

**General Instructions :**

*Read the following instructions very carefully and strictly follow them :*

- (i) *The question paper comprises four sections A, B, C and D. There are 36 questions in the question paper. All questions are compulsory.*
- (ii) *Section-A - question no. 1 to 20 - all questions and parts thereof are of one mark each. These questions contain multiple choice questions (MCQs), very short answer questions and assertion - reason type questions. Answers to these should be given in one word or one sentence.*
- (iii) *Section-B - question no. 21 to 26 are short answer type questions, carrying 2 marks each. Answers to these questions should in the range of 30 to 50 words.*
- (iv) *Section-C - question no. 27 to 33 are short answer type questions, carrying 3 marks each. Answers to these questions should in the range of 50 to 80 words.*
- (v) *Section-D - question no. - 34 to 36 are long answer type questions carrying 5 marks each. Answer to these questions should be in the range of 80 to 120 words.*
- (vi) *There is no overall choice. However, internal choices have been provided in some questions. A student has to attempt only one of the alternatives in such questions.*
- (vii) *Wherever necessary, neat and properly labeled diagrams should be drawn.*

**SECTION A**

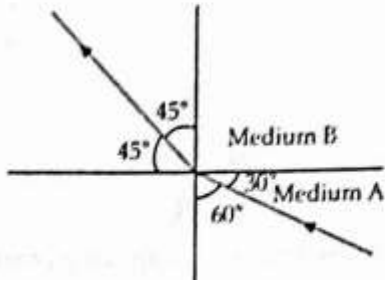
1. The atomic numbers of three elements X, Y and Z are 3, 11 and 17, respectively. State giving reason which two elements will show similar chemical properties ? 1
- [AI]** 2. Why do producers always occupy the first trophic level on every food chain ? 1
3. What would be the colour of litmus in a solution of sodium carbonate ? 1
4. Name a salt which does not contain water of crystallisation. 1
- [AI]** 5. Why is fertilization not possible without pollination ? 1
6. Which of the following reactions is an endothermic reaction ? 1
  - (a) Burning of coal.
  - (b) Decomposition of vegetable matter into compost.
  - (c) Process of respiration.
  - (d) Decomposition of calcium carbonate to form quick lime and carbon dioxide.

**OR**

Which of the following statements is not correct ?

- (a) All metal carbonates react with acid to give a salt, water and carbon dioxide.
- (b) All metal oxides react with water to give salt and acid.
- (c) Some metals react with acids to give salt and hydrogen.
- (d) Some non-metal oxides react with water to form an acid. 1

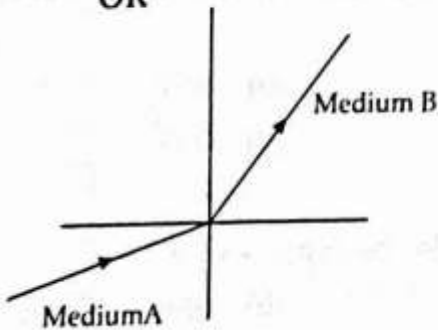
7. Figure shows a ray of light as it travels from medium A to medium B. Refractive index of the medium B relative to medium A is



(a)  $\frac{\sqrt{3}}{\sqrt{2}}$   
(c)  $\frac{1}{\sqrt{2}}$

(b)  $\frac{\sqrt{2}}{\sqrt{3}}$   
(d)  $\sqrt{2}$

OR



A light ray enters from medium A to medium B  
The refractive index of medium B relative to A will be

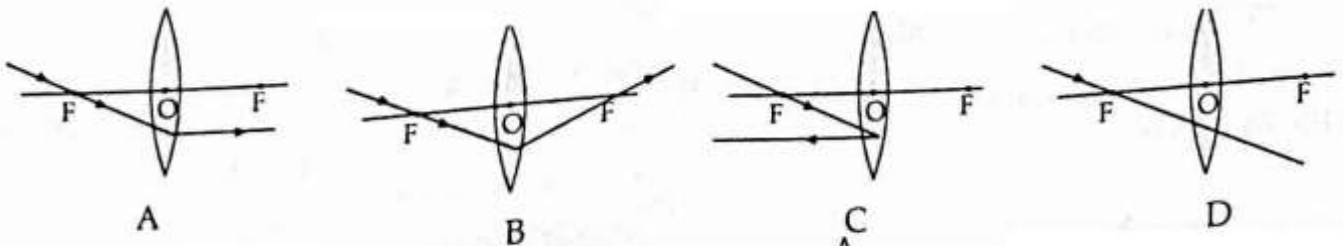
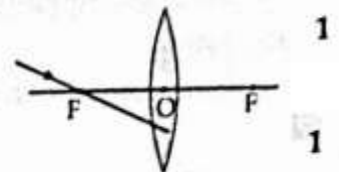
- (a) Greater than unity  
(c) Equal to unity

- (b) Less than unity  
(d) Zero

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

- (a) Plane (b) Concave  
(c) Convex (d) Either plane or convex

9. Which of the following ray diagrams is correct for the ray of light incident on a lens shown in figure ?



- (a) Fig. A (b) Fig. B (c) Fig. C (d) Fig. D

OR

Rays from sun converge at a point 15 cm in front of a concave mirror. Where should an object be placed so that size of its image is equal to the size of the object ?

