

**BOARD OF SECONDARY EDUCATION (AP)**  
**SUMMATIVE ASSESSMENT – II**  
**TENTH CLASS GENERAL SCIENCE**  
**PHYSICAL SCIENCE MODEL PAPER**  
**PAPER – I (ENGLISH VERSION)**

Time: 2 hrs. 45 mins.

PART – A &amp; B

Maximum Marks: 40

**INSTRUCTIONS:**

- 1) In the time duration of 2 hours 45 minutes, 15 minutes of time is allotted to read and understand the Question Paper.
- 2) Answer the questions under PART – A on a separate answer book.
- 3) Write the answer to the questions under PART – B on the question paper they and attach it to the answer book of PART – A.

Time: 2 hrs.

PART – A

Marks: 30

**SECTION – I**

Note: i) Answer ALL the questions.

ii) Each question carries ONE mark.

iii) Answer each question in 1 – 2 sentences.

 $4 \times 1 = 4$ 

1. See the following table.

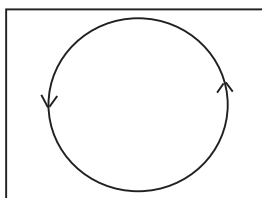
Substance	Refractive Index	Substance	Refractive Index
Ice	1.31	Benzene	1.5
Water	1.33	Carbon di sulphide	1.63

From the table in which substance, the velocity of light is least?

2. Identify the element which forms the ion and give reason.

A:  $1s^2 2s^2 2p^6 3s^2 3p^6$ B:  $1s^2 2s^2 2p^6 3s^2 3p^5$ 

3. The direction of current flowing in a coil is shown in the figure. What type of magnetic pole is formed at the face that has flow of current as shown in the figure



4. Why do we call alkanes as paraffins?

SECTION - II

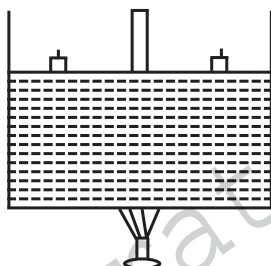
Note: i) Answer ALL the questions.

ii) Each question carries TWO marks.

iii) Answer each question in 4 – 5 sentences.

5 × 2 = 10

5. Consider a cylindrical vessel containing water. A frictionless movable piston is arranged to the cylinder as shown in the figure weights are placed on the piston. Heat the system



- a) When do you say that boiling process takes place?  
 b) Guess, what happens to boiling point when the weights are increased?
6. Distinguish between line spectrum and band spectrum.
7. Your friend required a resistor of resistance 40 Ω, then  
 a) How many resistors he will ask from you?  
 b) How will he connect the resistors?  
 c) Show their equivalent resistance is 10 Ω
8. An element belongs to 13<sup>th</sup> group and 2<sup>nd</sup> period. Now answer the following  
 a) Name of the element  
 b) Whether the element is metal or non-metal  
 c) What is the electronic configuration of element?  
 d) What is its valency?
9. Ranga observed that sky is beautiful with blue colour. How did he appreciate the role of molecules in the atmosphere for the blue colour?

SECTION - III

Note: i) Answer ALL the questions.

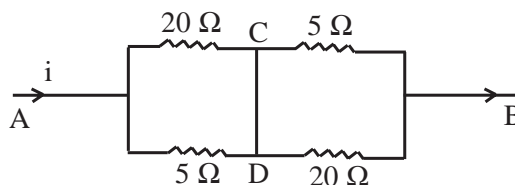
ii) Each question carries FOUR marks.

iii) Answer each question in 8 – 10 sentences.

iv) There is Internal Choice for each question. Only one option from each question is to be attempted.

4 × 4 = 16

10. a) An electric circuit is shown in the figure 'i' is the current entering into the circuit at A.  
 I) What is the potential difference between C and D?  
 II) What is the resultant resistance between A and B?



