

**BOARD OF SECONDARY EDUCATION (AP)**

**SUMMATIVE ASSESSMENT – I**

**TENTH CLASS GENERAL SCIENCE**

**PHYSICAL SCIENCE (PAPER – I)**

**MODEL PAPER (ENGLISH VERSION)**

**Time: 2 hours 45 mins.**

**PART A & B**

**Maximum Marks: 40**

**INSTRUCTIONS:**

1. This paper contains PART – A & B.
2. PART – A contains 3 Sections, answer the questions under PART – A on a separate answer book. Write the answers to the questions under PART – B on the question paper itself and attach it to the answer book of PART – A.
3. Answer all questions. Internal choice to the questions under Section – III.
4. In the duration of 2.45 hrs, 15 minutes of time is allotted to read the question paper.

**Time: 2 hours**

**PART – A**

**Marks: 30**

**INSTRUCTIONS:**

1. PART – A comprises of three Sections I, II, III.
2. All the questions are compulsory.
3. There is no overall choice. However, there is an internal choice to the questions under Section – III.

**SECTION – I**

**NOTE:** i) Answer ALL the questions.

ii) Answer each question in 1 or 2 sentences.

iii) Each question carries one mark.

**4 × 1 = 4**

1. Two students while walking on the road in the afternoon found image of water on the road. When they went near nothing was found. Guess what could be the reason for this.
2. Woollen clothes do not allow the body temperature to decrease. Ramesh mentioned the reason for this and appreciated the role of woollen cloth. What the reason might be? How will you appreciate it.
3. What is the use of keeping food in air tight containers?
4. Which colours do you observe when an iron rod is gradually heated to higher temperatures.

SECTION - II

NOTE: i) Answer ALL the questions.

ii) Answer each question in 4 or 5 sentences.

iii) Each question carries TWO mark.

2 × 5 = 10

5. 50 gm. of water at 20°C is mixed with 50 gm of water at t°C. If the final temperature is 30°C. Find the value of t°C.
6. Give an example for naturally occurring endothermic reaction.
7. Draw the ray diagram of image of object which is at the centre of curvature of a concave mirror.
8. The pH values of solutions X, Y, Z are 13, 6 and 2 respectively.
- a) Which solution is a strong acid?
- b) Which solution is a strong base?
- c) If a base is added to solution Z, then will the pH value of that solution increases or decreases?
9. When we sit at a camp fire, objects beyond the fire seen swaying. Give the reason for it?

SECTION - III

NOTE: i) Answer ALL the questions.

ii) Answer each question in 8 – 10 sentences.

iii) There is internal choice for each question. Only one option from each question is to be attempted.

iv) Each question carries FOUR marks.

4 × 4 = 16

10. A) Mahesh observed that Petrol kept in a vessel disappears after some time. Krishna heated water in a beaker and turned it in to water vapour. How would you distinguish between these processes?

OR

B) Soldiers in olden times used to burn the ships and tents of opponents by using certain mirrors.

- a) What are the mirrors used by them?
- b) Which energy is utilised to burn?
- c) What method is followed by them?
- d) With the help of a diagram explain the phenomenon in this?
11. A) How do you verify experimentally that the focal length of convex lens is increased when it is kept in water.

OR

B) A student conducted an experiment with a biconvex lens and prepared the following table.

|                       |       |       |       |       |    |
|-----------------------|-------|-------|-------|-------|----|
| Object distance in cm | 70    | 60    | 50    | 40    | 30 |
| Image distance in cm  | 14.5  | 15.2  | 16.2  | 17    | 20 |
| Focal length in cm    | 12.01 | 12.12 | 12.13 | 11.92 | 12 |

- a) What could be the reason for different focal lengths in the above table.
- b) How will you decide the focal length of the above lens? What is its value?
- c) Can you measure the image distance making the object distance 10 cm? Why?

12. A) Why should we balance a chemical equation? Take any one chemical equation and explain the procedure of balancing it.

OR

B) Write an activity to know whether an acid is strong or weak.

13. A) When we add water to Calcium oxide or when we add Zinc granules to Hydrochloric acid, heat will be released in both the cases. So Sita told that both of them are the same type of chemical reactions. But Lakshmi told that they are different types of reactions. How does Lakshmi come to this conclusion? Give equations for these reactions.

