

## SAMPLE PAPER-2

1. (d) Top of the trophic level shows lowest amount of energy and bottom of it shows highest amount of energy. (1 mark)
2. (a) Total internal reflection is the returning back of the light, coming from denser medium and incident at an angle greater than the critical angle, in the same medium. (1 mark)
3. (b) Heat is required to decompose calcium carbonate. Thus, this reaction proceeds with absorption of heat therefore it is an endothermic reaction. (1 mark)
4. (d) The largest artery is the aorta. It is the main high-pressure pipeline connected to the heart's left ventricle. The aorta branches into a network of smaller arteries that extends throughout the body. (1 mark)
5. (b) Iris is an opaque, dark and muscular diaphragm which is present behind the cornea. (1 mark)
6. (a) As pH of distilled water is 7, so it will show green colour of pH paper. Adding NaCl in distilled water will not affect the pH of the water because NaCl is a neutral salt. (1 mark)
7. (d) Medulla controls autonomic functions and relays nerve signals between the brain and spinal cord. It is responsible for controlling several major autonomic functions of the body like respiration (*via* dorsal respiratory group and ventral respiratory group), blood pressure, heart rate, reflex arcs and vomiting. (1 mark)
8. (a) A-R; B-S; C-T; D-P; E-Q (1 mark)
9. (b) As the metal surface has got a high thermal conductivity than wood, the heat flow from our body to metal surface is faster. This is the reason why we feel colder to touch the metal surface than a wooden one. (1 mark)
10. (d) Carbon dioxide (CO<sub>2</sub>) gas is responsible for causing green house effect. (1 mark)
11. The resistance of air gap is generally considered to be infinite. (1 mark)
12. (a)  $Zn + 2HCl \longrightarrow ZnCl_2 + H_2$   
(b)  $2Na + 2H_2O \longrightarrow 2NaOH + H_2$  (1 mark)
13. The temporal lobe aids in auditory processing and perception of sound. (1 mark)

**OR**

Parietal lobe of the brain is involved in touch, smell, temperature and consciousness. (1 mark)
14. Magnetic monopole does not exist because magnetic field lines always form a closed loop. (1 mark)

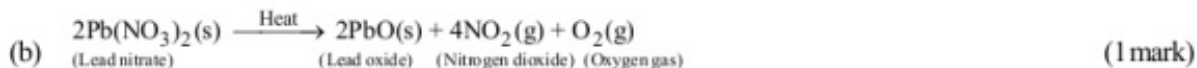
**OR**

A commutator is a rotary electrical switch in motors and electrical generators that periodically reverses the direction of current between the rotor and the external circuit. (1 mark)
15. 500J (10% Law) (1 mark)
16. Unsaturated hydrocarbons are more reactive due to the presence of C=C and C≡C bonds. These are the reactive sites in the unsaturated hydrocarbons. (1 mark)

**OR**

Carbon compounds have covalent bonds between them, these do not give ions in their solution form or in molten state. So, carbon compounds do not conduct electricity through them. (1 mark)
17. A convex mirror forms images which are always smaller than the object, therefore the linear magnification (m) produced by a convex mirror is always less than 1. (1 mark)
18. (b)  $R = \frac{\rho \ell}{A}$ , bending a wire does not affect the resistivity, length and area of cross-section of wire, thus resistance is not affected. (1 mark)

19. (b) Pine oil is used in froath floatation process because it does not have affinity towards water and it attracts impurities which can be washed away. (1 mark)
20. (a) Pneumatic bones (light weight) with abundant air pocket are present in the birds which help them during flight. (1 mark)
21. (a) (i) Combination reaction are generally exothermic whereas decomposition reactions are endothermic.  
(ii) In a displacement reaction one element displaces another element from its compound, whereas in double displacement reaction two different atoms or group of atoms are exchanged. (2 marks)



OR

- (a) Henry Moseley (1 mark)
- (b) Atomic number (1 mark)
- (c) **Modern Periodic Law:** It states that "properties of elements are the periodic functions of their atomic numbers." (1 mark)
22. (a) (i) Ethanol (½ mark)  
(ii) Ethanoic acid (½ mark)  
(iii) Ethene (½ mark)
- (b) (i) Prop-2-ol-1-oic acid (½ mark)  
(ii) Ethyl ethanoate (½ mark)  
(iii) But-1, 2-diol (½ mark)
23. (a) A soap molecule has two ends-one end is hydrophobic and the other end is hydrophilic. With the help of these, it attaches to the grease or dirt particle and forms a cluster called micelle. These micelles remain suspended as a colloid. To remove these micelles (entrapping the dirt), it is necessary to agitate clothes. (3 marks)

