

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

Time: 2 hrs. 45 mins.

PART – A & B

Maximum Marks: 40

**INSTRUCTIONS:**

- In the time duration of 2 hrs. 45 mins. 15 minutes of time is allotted to read and understand the question paper.
- Answer the questions under PART – A on 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.

Time: 2 hrs. 15 mins.

PART – A

Marks: 35

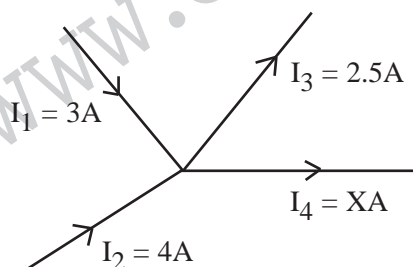
**INSTRUCTIONS:**

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

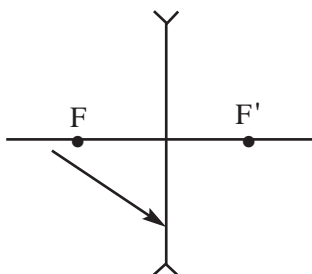
**SECTION – I**

**INSTRUCTIONS:**

- Answer ALL the questions.
  - Each question carries ONE Mark.
  - Write the answers in 1 – 2 sentences.  $7 \times 1 = 7$
- What are the modifications that are to be made to change AC generator as DC generator?
  - On what basis did Mandeleev arrange the elements in his periodic table.
  - What do we call the compounds formed by C, H, X?
  - What is the change you observe in litmus paper with base?
  - Find the value of 'X' in the following figure.



6. Which hydrocarbons burn with bright blue flame and used as fuels?
7. Complete the ray diagram to show the path of the ray after refraction through the lens shown in the figure.

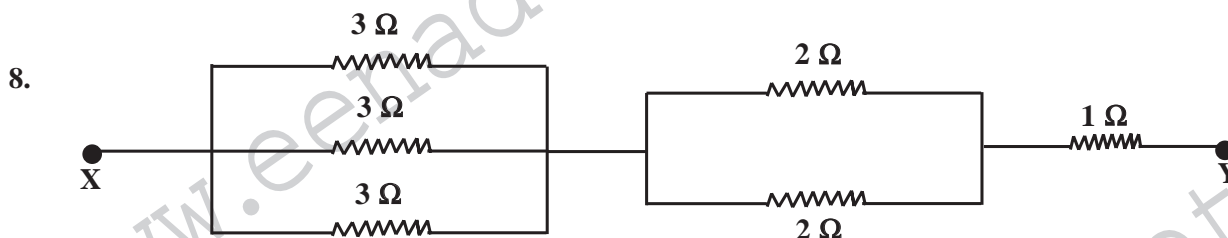


### SECTION - II

#### INSTRUCTIONS:

- i) Answer ALL the questions.
- ii) Each question carries TWO Marks.
- iii) Answer the questions in 4 – 5 sentences.

$$6 \times 2 = 12$$



From the above circuit diagram find the effective resistance between X and Y.

9. Write the difference between ionic bond and covalent bond.
10. Predict what happens if the fuse is not used in house hold electric circuits.
11. What happens if magnetic fields does not form in current carrying conductor?
12. Draw the shapes of s and p orbitals.
13. What are the uses of Plaster of Paris?

### SECTION - III

#### INSTRUCTIONS:

- i) Answer ALL the questions.
  - ii) Each question carries FOUR Marks.
  - iii) There is Internal Choice for each question. Only one option from each question is to be attempted.
  - iv) Answer each question in 8 – 10 sentences.
14. Explain the nature of images formed with the help of ray diagrams, when an object is placed at different points before a concave mirror.

(OR)

In Doshagna's house there are four tubelights, two fans and one television. A tubelight consumes 40 W, a fan 80 W, a TV 100 W. If each tubelight is used for 5 hours, two fans for 12 hours and TV for 6 hours in a day. Find the cost of electric energy used 30 days at the rate of Rs.2 per unit.

15. Explain different factors which influence the Ionization energy.

(OR)

Q: What are the methods of concentration of ores and explain.