OR

B) a) What are the different types of chemical decomposition reactions?

b) Raghava dissociated water into Hydrogen and Oxygen gases. Draw the diagram for this reaction. What are the apparatus required for this reaction.

## INSTRUCTIONS:

- i) Answer ALL the questions.
- ii) Each question carries  $\frac{1}{2}$  mark.
- iii) Marks will not be awarded in any case of over – writing, rewritten or erased answers.
- iv) Write the CAPITAL LETTER (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.  $20 \times \frac{1}{2} = 10$

## SECTION – IV

14. The difference in temperature of a body measured as  $27^{\circ}\text{C}$ . Its corresponding difference in Kelvin Scale is ( )  
 A) 300 K                      B) 0 K                      C)  $-154$  K                      D) 27 K
15. P: Rusting of Iron is an example of reduction. ( )  
 Q: Rancidity of food is an example of oxidation ( )  
 A) P and Q are correct                      B) P correct Q wrong  
 C) P wrong Q correct                      D) P and Q are wrong
16. We are using tooth paste to clean our mouth and to avoid tooth decay. The nature of the tooth paste is ( )  
 A) Acidic                      B) Base  
 C) Neutral                      D) Amphoteric
17. Metal oxide + Acid  $\longrightarrow$  ..... ( )  
 A) Salt + Metal  
 B) Salt + Water  
 C) Base + Water  
 D) Non Metallic oxide + Base
18. Which of the following is Snell's Law? ( )  
 A)  $n_1 \sin i = \frac{\sin r}{n_2}$                       B)  $\frac{n_1}{n_2} = \frac{\sin r}{\sin i}$   
 C)  $\frac{n_2}{n_1} = \frac{\sin r}{\sin i}$                       D)  $n_1 = \sin i = \text{Constant}$
19. Focal length of plano concave lens is ..... when its radii of curvature of the surface is R and n is the refractive index of the lens ( )  
 A)  $f = \frac{R}{(n - 1)}$                       B)  $f = \frac{-R}{(n - 1)}$                       C)  $f = \frac{n - 1}{R}$                       D)  $f = \frac{n - 1}{-R}$

20. Consider a Convex lens and match the following ( )
- | Position of Object   | Position of image   |
|----------------------|---------------------|
| I) at focus          | P) Same side        |
| II) between 2F and F | Q) infinitive       |
| III) between F and P | R) beyond 2F        |
| A) I-Q, II-R, III-P  | B) I-P, II-Q, III-R |
| C) I-R, II-P, III-Q  | D) I-Q, II-P, III-R |
21. Match the following Set – A and Set – B. ( )
- | Set – A                   | Set – B   |
|---------------------------|---|
| I) Plaster of Paris       | P) $\text{NaHCO}_3$                                     |
| II) Bleaching Powder      | Q) $\text{CaOCl}_2$                                     |
| III) Baking Soda          | R) $\text{CaSO}_4 \cdot \frac{1}{2} \text{H}_2\text{O}$ |
| IV) Washing Soda          | S) $\text{Na}_2\text{CO}_3$                             |
| A) I-R, II-Q, III-P, IV-S | B) I-R, II-P, III-Q, IV-S                               |
| C) I-R, II-S, III-P, IV-Q | D) I-P, II-R, III-S, IV-Q                               |
22. A vessel is kept at the .... of a Solar Cooker. ( )
- |                        |                   |
|------------------------|-------------------|
| A) Centre of Curvature | B) Pole           |
| C) Focal Point         | D) Convex Surface |
23. Ranga is doing an experiment with the glass Slab. He focussed the light towards glass slab at an angle  $30^\circ$  what would be the angle of emergence ( )
- |              |               |               |                |
|--------------|---------------|---------------|----------------|
| A) $0^\circ$ | B) $90^\circ$ | C) $30^\circ$ | D) $180^\circ$ |
|--------------|---------------|---------------|----------------|
24. Consider two materials Lead and Iron with Specific heat values  $0.031 \text{ cal/gm } ^\circ\text{C}$  and  $0.115 \text{ cal/gm } ^\circ\text{C}$  respectively. If the mass of the two materials are the same and are supplied same heat, then ( )
- A) Temperature of lead will be increased  
 B) Temperature of iron will be increased  
 C) Both are at the same temperature  
 D) No change in the temperature
25. Find the refractive index of glass if the speed of light in glass is  $2 \times 10^8 \text{ m/s}$  and speed of light in vacuum is  $3 \times 10^8 \text{ m/s}$  ( )
- |                              |                  |                  |                              |
|------------------------------|------------------|------------------|------------------------------|
| A) $\frac{2}{3} \text{ m/s}$ | B) $\frac{2}{3}$ | C) $\frac{3}{2}$ | D) $\frac{3}{2} \text{ m/s}$ |
|------------------------------|------------------|------------------|------------------------------|
26. Which of the following is not related to a Concave mirror? ( )
- |                                 |                     |
|---------------------------------|---------------------|
| A) T.V. dish antenna            | B) Shaving mirror   |
| C) Vehicle head light reflector | D) Rear View mirror |