(OR)

b) Revathi observed reflection of light from a concave mirror. How do you appreciate the use of reflection of light by a concave mirror in making use of TV antenna dishes?

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

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

(OR)

b) How do you explain the process of artificial ripening of fruits by Ethylene.

13. a) Draw-ray diagrams for image formation by a convex lens when  
I) object is placed between the centre of curvature and focal point,  
II) when the object is placed between focal point and optic centre,

Also mention the nature of the image formed in each case.

(OR)

b) What are the various physical methods used for enrichment of the ore. Draw the diagram of the method which is mainly useful for Sulphide ores which have no wetting property whereas impurities get wetted.

**INSTRUCTIONS:**

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

14. Rate of evaporation of a liquid depends on ( )  
 1) its surface area  
 2) mass  
 3) its temperature  
 A) only 1 is correct  
 B) Both 1 and 2 are correct  
 C) 1, 2, 3 are correct  
 D) Both 1 and 3 are correct
15.  $2 \text{C}_3\text{H}_8 + \text{X.O}_2 \longrightarrow 6 \text{CO}_2 + \text{Y.H}_2\text{O}$  in this equation X, Y values are ( )  
 A) X = 4, Y = 8  
 B) X = 10, Y = 4  
 C) X = 10, Y = 8  
 D) X = 2, Y = 9
16. The rear view mirror used in vehicles is ( )  
 A) Plane mirror  
 B) Convex mirror  
 C) Concave mirror  
 D) Reflecting glass plate
17. Planets do not twinkle because ( )  
 1) They are much closer to the Earth  
 2) They are seen as extended sources of light  
 A) 1 and 2 are true  
 B) 1 is false and 2 is true  
 C) Both 1 and 2 are false  
 D) 1 is true and 2 is false
18. When parallel rays of light fall on a lens making some angle with the Principal axis, the rays ( )  
 A) converge at a point  
 B) appear to diverge from a point lying on the focal plane  
 C) go undeviated  
 D) Converge at a point or appear to diverge from a point lying on the focal plane
19. Find the odd one out ( )  
 A)  $c = \frac{v}{\lambda}$       B)  $\lambda = \frac{c}{v}$       C)  $v = \frac{c}{\lambda}$       D)  $c = v\lambda$

20. Match the following. ( )
- |            |              |
|------------|--------------|
| 1) Bauxite | P) Lead      |
| 2) Galena  | Q) Calcium   |
| 3) Gypsum  | R) Aluminium |
- A) 1 – P, 2 – Q, 3 – R  
 B) 1 – Q, 2 – P, 3 – R  
 C) 1 – R, 2 – P, 3 – Q  
 D) 1 – R, 2 – Q, 3 – P
21. Arrange the following in a systematic order ( )
- |                          |                    |
|--------------------------|--------------------|
| i) Modern Periodic table | ii) Law of octaves |
| iii) Periodic table      | iv) Law of triads  |
- A) i, ii, iii, iv  
 B) ii, i, iv, iii  
 C) iv, ii, iii, i  
 D) iii, ii, iv, i
22. a) In series connection of electrical elements the same current flows through each element.  
 b) In parallel connection of electrical elements the same potential difference gets applied across each element ( )
- A) Both a and b are correct  
 B) a is correct but b is wrong  
 C) a is wrong but b is correct  
 D) Both a and b are wrong
23. The speed required for a 3m long conductor placed in a 5 tesla inductive to get an induced emf of 30 V is ( )
- A) 2 kmph  
 B) 2 mps  
 C) 20 kmph  
 D) 10 kmph
24. The minimum number of Carbon atoms in a hydrocarbon to show isomerism ( )
- A) 2  
 B) 3  
 C) 1  
 D) 4
25. Sidgwick and Powell proposed VSEPR... valence bond theory was suggested by ( )
- A) Linus Pauling  
 B) Lewis  
 C) Kossel  
 D) Pauli
26. Test tube P contains rain water, Test tube Q contains sea water on introducing a litmus paper in both of them it is observed that ( )
- A) Paper turns red in P and blue in Q  
 B) Paper turns blue in P and red in Q  
 C) Paper turns blue in both P and Q  
 D) Paper turns red in both P and Q
27. When two Convex lenses are put in contact, their resultant focal length ( )
- A) increases  
 B) decreases  
 C) remains constant  
 D) is zero
28. A soft iron bar is introduced inside a current carrying solenoid. The magnetic field inside the solenoid ( )
- A) increases  
 B) remains constant  
 C) decreases  
 D) becomes zero
29. If 2 ml of Acetic acid was added slowly in drops to 5 ml of water then we will notice ( )
- A) The acid forms a separate layer on the top of water.  
 B) Water forms a separate layer on the top of the acid.  
 C) Formation of a clear and homogeneous solution.  
 D) Formation of a pink and clear solution.