16. How can you verify the Faraday's law of induction with the help of an experiment.

(OR)

Q: List out the apparatus required to find the refractive index of a prism experimentally. Explain the procedure with the help of a rough diagram.

17. Observe the table and answer the questions.

| Groups →  | 1  | 2  | 13 | 14 | 15 | 16 | 17 |
|-----------|----|----|----|----|----|----|----|
| ↓ Periods |    |    |    |    |    |    |    |
| 3         | Na | Mg | Al | Si | P  | S  | Cl |
| 4         | K  | Ca | Ga | Ge | As | Se | Br |
| 5         | Rb | Sr | In | Sn | Sb | Te | I  |

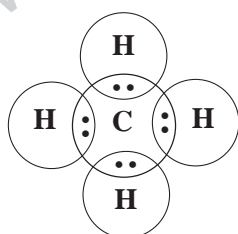
i) Which elements atom has less atomic size?

ii) Write the electronic configuration of Mg, K.

iii) Find the elements whose physical and chemical properties are same as of Ca.

iv) Which is element of more atomic radius?

(OR)



Observe the figure given and answer the questions.

i) How many valence electrons are there in Carbon atom?

ii) What is the valency of Hydrogen?

iii) How many covalent bonds are there in this molecule?

iv) What is the bond angle between H C H?

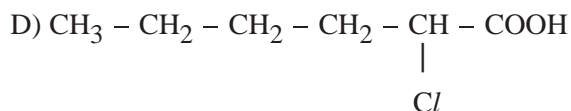
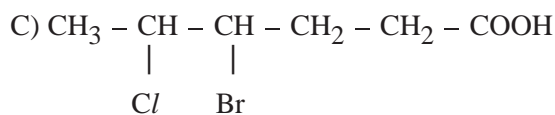
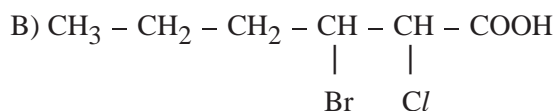
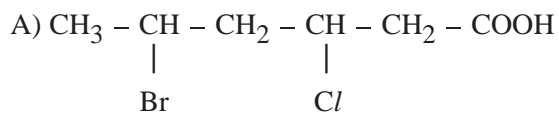
## INSTRUCTIONS:

- 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 any over writing and rewriting or erased answers.
- v) Write the CAPITAL LETTER (A, B, C, D) showing the correct answer for the following questions in the brackets provided against them.

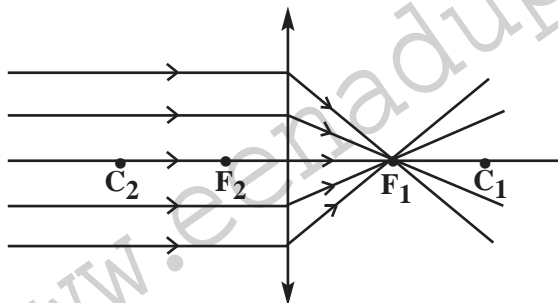
$$10 \times \frac{1}{2} = 5$$

18. Select the incorrect balanced chemical equation from the following ( )
- A)  $4 \text{NH}_3 + \text{Cl}_2 \longrightarrow \text{N}_2\text{H}_4 + 2 \text{NH}_4\text{Cl}$
- B)  $\text{NH}_3 + 3 \text{Cl}_2 \longrightarrow \text{NCl}_3 + 3 \text{HCl}$
- C)  $8 \text{NH}_3 + 3 \text{Cl}_2 \longrightarrow 6 \text{NH}_4\text{Cl} + \text{N}_2$
- D)  $2 \text{NH}_3 + 3 \text{Cl}_2 \longrightarrow 2 \text{NCl}_3 + 3 \text{HCl}$
19. Match the following. ( )
- |                            |                               |
|----------------------------|-------------------------------|
| 1. Electric generator (AC) | a) Electro magnetic induction |
| 2. Solenoid                | b) Two slip rings             |
| 3. Electric Motor          | c) Two commutators            |
| 4. Electric generator (DC) | d) Soft Iron Rod              |
- A) 1-b, 2-d, 3-c, 4-a
- B) 1-a, 2-d, 3-b, 4-c
- C) 1-b, 2-a, 3-c, 4-d
- D) 1-b, 2-d, 3-a, 4-c
20. If the convex lens is in water its focal length ( )
- A) remain same
- B) decreases
- C) increases
- D) None
21. If we add few drops of universal indicator to dilute Hydrochloric acid then the colour of the solution is ( )
- A) Red
- B) Yellow
- C) Violet
- D) Green
22.  $R = e \frac{l}{A}$  in this formula 'l' indicates ( )
- A) resistance
- B) radius
- C) Area of cross section
- D) length