27. Spoilage of food can be prevented by ( )  
 I) Adding preservatives like Vitamin C and E  
 II) Adding antioxidants  
 III) Adding water  
 IV) Keeping food in Air light Containers  
 A) III only                      B) I and III                      C) I, II and IV                      D) I, III, and IV
28. Krishna added water to acid. Ravi added acid to water. Which of the following is correct? ( )  
 A) Both Krishna and Ravi are correct  
 B) Krishna is correct and Ravi is incorrect  
 C) Krishna is incorrect and Ravi is correct  
 D) Both Krishna and Ravi are incorrect
29. Suppose you are inside the water in a swimming pool, your friend is standing on the edge of the swimming pool. your friend appears to be ( )  
 A) shorter                      B) taller                      C) same size                      D) stout
30. Internal energy of a system is ( )  
 1) Potential energy  
 2) Vibrational energy  
 3) Rotational and liner kinetic energy  
 A) 1 is correct                      B) 1, 2 and 3 are correct  
 C) 3 is correct                      D) 1 and 3 are correct
31.  $X. \text{NH}_3(\text{aq.}) + \text{Cl}_2(\text{g}) \longrightarrow \text{N}_2\text{H}_4 + Y.\text{NH}_4\text{Cl}$  in this equation X and Y are ( )  
 A)  $X = 3, Y = 2$                       B)  $X = 2, Y = 3$   
 C)  $X = 4, Y = 2$                       D)  $X = 2, Y = 4$
32. Mirage is  
 X) an optical illusion  
 Y) due to denser upper layer and rarer lower layer in the air on the road.  
 A) X and Y are true                      B) X is true and Y is false  
 C) X is false and Y is true                      D) Both X and Y are false
33. The lens makers formula is ( )  
 A)  $\frac{1}{f} = (n - 1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$                       B)  $\frac{1}{f} = (n + 1)\left(\frac{1}{R_1} + \frac{1}{R_2}\right)$   
 C)  $\frac{1}{f} = (n + 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$                       D)  $f = (n - 1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

## ANSWERS

### SECTION – I

1. Two students while walking on the road in the afternoon found an image of water on the road. When they went near nothing was found. Guess what could be the reason for this.

A: ★ The students saw the mirage formed due to total internal reflection.

★ The illusion is because of the formation of virtual image of the sky and an inverted image of a tree on the road.

2. Woollen clothes do not allow the body temperature to decrease. Ramesh mentioned the reason for this and appreciated the role of woollen cloth. What the reason might be? How will you appreciate it.

A: ★ Woollen clothes are bad conductors of heat. So the body temperature will not decrease when a person wears these clothes.

★ In winter and in cold places people wear woollen clothes keeping in view this property.

★ I appreciate the role of woollen clothes in safe guarding the temperature of the body.

3. What is the use of keeping food in air tight containers.

A: To prevent rancidity and to slow down the oxidation process, food will be stored in air tight containers.

★ The manufacturers of potato chips flush bags of chips with nitrogen gas to prevent the chips from getting oxidized.

4. Which colours do you observe when an iron rod is gradually heated to higher temperatures.

A: Red, Orange, Yellow, blue or even white if the temperature is high.

### SECTION – II

5. 50 g. of water at 20 °C is mixed with 50 g. of water at t °C. If the final temperature is 30 °C find the value of t °C?

A: Given:  $m_1 = 50$  g,  $t_1 = 20$  °C

$m_2 = 50$  g,  $t_2 = t$  °C = ?