30. The angular-momentum quantum number is related to ( )
- A) Size of the orbit
  - B) Orientation of orbital in space
  - C) Orientation of the spin of the electron
  - D) Shape of the orbital

31.

Effect	Current in ampere
P	.015
Q	.005
R	0.70
S	0.10

This current passing through our body causes spasms ( )

- A) P
- B) S
- C) Q
- D) R

32. Match the following.

- |                                  |                                   |
|----------------------------------|-----------------------------------|
| 1) Total internal reflection ( ) | P) Vertical Shift                 |
| 2) Speed of light ( )            | Q) Refractive index of the medium |
| 3) Glass slab ( )                | R) Brilliance in diamonds ( )     |
| A) 1 – P, 2 – Q, 3 – R           | B) 1 – R, 2 – P, 3 – Q            |
| C) 1 – R, 2 – Q, 3 – P           | D) 1 – Q, 2 – R, 3 – P            |

33. In a home, there is a television in one room and a computer in another room connected in a single circuit. They are connected in .... ( )

- A) Series
- B) One in series and other in parallel
- C) Parallel
- D) any manner

## ANSWERS

### PART – A

#### SECTION – I

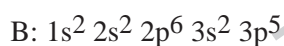
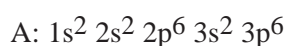
1. See the following table.

Substance	Refractive Index	Substance	Refractive Index
Ice	1.31	Benzene	1.5
Water	1.33	Carbon di sulphide	1.63

From the table in which substance, the velocity of light is least?

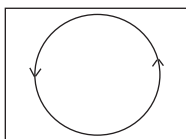
- A:** 1) The velocity of light in a medium is inversely proportional to its refractive index.  
 2) So the velocity of light is least in carbon di sulphide as its refractive index is 1.63 which is highest in the table given.

2. Identify the element which forms the ion and give reason.

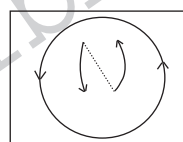


- A:** 1) Element B forms ion.  
 2) As it requires only one electron for nearest inert gas electronic configuration. Then it forms as an anion.

3. The direction of current flowing in a coil is shown in the figure. What type of magnetic pole is formed at the face that has flow of current as shown in the figure?



- A:** 1) North pole is formed at the face we are observing.  
 2) Since the current is flowing in the anticlockwise direction.

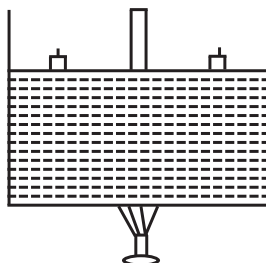


4. Why do we call alkanes as paraffins?

- A:** 1) Alkanes are saturated hydrocarbons with least reactivity. So they are called Paraffins. (Parum = little, affins = affinity)

#### SECTION – II

5. Consider a cylindrical vessel containing water. A frictionless movable piston is arranged to the cylinder as shown in the figure weights are placed on the piston. Heat the system



- a) When do you say that boiling process takes place?  
 b) Guess, what happens to boiling point when the weights are increased?

