he based his experiments (No marks will be allotted for common name) *Pisum Sativum*
- b. If YYRR represents yellow and round seeds. What do yyrr and yyRR represent.
- c. In humans if gene B gives brown eyes and gene b gives blue eyes, what will be the colour of eyes of a person having combination (i) Bb (ii) bb
- d. A green stemmed rose plant denoted by GG and brown stemmed rose plant denoted by gg are crossed with each other. Answer any two of the following questions:-
  - (i) Colour of stem in F<sub>1</sub> progeny
  - (ii) Percentage of brown stemmed plants in F<sub>2</sub> generation if F<sub>1</sub> plants are self pollinated
  - (iii) Ratio of GG and Gg in F<sub>2</sub> progeny.
  - (iv) If we get 40 progenies in F<sub>2</sub> generation. How many plants in total will be brown stemmed.

Q.39

In our homes, we receive supply of electric power through a main supply known as mains, either supported by overhead electric poles or by underground cables. One of the cables usually with red insulation cover is called live wire or positive. Another wire with black insulation, is called neutral wire or negative wire. The earth wire which has green colour insulation is usually connected to a metal plate deep in the earth near the house. Answer the following questions given below-

- (i) What is potential difference between live (Red-wire) and neutral (Black-wire) wire in our country?
- (ii) Name the type of current which we receive in our houses from the mains and what is its frequency?
- (iii) What do you mean by overloading and write any two causes of overloading?

OR

- (iii) An electric oven of 1.5kW power rating is operated in a domestic electric circuit of Indian house hold that has a current rating of 5A. What result do you expect? Explain.