24 (i)  $h_1 = 1\text{m}$   
Magnification (m) =  $\frac{h_2}{h_1} \Rightarrow 2 = \frac{h_2}{h_1}$  or  $h_2 = 2h_1$

$\Rightarrow h_2 \times 1 = 2\text{m}$

(ii)  $F_1 = 40\text{ cm} = 0.4\text{ m}$

$\therefore P_1 = \frac{1}{0.4} = 2.5\text{ D}$

$F_2 = -20\text{ cm} = -0.2\text{ m}$

$\therefore P_2 = \frac{1}{-0.2} = -5\text{ D}$

$P = P_1 + P_2 = 2.5 + (-5) = -2.5\text{ D}$

It behaves like a concave lens. (3 marks)

25. Scrap paper and vegetable wasters can be used to produce biogas.  
**Advantages of converting these waste material into biogas are as follows:**
- (a) Biogas has high calorific value than biomass.  
(b) Biogas does not produce any smoke.  
(c) Biogas does not leave any residue.  
(d) By obtaining biogas from biomass, the left over residue can be used by farmers as manure.(3 marks)

26. Photosynthesis is a process used by plants and other organisms to convert light energy into chemical energy that can later be released to fuel the organism's activities. Photosynthesis is considered the most important process in the biosphere because:
- It is the only known process which converts light energy into chemical energy for utilisation by all living organisms.
  - It manufactures organic food. All heterotrophs are dependent on the organic food prepared by the green plants by photosynthesis.
  - A number of plant products of economic importance such as timber, fibres, resins, alkaloids, gums, tannins, oils, rubber, cork, etc. are produced by photosynthesis.
  - Coal, natural gas and petroleum are products of photosynthetic organisms that lived in the past on this earth.
  - It maintains the concentration of atmospheric carbon dioxide and oxygen. (3 marks)

OR

Urine is formed in the kidney through a filtration of blood. The urine is then passed through ureters to the bladder, where it is stored. During urination, the urine is passed from the bladder through urethra to the outside of the body.

The pathway of urine starting from the organ of its formation:

Kidney → Ureters → Urinary bladder → Urethra

The four substances reabsorbed from initial filtrate are:

- Amino acid
  - Glucose
  - Salts
  - Major amount of water (3 marks)
27. Stakeholders in respect of forest are those people who utilise various forest products. These are:
- The people who live in and around the forest.
  - Industrialist engaged in manufacture of furniture, biris, plywood and sports goods.
  - Wild-life and nature exthusiastic, the industrialists cause maximum damage to forests as they consider the forest as merely a source of raw material for their factories. (3 marks)

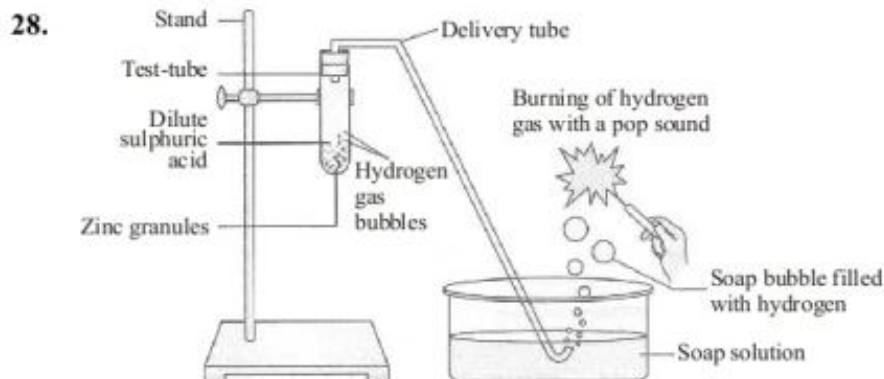


Fig.: Experiment showing reaction between dilute  $\text{SO}_4$  zinc granules.

- The gas evolved in hydrogen.
- Test for  $\text{H}_2$  gas:** The presence of  $\text{H}_2$  gas can be tested by passing the gas through soap solution and then bringing a burning splinter near the soap bubbles filled with the gas. If the gas burns with a pop sound, it is hydrogen.  

$$\text{Zn(s)} + \text{H}_2\text{SO}_4(\text{aq}) \longrightarrow \text{ZnSO}_4(\text{aq}) + \text{H}_2(\text{g}) \uparrow$$
 (3 marks)

OR

- Bleaching powder —  $\text{CaOCl}_2$
- $\text{Ca(OH)}_2 + \text{Cl}_2 \longrightarrow \text{CaOCl}_2 + \text{H}_2\text{O}$
- Two uses other than disinfection are :
  - Paper industries
  - Chemical industries (3 marks)