23. The structure of 3 - bromo - 2 - chloro - hexanoic acid is ( )



24. In the following figure  $F_1$  Show ( )



A) centre of concave lens

B) centre of convex lens

C) Focus of concave lens

D) Focus of convex lens

25. Lewis structure of oxygen is ( )



26. The mirrors used in the solar devices are

A) concave mirror

B) convex mirror

C) plane mirror

D) None of these

27. Which substance is used to detect the ethanol in the drivers breath ( )

A)  $\text{K}_2\text{Cr}_2\text{O}_7$

B)  $\text{CH}_3\text{COOH}$

C)  $\text{CH}_3\text{OH}$

D)  $\text{CHCl}_3$

## ANSWERS

### PART - A

#### SECTION - I

1. What are modifications that are to be made to change AC generator as DC generator?

A: Two half Slip rings are to be connected to the ends of the coil in place of full slip rings. Then AC generator works as DC generator.

2. On what basis did Mandeleev arrange the elements in his periodic table?

A: Atomic masses

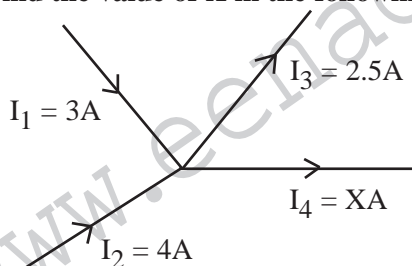
3. What do we call the compounds formed by C, H, X?

A: Halo Hydrocarbons

4. What is the change you observe in litmus paper with base?

A: In the presence of base, red litmus turns blue and blue litmus remains unchanged

5. Find the value of X in the following figure



A: From junction law

$$I_1 + I_2 = I_3 + I_4$$

$$3 + 4 = 2.5 + X$$

$$7 = 2.5 + X$$

$$X = 7 - 2.5$$

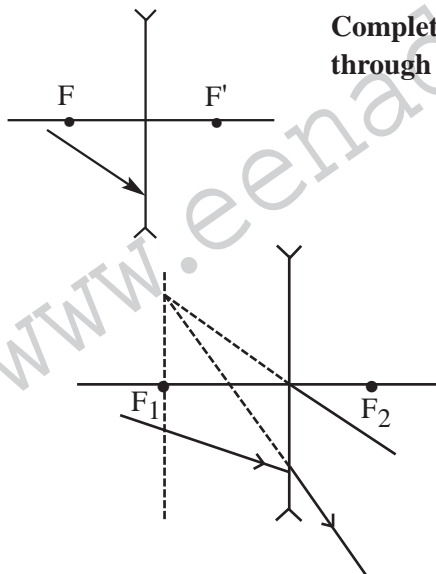
$$X = 4.5A$$

6. Which hydrocarbons burn with bright blue flame and used as fuels?

A: Saturated hydrocarbons

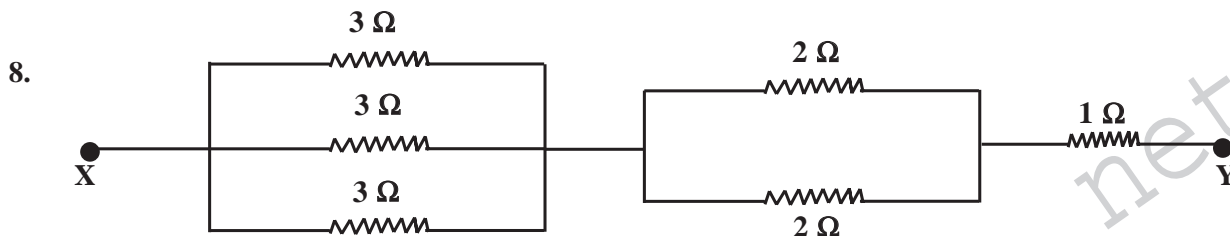
7.