- (a) 15 cm in front of the mirror (c) Between 15 cm and 30 cm in front of the mirror  
(b) 30 cm in front of the mirror (d) More than 30 cm in front of the mirror

10. If the current  $I$  through a resistor is increased by 100% (assume that temperature remains unchanged), the increase in power dissipated will be (a) 100% (b) 200% (c) 300% (d) 400%

11. An electric bulb is rated 220 V and 100 W. When it is operated on 110 V, the power consumed will be: (a) 100 W (b) 75 W (c) 50 W (d) 25 W

OR Unit of electric power may also be expressed as: (a) Volt-ampere (b) Kilowatt-hour  
(c) Watt-second (d) Joule-second

- AI** 12. The phenomena of electromagnetic induction is
- the process of charging a body
  - the process of generating magnetic field due to a current passing through a coil
  - producing induced current in a coil due to relative motion between a magnet and the coil
  - the process of rotating a coil of an electric motor
13. Which of the followings are environment-friendly practices ?
- Carrying cloth-bags to put purchases in while shopping
  - Switching off unnecessary lights and fans
  - Walking to school instead of getting your mother to drop you on her scooter
  - All of the above

OR

Disposable plastic plates should not be used because :

- they are made of materials with light weight.
- they are made of toxic materials.

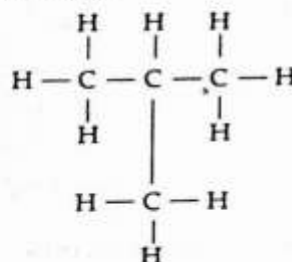
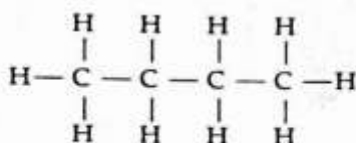
(c) they are made of biodegradable materials.

(d) they are made of non-biodegradable materials. 1

Directions : For question numbers 14 and 16, 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 :

- Both A and R are true and R is correct explanation of the assertion.
- Both A and R are true but R is not the correct explanation of the assertion.
- A is true but R is false.
- A is false but R is true

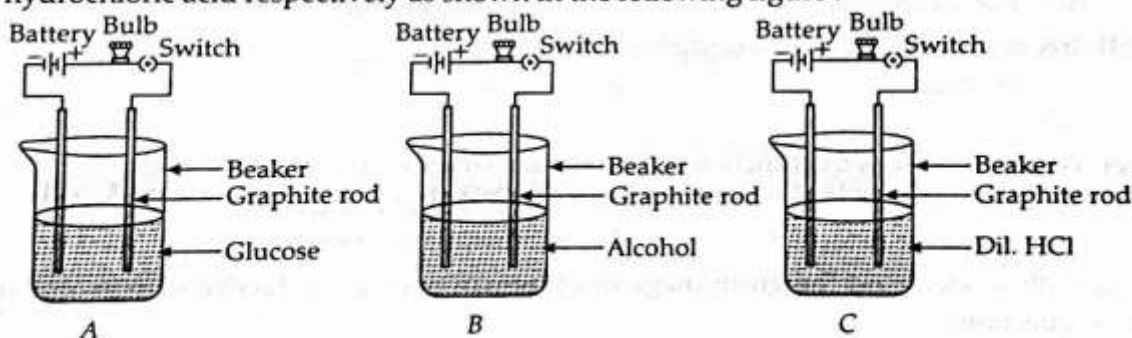
14. Assertion : Following are the structural isomers of butane.



Reason : Structural isomers have the same molecular formula but they differ in their structures.

15. Assertion (A) : The sky appears dark to passengers flying at a very high altitude. 1  
Reason (R) : It is due to water droplets present in the atmosphere.
16. Assertion (A) : At puberty, in boys, voice begins to crack and thick hair grows on face. 1  
Reason (R) : At puberty, there is decreased secretion of testosterone in boys.
- Directions : Answer Q. No 17 - 20 contain five sub-parts each. You are expected to answer any four sub-parts.