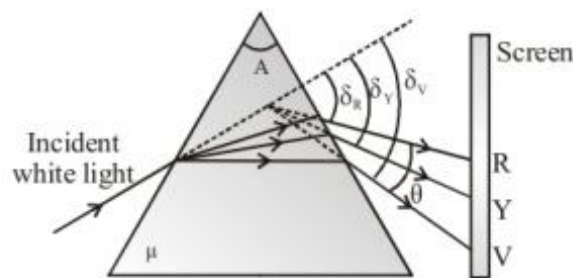
29. No, the information is not enough to tell whether the trait of the blood group A ( $I^A$ ) or blood group O ( $I^O$ ) is dominant. Either can be possible. Each individual carries two alleles. A recessive trait appears only when the two alleles are similar.

**Possibility 1. Blood Group A is Dominant and O Recessive.** The trait of blood group O can appear only when both the recessive alleles occur together as in mother and daughter ( $I^O I^O$ ). A group father should carry both the alleles of A and O ( $I^O I^A$ )

**Possibility 2. Blood Group O is Dominant and A Recessive.** In this case the father should carry the alleles of A ( $I^A I^A$ ) while the mother can be homozygous or heterozygous ( $I^O I^O$ ,  $I^O I^A$ ). The daughter will have one dominant alleles of O ( $I^O I^A$ ).

As both the possibilities can occur, the given information is unable to tell whether allele for blood group A or O is dominant. (3 marks)

30. When white light splits into its seven constituent colours (VIBGYOR) on passing through a prism, is known as dispersion of light. (1 mark)

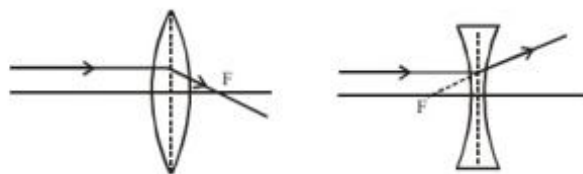


Refractive index of glass is different for different components of white light. As different colours of light pass through a prism, they bend through different angles with respect to the incident ray. (1 mark)  
The red light bends the least while the violet bends the most. Thus, the rays of different colours emerge along different paths and get dispersed. (1 mark)

OR

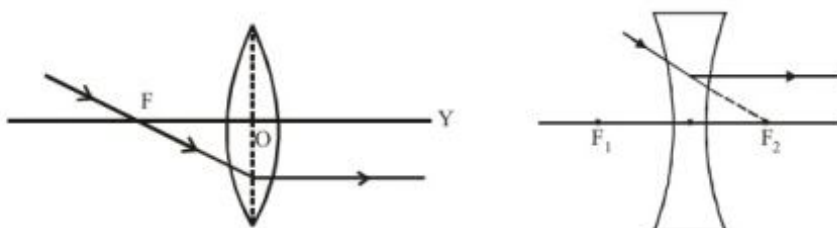
Rules :

- (a) A ray falling on a lens in a direction parallel to the principal axis passes through, or appears to pass through, the principal focus after refraction.



(1 mark)

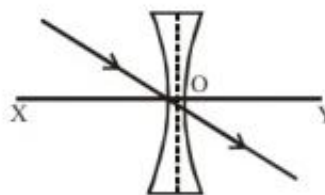
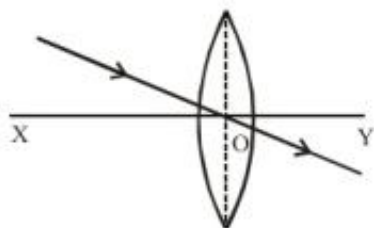
- (b) A ray of light passing through focus becomes parallel to principal axis after refraction.



(1 mark)



- (c) A ray passing through the optical centre of the lens emerges out undeviated.



(1 mark)

31. Two reasons for avoiding frequent pregnancies by women are:

- (i) It adversely affects the health of a woman.  
 (ii) It also adds to the exploding population. (1 × 2 = 2 marks)

(a) **Barrier methods:** In this method, physical devices such as condoms, diaphragm and cervical caps are used. These devices prevent the entry of sperm in the female genital tract during copulation, thus acting as a barrier between them. (1 mark)

(b) **Chemical methods:** In this method, specific drugs are used by females, which are of two types—oral pills and vaginal pills. (1 mark)

(c) **Surgical methods:** In this method, a small portion of vas deferens in male and the fallopian tube in female is surgically removed or tied. It is called vasectomy in males and tubectomy in females. (1 mark)

32. (a) Breathing is a physical process of inhalation or bringing in fresh air for obtaining oxygen and exhalation or taking out of foul air for elimination of carbon dioxide. Breathing becomes rapid during vigorous exercise because of the requirement of large amount of oxygen. It is used in providing higher amounts of energy. (2 marks)