Complete the ray diagram to show the path of the ray after refraction through the lens shown in the figure.



A:

SECTION – II



From the above circuit diagram find the effective resistance between X and Y.

A: Resistance of 1<sup>st</sup> parallel combination is  $= \frac{1}{3} + \frac{1}{3} + \frac{1}{3} = \frac{1+1+1}{3} = \frac{3}{3} = 1 \Omega$

Resistance of 2<sup>nd</sup> parallel combination is  $= \frac{1}{2} + \frac{1}{2} = \frac{1+1}{2} = \frac{2}{2} = 1 \Omega$

These two are in series with 1 Ω in between X and Y

∴ Effective resistance between X and Y is  $= 1 + 1 + 1 = 3 \Omega$

9. Write the difference between ionic bond and covalent bond.

| Ionic bond   | Covalent bond   |
|--|---|
| ★ It is formed by transfer of electrons from one atom to the other.            | ★ It is formed by the sharing of electron pairs by two atoms.   |
| ★ It is formed between metal and non – metal.                                  | ★ It is formed between non – metals.  |
| ★ Ionic substances are formed by ionic bonds.<br>e.g.: NaCl, MgCl <sub>2</sub> | ★ Covalent substances are formed by covalent bonds.<br>e.g.: N <sub>2</sub> , H <sub>2</sub> O, NH <sub>3</sub> |
| ★ Ionic bond is non – directional  | ★ Covalent bond is directional  |

10. Predict what happens if the fuse is not used in current carrying conductor?

A: ★ If fuse is not used in the house hold electrical circuits then there is a possibility of damage of electrical appliances due to electrical fluctuations.

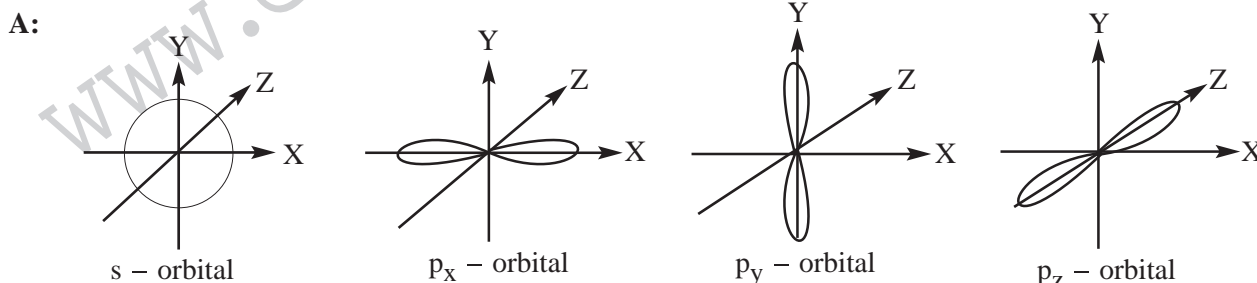
★ We can not protect the appliances from overload

11. What happens if magnetic fields does not form in current carrying conductor?

A: ★ Electro magnetism does not exist.

★ The appliances like motor, dynamo, electric bell etc. can not be possible.

12. Draw the shapes of s and p orbitals.



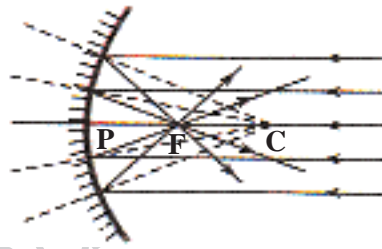
13. What are the uses of plaster of paris?

- A: ★ Plaster of Paris is used as plaster for supporting fractured bones in the right position.  
 ★ Plaster of Paris is used for making statues, moulds, black board chinks, toys, materials for decoration and for making surfaces smooth.