Resultant final temperature  $T = 30$  °C

$$\text{Formula: } T = \frac{m_1 t_1 + m_2 t_2}{m_1 + m_2}$$

Substituting the values

$$30 \text{ °C} = \frac{50 \times 20 + 50 \times t}{50 + 50}$$

$$\therefore 50t = 3,000 - 1,000 = 2,000$$

$$\text{So } t = \frac{2,000}{50} = 40 \text{ °C}$$

6. Give an example for naturally occurring endothermic reaction.

A: ★ The naturally occurring endothermic reaction is photosynthesis.

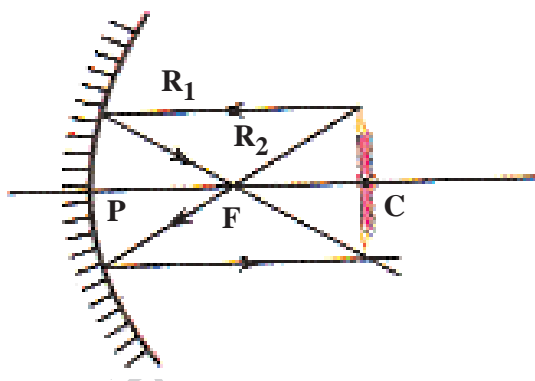
★ Green plants in the presence of water, carbon dioxide absorb sun light and form carbohydrates.

★ As heat is absorbed in this reaction, it is an endothermic reaction.

★ This is an example for naturally occurring endothermic reaction.

7. Draw the ray diagram of image of object which is at the centre of curvature of a concave mirror.

A:



8. The pH values of solutions X, Y, Z are 13, 6 and 2 respectively

a) Which solution is a strong acid?

b) Which solution is a strong base?

c) If a base is added to solution Z, will the pH value of that solution increases or decreases?

A: ★ Given the pH values of solutions X, Y, Z are 13, 6 and 2 respectively.

a) Solution 'Z' is a strong acid as its pH is 2.

b) Solution 'X' is a strong base as its pH is 13.

c) If a base is added to solution 'Z', then the pH value of the solution increases.

9. When we sit at a camp fire, objects beyond the camp fire seen swaying. Give the reason for it.

A: ★ When light comes out from the camp fire it enters into atmosphere.

★ Due to fluctuations in the refractive index of the atmosphere, the refraction and deviation of the light becomes irregular.

★ This is the reason for the objects to be seen as swaying.

### SECTION – III

10. A) Mahesh observed that Petrol Kept in a vessel disappears after some time. Krishna heated water in a beaker and turned it into water vapour. How would you distinguish between these processes?

A: ★ Petrol in a vessel disappears after some time is due to evaporation.

★ Water turns into water vapour on heating is due to boiling.



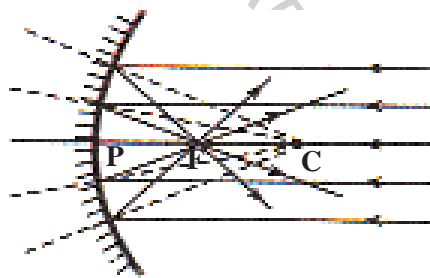
| Evaporation  | Boiling  |
|--|--|
| 1. At every temperature evaporation takes place.                 | 1. At a particular temperature boiling takes place.                            |
| 2. It is a surface phenomenon.                                   | 2. It is a bulk phenomenon.  |
| 3. It is a cooling process.                                      | 3. It is a warming process.  |
| 4. Bubbles are not formed.                                       | 4. Bubbles are formed.   |
| 5. Rate of evaporation increases with temperature.               | 5. Boiling Point is affected by atmospheric pressure.                          |
| 6. The temperature will not be constant at any interval of time. | 6. The temperature remains constant until the entire liquid turns into vapour. |

(OR)

10. B) Soldiers in olden times used to burn the ships and tents of opponents by using certain mirrors.

- What are the mirrors used by them?
- Which energy is utilized to burn?
- What method is followed by them?
- With the help of a diagram explain the Phenomenon in this?

- A:
- The soldiers used plane mirrors arranged in a Concave shape.
  - Solar energy is used to burn the ships.
  - Sun at infinity distance is taken as an object for the concave mirror in such a way that its focus lies at the target ship or tent this method is followed by them.
  - The ray diagram is drawn below.