(b) Translocation is the movement of food in solution form inside phloem part of plants from the region of source (manufacture or storage) to the area of sink (use or storage). All plant parts require food for growth, development and respiration. However, food is manufactured in only green cells exposed to sunlight. Therefore, manufactured food is translocated to all non-green parts and their cells. (3 marks)

33. (a)

S.no.	Properties of baking powder	Uses
(i)	On heating releases CO <sub>2</sub> gas.	Baking industry
(ii)	Alkaline in nature, neutralises excess acid in stomach.	Antacid
(iii)	When it reacts with acid, it releases CO <sub>2</sub> gas which can extinguish fire.	Soda-acid fire extinguisher

(1 × 3 = 3 marks)

(b) Acid + Metal → Salt + Hydrogen



(1 mark)

Nitric acid does not release hydrogen gas when it reacts with metals. This is because nitric acid is strong oxidising agent. Nitric acid reacts only with magnesium and manganese to evolve hydrogen gas.



(1 mark)

OR

- (a) Salts, having the same positive or negative radicals, are said to belong to the same family. (1 mark)
- (b) It is because HCl and HNO<sub>3</sub> ionise in aqueous solution whereas ethanol and glucose do not ionise in aqueous solution. (2 marks)
- (c) When a weak acid is added to a concentrated solution of hydrochloric acid, the solution becomes more acidic because it increases the hydronium ion concentration of the solution. (2 marks)

34. **Advantages of artificial vegetative reproduction:**

- (a) Many fruit plants such as banana, navel orange and grapes do not produce fertile seeds. In order to maintain their best varieties as such and to increase their production, artificial vegetative means are the only methods available to plant cultivators.
- (b) Seedlings raised from seeds go through a long period of vegetative growth before fruiting. Moreover, all seedlings will mature to fruiting is also not certain while vegetative methods take short time in fruiting and success. It is almost certain.
- (c) The yield is more in graft-crop as compared to crop obtained from seeds.
- (d) Plant raised by vegetative means is, in fact, a part of parent plants hence genetically it has all characters of the parent plant. Since they are raised by vegetative methods their character remains the same generation after generation. (4 marks)

**Two methods of vegetative propagation** are cutting and layering. (1 mark)

35. (a) Mirror formula is,  $\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$  where  $u$ ,  $v$  and  $f$  are object distance, image distance and focal length.

$$\frac{1}{v} = \frac{1}{f} - \frac{1}{u}$$

Focal length and object distance are both  $-ve$  for concave mirror.

It is given  $u < f$ ,

$$\therefore \frac{1}{v} \text{ becomes } \frac{-1}{f} + \frac{1}{u} \text{ and is positive.}$$

$v$  becoming  $+ve$  denotes a virtual image. (2½ marks)

- (b) Here  $f = 15 \text{ cm}$ ,  $v = 10 \text{ cm}$

By using mirror formula,

$$\frac{1}{f} = \frac{1}{v} + \frac{1}{u}$$

$$\frac{1}{15} = \frac{1}{10} + \frac{1}{u}$$

$$\frac{1}{u} = \frac{1}{15} - \frac{1}{10}$$

$$\text{or, } u = -30 \text{ cm}$$

(2½ marks)

36. (a) **Electromagnet:** When a material, like soft iron, is placed inside a coil carrying current (may be a solenoid), it will get magnetised. Once the current is put-off, the magnetic field will also be lost. Such magnets are called electromagnets. (2 marks)

Two uses of electromagnet are:

- (i) In electric bells
  - (ii) For sorting scrap metal (1 mark)
- (b) The purpose of soft iron core used in making an electromagnet is that:
- (i) It is temporarily magnetised.
  - (ii) It retains magnetism as long as current flow is maintained.
  - (iii) It will ensure an uniform and stronger field. (2 marks)

**OR**

- (a) **Magnetic field lines:** The imaginary curves through which a hypothetical north can move if free to do so are called the magnetic field lines.  
The direction of magnetic field at a point is determined by drawing a tangent at that point. The direction of tangent gives the direction of magnetic field. (1 + 1 = 2 marks)
- (b) **Characteristics of magnetic field lines:**
- (i) The direction of the magnetic field is indicated by the arrow in the line at any point (Tangent).
  - (ii) The field lines come out of the North pole and get into the South pole (closed loops are formed).
  - (iii) The strength of magnetic field is indicated by the closeness of the field lines. Closer the lines, more will be the strength and farther the lines, lesser will be the field strength.
  - (iv) No two field lines will intersect each other. If they intersect there will be two different directions for field at the same point which is not possible. (3 marks)