- A:**
- 1) The weights on the Piston fall down, when the boiling process takes place.
  - 2) There will be no change in boiling point of water when the weights are increased. This is because the piston is a frictionless movable one.

**6. Distinguish between line spectrum and band spectrum.**

**A:**

S. No.	Line Spectrum	Band Spectrum
1.	This is characteristic of atoms and is also called as atomic spectrum.	This is characteristic of molecules and is also called as molecular spectrum.
2.	The line spectrum is given by inertgases, metal vapours and atomised non-metals.	The band spectrum is given by hot metals and molecular non-metal.

**7. Your friend required a resistor of resistance 40 Ω, then**

- a) How many resistors he will ask from you?
- b) How will he connect the resistors?
- c) Show their equivalent resistance is 10 Ω

- A:**
- a) He will ask four resistors.
  - b) He will connect the resistors in parallel.
  - c) Let R be the equivalent resistance

$$\text{then } \frac{1}{R} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \frac{1}{R_4}$$

$$\text{But } R_1 = R_2 = R_3 = R_4 = 40 \Omega$$

$$\therefore \frac{1}{R} = \frac{1}{40} + \frac{1}{40} + \frac{1}{40} + \frac{1}{40} = \frac{4}{40} = \frac{1}{10}$$

$$\therefore R = 10 \Omega$$

**8. An element belongs to 13<sup>th</sup> group and 2<sup>nd</sup> period. Now answer the following**

- a) Name of the element
- b) Whether the element is metal or non-metal
- c) What is the electronic configuration of element?
- d) What is its valency?

- A:**
- a) Name of the element is Boron;
  - b) The element is a metal
  - c) Electronic configuration of Boron is  $1s^2 2s^2 2p^1$
  - d) Valency of Boron is 3.



9. Ranga observed that sky is beautiful with blue colour. How did he appreciate the role of molecules in the atmosphere for the blue colour?

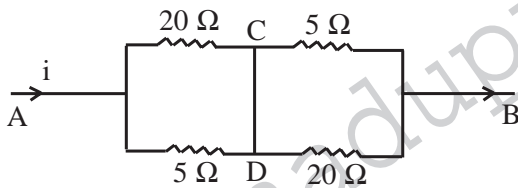
- A:
- 1) Atmosphere consists of many atoms and molecules of Nitrogen and Oxygen.
  - 2) These molecules are responsible for the blue colour of the sky.
  - 3) The sized of these molecules are comparable to the wavelength of blue colour light.
  - 4) These molecules act as scattering centres for the blue light. So Ranga appreciated the role of these molecules in the sky.

**SECTION – III**

10. a) An electric circuit is shown in the figure 'i' is the current entering into the circuit at A.

I) What is the potential difference between C and D?

II) What is the resultant resistance between A and B?



A: I) According to Kirchhoff's laws (Loop law):

- ★ The algebraic sum of increase and decrease in potential difference across various components of the circuit in a closed circuit loop must be zero.
- ★ So the potential difference across CD is zero because it is a closed loop.

II) Resultant resistance between A and B:

- i) 20 Ω and 5 Ω are parallel to each other.
- ii) Their resultant are in series.

$$\therefore \text{Resultant of } 20 \Omega \text{ and } 5 \Omega : \frac{1}{R_1} = \frac{1}{20} + \frac{1}{5} = \frac{1+4}{20} = \frac{5}{20}$$

$$\therefore R_1 = \frac{20}{5} = 4 \Omega$$

iii) For the other two resistors resultant:  $R_2 = 4 \Omega$

$$\therefore \text{The resultant resistance between A and B} = 4 + 4 = 8 \Omega$$

(OR)

b) Revathi observed reflection of light from a concave mirror. How do you appreciate the use of reflection of light by a concave mirror in making use of TV antenna dishes?