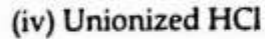
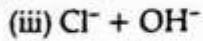
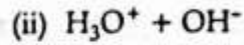
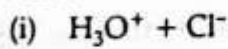
17. Suhana takes three beakers A, B and C filled with aqueous solutions of glucose, alcohol and hydrochloric acid respectively as shown in the following figure :



- (a) Which of the following statement is correct in terms of glowing of bulb when the switch is ON ?
- Bulb A and B do not glow but bulb C glows.
  - Bulb A and C do not glow but bulb B glows.
  - Bulb B and C do not glow but bulb A glows.
  - All the bulbs glow.

(b) Justify your observations by giving reason in each case ?

(c) Which of the following (major ions) are present in a dilute aqueous solution of hydrochloric acid ?



(d) What will happen if the content of beaker B is replaced by sodium hydroxide solution?

(i) Bulb A did not glow but bulb B and C glows.

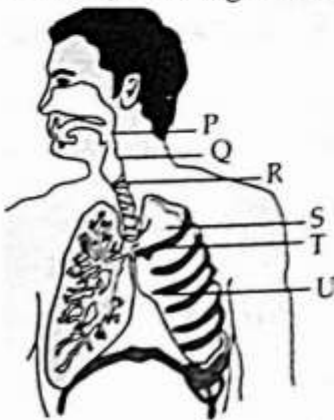
(ii) Bulb A and C do not glow but bulb B glows.

(iii) Bulb B and C do not glow but bulb A glows.

(iv) All the bulbs glow.

(e) Though the compounds such as glucose and alcohol have hydrogen atoms in their molecules yet they are not categorised as acids. Why ?

18. Study the diagram of human respiratory system and answer the following questions ?



(a) The balloon like structures present in 'S' is:

(i) Nephron

(ii) Alveoli

(iii) Bronchi

(iv) Bronchiole

(b) Which of these organ is surrounded by cartilaginous rings ?

(i) P

(ii) Q

(iii) R

(iv) S

(c) Which of these statements is incorrect regarding human lungs?

(i) It is the secondary organ for respiration.

(ii) It is located on the two sides of heart.

(iii) The membrane that encloses lungs is pleural membrane.

(iv) The alveolar epithelium of lungs is non-ciliated epithelium.

(d) Trachea is divided into two smaller tubes called \_\_\_\_\_.

(i) Bronchi

(ii) Bronchioles

(iii) Larynx

(iv) Alveoli

(e) Which of these is the function of balloon like structure present in lungs?

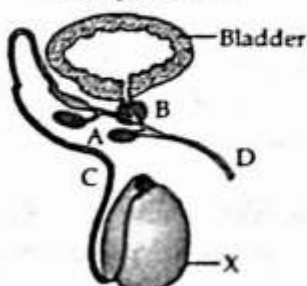
(i) Exchange of gases

(ii) Absorption of nutrients

(iii) Transport of food

(iv) Removal of waste materials

19. Carefully understand the given diagram of human male reproductive system and answer any four questions.



(a) The parts labelled as A and B are \_\_\_\_\_ and \_\_\_\_\_ respectively.

(i) Seminal vesicle and prostate gland

(ii) Prostate gland and seminal vesicle

(iii) Urethra and prostate gland

(iv) Urethra and seminal vesicle

(b) Which of these hormones is produced by organ 'X'?

(i) Estrogen

(ii) Progesterone

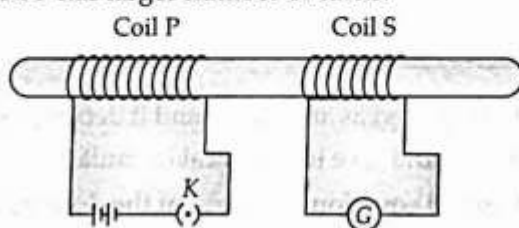
(iii) Testosterone

(iv) Adrenalin

- (c) Which of these is the function of the hormone released by organ X?
- It controls gamete formation.
  - It develops sexual characteristics in human males.
  - It develops sexual characteristics in human females.
  - Both (i) and (ii)
- (d) The substances that are transported by tubes C and D respectively are:
- C- Sperms, D- Semen and urine
  - C- Semen, D- Urine
  - C- Urine, D- Saliva
  - C- Sperms, D- Saliva
- (e) Which of the following statements is correct about sperms and eggs of humans ?
- Sperms contain one of the two types of sex chromosomes i.e., X chromosomes and Y chromosomes
  - Egg contains one type of sex chromosomes only i.e., X chromosome.
  - Sperms contain one type of sex chromosomes only i.e. Y chromosome
  - Both (i) and (iii)

**AI** 20. Understand the given diagram and answer any four questions. 4

In the given diagram, two coils of insulated copper wire are wound over a non-conducting cylinder as shown. Coil P has larger number of turns.