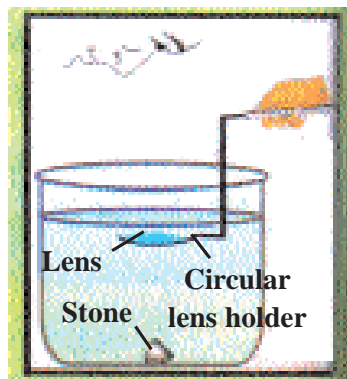


Rays of light from the Sun after reflection pass through the focus of the mirror

11. A) How do you verify experimentally that the focal length of convex lens is increased when it is kept in water?

- A:
- ★ Take a Convex lens whose focal length is known.
  - ★ Take a cylindrical vessel such as a glass tumbler, whose height must be nearly four times the focal length of the lens.
  - ★ keep a black stone inside the vessel at its bottom.

- ★ Now pour water into vessel upto a height such that the height of the water level from the top of the stone is greater than the focal length of the lens.
- ★ Now dip the lens horizontally using a circular lens holder as shown in the figure.



- ★ Set the distance between stone and lens that is equal to less than the focal length of lens.
- ★ Now look at the stone through the lens.
- ★ We can see the image of the stone if the distance between the lens and stone is less than the focal length of the lens.
- ★ Now increase the distance between lens and stone until we can not see the image of the stone.
- ★ We have dipped the lens to a certain height which is greater than the focal length of the lens in air but we can see the image.
- ★ This shows that the focal length of the lens has increased in water.

(OR)

11. B) A student conducted an experiment with a biconcave lens and prepared the following table.

|                       |       |       |       |       |    |
|-----------------------|-------|-------|-------|-------|----|
| Object distance in cm | 70    | 60    | 50    | 40    | 30 |
| Image distance in cm  | 14.5  | 15.2  | 16.2  | 17    | 20 |
| focal length in cm    | 12.01 | 12.12 | 12.13 | 11.92 | 12 |

- A: a) What could be the reason for different focal lengths in the above table.

A: The difference in focal length of the lens is only due to experimental error.

- b) How will you decide the focal length of the above lens? What is its value?

A: The average of all the values in the experiment is taken as the focal length of the lens.

$$\therefore \text{Focal length of the lens} = \frac{12.01 + 12.12 + 12.13 + 11.92 + 12}{5}$$

$$= 12.034 \text{ cm.}$$

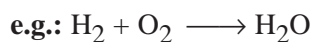
- c) Can you measure the image distance making the object distance 10 cm? Why?

A: As the object distance is 10 cms, the object is placed in between the optic centre and focus of the lens. A virtual magnified image is formed which can be seen through the lens. So we cannot measure the image distance.

12. A) Why should we balance a chemical equation? Take any one chemical equation and explain the procedure of balancing it.

A: ★ Chemical reactions obey law of conservation of mass.

★ This means that the total number of atoms of each element in the reactants must be equal to the total number of atoms of each element in the products. So we should balance a chemical equation.



**Step – 1:** This is an unbalanced equation.

**Step – 2:** Compare number of atoms of each elements on both sides.

| Atom | No. of atoms on L.H.S. | No. of atoms on R.H.S.        |
|------|------------------------|-------------------------------|
| H    | 2 (in $\text{H}_2$ )   | 2 in ( $\text{H}_2\text{O}$ ) |
| O    | 2 (in $\text{O}_2$ )   | 1 in ( $\text{H}_2\text{O}$ ) |

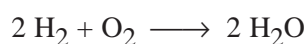
No. of O atoms balancing  $\longrightarrow \text{H}_2 + \text{O}_2 \longrightarrow 2 \text{H}_2\text{O}$

No. of H atoms balancing  $\longrightarrow 2 \text{H}_2 + \text{O}_2 \longrightarrow 2 \text{H}_2\text{O}$

**Step – 3:** The above equation is balanced, and write the coefficients in smallest ratio.



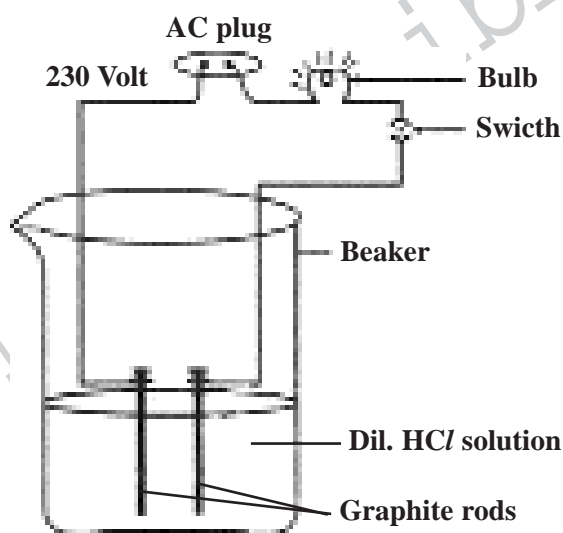
**Step – 4:** Verified above equation for balancing of atoms of each element on both sides hence the equation is balanced.