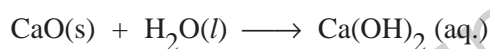
- A:
- ★ Revathi observed that a parallel beam of light rays incident on a concave mirror are converging at its focus.
  - ★ The concave shape or the parabolic shape of a dish also reflects the incident parallel signals at the dish's focal point.
  - ★ A device called feed horn is mounted on brackets at the dish's focal point.
  - ★ This feed horn is a wave guide. This gathers the signals at or near the focal point of the dish and then conducts them to a LNB (Low-Noise Block down convertor).

- ★ The LNB converts these electromagnetic waves into electric signals and transmits to the receiver (TV Set).
- ★ All this process is made possible only with parabolic (concave shape) dish antennas.
- ★ Nowadays TV is an important thing in every house. I appreciate the application of concave mirror's property in the preparation of parabolic dish antenna.

11. 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 of 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 liberated.

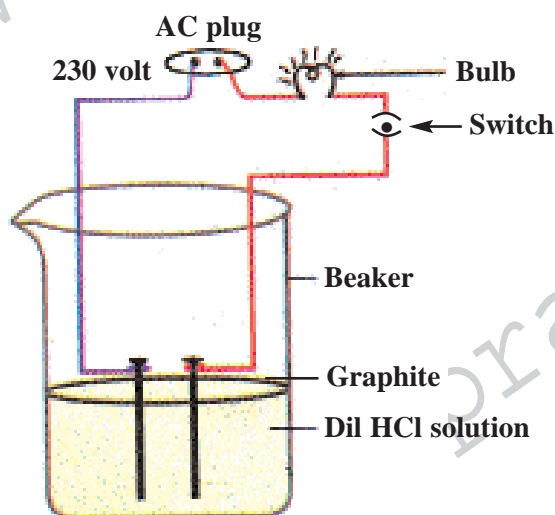


- ★ It is easy to note that this is a chemical displacement reaction. So Lakshmi is correct

(OR)

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

A:



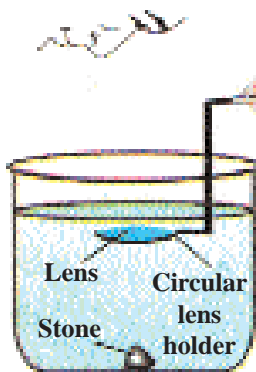
#### Acid solution in water conducts electricity

- ★ Connect two different coloured electrical wires to graphite rods separately in a beaker as shown in the figure.
- ★ Connect free ends of the wire to 230 Volts AC 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 the 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.

12. a) **How do you verify experimentally that the focal length of a 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 of the focal length of the lens.
- ★ Keep a black stone inside the vessel at its bottom.
- ★ Now pour water into the vessel upto a height such that the height of the water level from the top of the stone is greater than 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 or less than focal length of lens.
- ★ Now look at the stone through the lens.
- ★ We can see the image of the stone if the distance between lens and stone is less than the focal length of the lens.
- ★ Now increase the distance between lens and stone until you cannot see the image of the stone.
- ★ We have dipped the lens to a certain height which is greater than the focal length of lens in air but we can see the image. This shows that the focal length of lens has increased in water.

(OR)

b) **How do you explain the process of artificial ripening of fruits by Ethylene.**

- A:
- ★ The starch present in the fruit breaks down to sugar during the process of ripening. The colour of the skin of the fruit also changes.
  - ★ Ripening of fruits depend upon the season. The plant detects the changes in the season, and produce ethylene ( $C_2H_4$ ) and distributes across the plant.
  - ★ When Ethylene reaches the fruits, it sends a signal to all the cells in the fruit to make enzymes which breaks starch into Sugar.
  - ★ The cells in the skin of the fruit start making pigments, which gives colour to the skin of the fruit.