- (a) What will you observe when key K is closed?
- A momentary deflection shown by the galvanometer.
  - A momentary deflection shown by the galvanometer but in opposite direction.
  - No momentary deflection shown by the galvanometer
  - None of these.
- (b) Give reason for your observations.
- (c) Which of the phenomenon is involved in this?
- Electromagnetic induction
  - Tyndall effect
  - Heating effect
  - Ohm's law
- (d) Name of two coils used in this experiment.
- (e) The rule which gives the direction of induced current is:
- Fleming's right hand rule
  - Fleming's left hand rule
  - Maxwell right hand rule
  - Maxwell corkscrew rule

## SECTION-B

21. When Hydrogen gas is passed over heated copper (II) oxide, copper and steam are formed. Write the balanced chemical equation with physical states for this reaction. State what kind of chemical reaction is this? 2

**AI** 22. What is bleaching powder? How is it prepared? List two uses of bleaching powder. 2

23. Name the following :
- (i) A metal, which is preserved in kerosene.
  - (ii) A lustrous coloured non-metal.
  - (iii) A metal, which can melt while kept on palm.
  - (iv) A metal, which is a poor conductor of heat. 2

OR

Arrange the metals iron, magnesium, zinc and copper in the increasing order of their reactivity. What will be the two made by the student when iron filings are added to sulphate solution ? 2

24. Give reasons for the following :
- (i) The muscular walls of ventricles are thicker than the walls of atria.
  - (ii) Arteries have thick elastic walls. 2

OR

Draw a diagram of cross-section of the human heart and label the following parts :

- (i) Right ventricle (ii) Aorta
  - (iii) Left atrium (iv) Pulmonary arteries. 2
25. How can we determine north and south pole of an electromagnet with the help of magnetised iron bar ? 2
26. State the physical quantity which is equal to the ratio of potential difference and current. Define its SI unit. 2

### SECTION-C

27. A compound 'X' of sodium is used as an antacid and it decomposes on strong heating.
- (i) Name the compound 'X' and give its chemical formula ?
  - (ii) Write a balanced chemical equation to represent the decomposition of 'X' ?
  - (iii) Give one use of compound 'X' besides an antacid ? 3
- OR
- (a) For the preparation of cakes, baking powder is used. If at home your mother uses baking soda instead of baking powder, how will it affect the taste of the cake and why ?
  - (b) How is baking soda be converted into baking powder ?
  - (c) What makes the cake soft and spongy ? 3
28. State reason for the following :
- (i) Non-metals cannot displace hydrogen from the acids.
  - (ii) Hydrogen is not a metal, yet it is placed in the activity series of metals.
  - (iii) Aluminium is more reactive than iron, yet its corrosion is less than that of iron. 3
29. Write three types of blood vessels ? Give one important feature of each ? 3
30. In one of his experiments with pea plants Mendel observed that when a pure tall pea plant is crossed with a pure dwarf pea plants, in the first generation,  $F_1$ , only tall plants appear.
- (i) What happens to the traits of the dwarf plants in this case ?
  - (ii) When the  $F_1$  generation plants were self-fertilised, he observed that in the plants of second generation,  $F_2$ , both tall plants and dwarf plants were present. Why it happened ? Explain briefly. 3
31. How will you create an artificial aquatic ecosystem, which is self-sustainable ? 3

32. 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 the object distance in the above case ?
- (ii) Will the image be smaller or larger than the object ? Draw a 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 ? 3

OR

- (i) Write the formula for Resistance in terms of  $\rho$ , L and A. If the area of cross section of wire is made (i)  $A/3$  (ii)  $3A$ .
  - (ii) Find the Resistance in each case and write in which case it will be maximum and minimum.
33. Explain the role of UV radiation in formation of ozone with the help of a chemical reaction. Name the pollutant and write its role in depletion of ozone layer ? 3

#### SECTION-D

34. (a) Define the following terms ?

(i) Valency, (ii) Atomic size.

(b) How do the valency and the atomic size of the elements vary while going from left to right along a period in the modern periodic table ? 5

OR

Two elements 'A' and 'B' belong to the 3<sup>rd</sup> period of Modern periodic table and are in group 2 and 13 respectively. Compare their following characteristics in tabular form :

(i) Number of electrons in their atoms

(ii) Size of their atoms

(iii) Their tendencies to lose electrons

(iv) The formula of their oxides

(v) Their metallic character

(vi) The formula of their chlorides. 5

35. (a) What is pollination ? Give its two types.

(b) Draw a longitudinal section of female reproductive part of a flower showing germination of pollen grain. Label on it the following :

(i) Stigma;

(ii) Pollen tube with a male germ cell;

(iii) Female germ cell. 5

36. (a) Write an activity for observing scattering of light in colloidal solution ?

(b) On the basis of this activity explain why sky appears red at sunrise or sunset ? 5

OR

What is Tyndall effect ? What is its causes ? Name two phenomena observed in daily life which are based on Tyndall effect. 5