(OR)

12. B) Write an activity to know whether an acid is strong or weak?

A:



Acid solution in water conducts electricity

★ Connect two different coloured electrical wires to graphite rods separately in a beaker as shown in the figure.

★ Connect free ends of the wires to 230 Volts A.C. plug and complete the circuit by connecting a bulb and switch in the circuit.

- ★ Prepare dilute Hydrochloric acid and pour it in the beaker.
- ★ Switch on current.
- ★ The bulb in the circuit glows. This indicates the flow of electricity through dilute Hydrochloric acid.
- ★ Repeat the experiment taking dilute Acetic acid in the beaker instead of dilute Hydrochloric acid.
- ★ This time the bulb glows with low intensity.
- ★ We thus conclude more  $H^+$  ions are produced in dilute Hydrochloric acid than in Acetic acid.
- ★ So Hydrochloric acid is a strong acid and Acetic acid is a weak acid.

13. A) When we add water to Calcium Oxide or when we add Zinc granules to Hydrochloric acid, heat will be released in both the cases. So Sita told that both of them are the same type of chemical reactions. But Lakshmi told that they are different types of reactions. How does Lakshmi come to this conclusion? Give equations for these reactions.

A: ★ In both the cases heat is released. Therefore They are exothermic reactions. So Sita thought that both of them are the same type of chemical reactions.

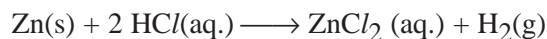
★ Lakshmi told that they are different types of reactions because

★ When Calcium Oxide reacts with water, Calcium hydroxide is formed



It is evident that this is a chemical combination reaction.

★ When Zinc granules react with Hydrochloric acid, Hydrogen gas is released.



It is easy to note that this is a chemical displacement reaction.

So Lakshmi is correct.

(OR)

13. B) a) What are the different types of chemical decomposition reactions?

b) Raghava dissociated water into Hydrogen and Oxygen gases. Draw the diagram for this reaction. What are the apparatus required for this reaction.

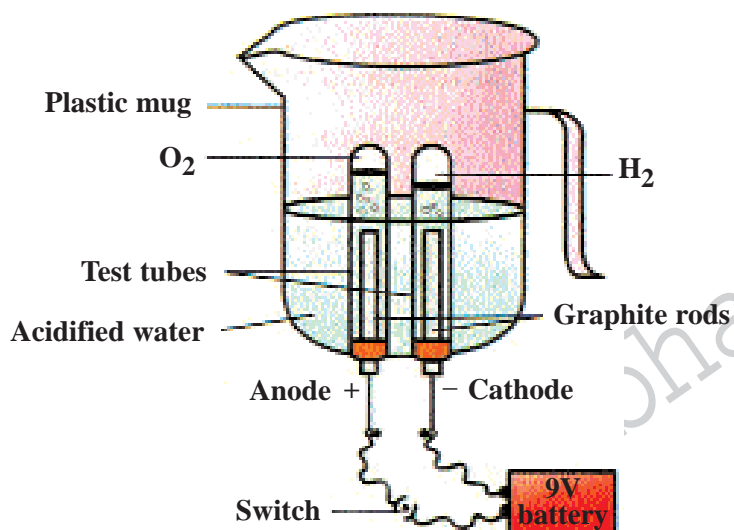
A: a) There are three types of chemical decomposition reactions.

1) Thermal decomposition

2) Photolytic decomposition

3) Electrolytic decomposition

b) Raghava dissociated water by electrolytic decomposition



### Electrolysis of water

#### PART - B

#### ANSWERS

14-A; 15-C; 16-B; 17-B; 18-B; 19-B; 20-A; 21-A; 22-C; 23-C; 24-A; 25-D; 26-D; 27-C; 28-C; 29-B; 30-B; 31-C; 32-A; 33-D.

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