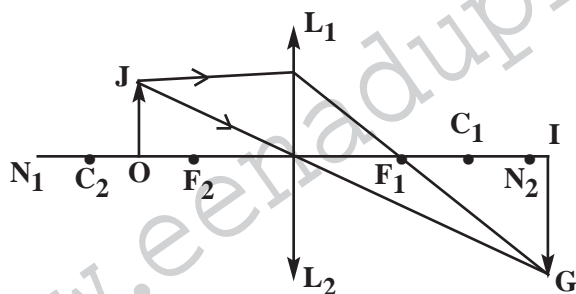
**Artificial ripening:**

- ★ Raw fruits are kept in hay-lined wooden boxes called crates. These crates are stacked on shelves and a wood fire is lit below them.
- ★ The smoke contains Ethylene and Acetylene gases which induce ripening.
- ★ Fruits are placed in a room in which Ethylene gas or Acetylene gas is introduced.
- ★ In another method Calcium carbide ( $\text{CaC}_2$ ) is applied over fruits. It reacts with moisture to form Acetylene, which induces ripening.

13. a) Draw-ray diagrams for image formation by a convex lens when
- I) object is placed between the centre of curvature and focal point,
  - II) when the object is placed between focal point and optic centre,

Also mention the nature of the image formed in each case.

- A: I) When the object is placed between the centre of curvature and focal points.

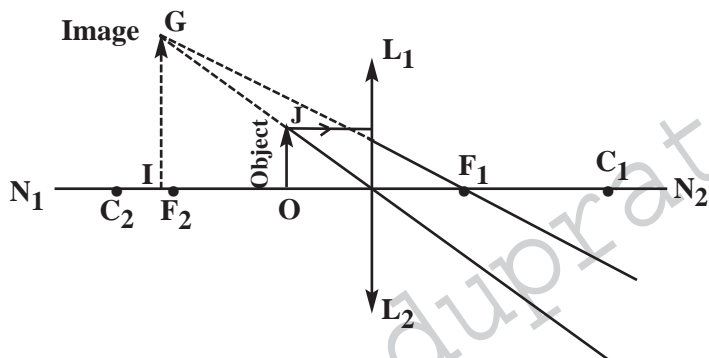


- Parts:**  $L_1, L_2$  : Convex Lens  
 $N_1, N_2$  : Principal axis  
 $C_1, C_2$  : Centres of curvature  
 $F_1, F_2$  : Focii on either side of the lens.  
 OJ : Object  
 IG : Image

**Nature of the Image:**

- ★ Real and inverted image bigger than the object formed beyond  $C_1$ .

- II) When the object is placed between focal point and optic centre.



- PartS:**  $L_1, L_2$  : Convex Lens  
 $N_1, N_2$  : Principal axis  
 $C_1, C_2$  : Centres of curvature  
 $F_1, F_2$  : Focii on either side of the lens.  
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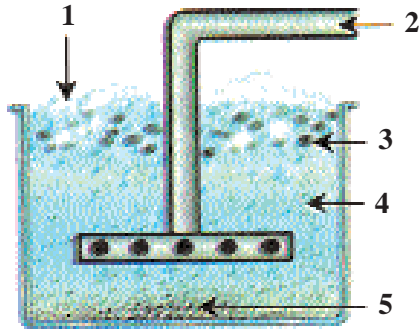
**Nature:** Image is virtual and erect.

It is formed on the same side of the object, magnified.

(OR)

- b) What are the various physical methods used for enrichment of the ore. Draw the diagram of the method which is mainly useful for Sulphide ores which have no wetting property whereas impurities get wetted.

- A: 1) Hand Picking, Washing, Frothflotation, Magnetic Separation are some physical methods used for enrichment of the ore.
- 2) Frothflotation process is used for the concentration of sulphide ores.



Frothflotation Process

**PARTS**

1. Froth bubbles carrying sulphide ore particles
2. Compressed air
3. Sulphide ore particles
4. Water containing Pine oil
5. Gangue

**PART - B**

**ANSWERS**

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

**Writer: C.V. SARVESWARA SARMA**