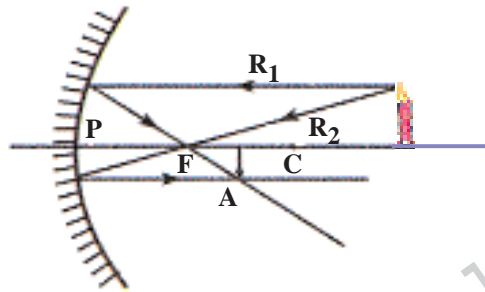
SECTION – III

14. Explain the nature of images formed with the help of ray diagrams, when an object is placed at different points before a concave mirror.

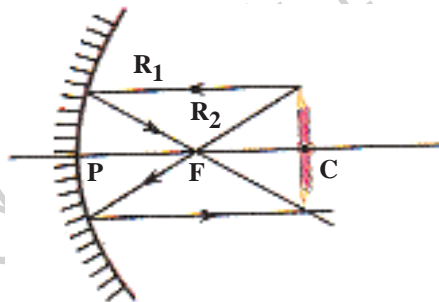
- A: i) **When an object is at infinity:** When an object is at infinity, the image is formed at focal point (F) of the mirror. The image is real and point sized.



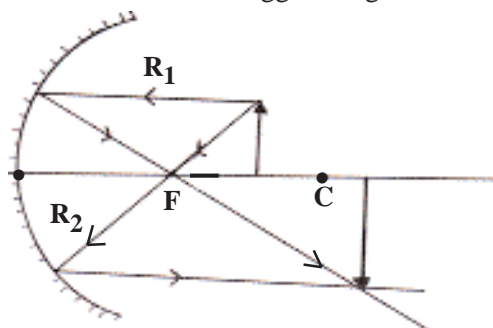
- ii) **When the object is between infinity and centre of curvature:** When the object is in between infinity and centre of curvature (C), the image is formed between F and C. This is a real inverted and smaller image.



- iii) **When the object is at C:** When the object is at C, The image also forms at c. This is a real, inverted and same sized image.

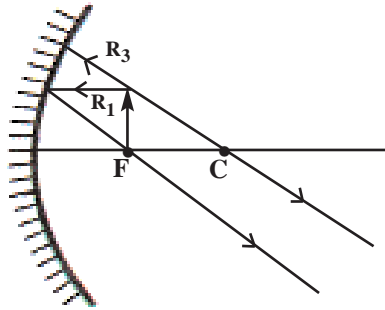


- iv) **When the object is in between C and F:** When the object is in between F and C, The image is formed beyond C. This is a real, inverted and bigger image.

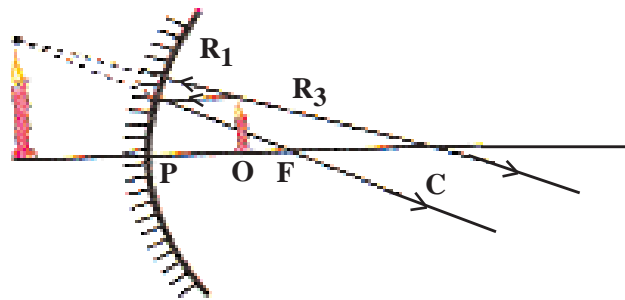




v) **When the object is at F:** When the object is at F, the image is formed at infinity.



vi) **When the object is between F and pole:** When the object is in between F and pole, the image forms behind the mirror. This is a virtual, enlarged and erect image.



(OR)

**Q:** In Doshagna's house there are four tube lights, two fans and one Television. A tube light consumes 40 W, a fan 80 W, a T.V. 100 W. If each tube light is used for 5 hours, two fans for 12 hours and T.V. for 6 hours in a day. Find the cost of electric energy used for 30 days at the rate of Rs.2 per unit.

**A:** Energy consumed by the tube lights in a day = no. of tube lights  $\times$  Wattage  $\times$  hours of use per day  
 $= 4 \times 40 \times 5$   
 $= 800 \text{ WH}$

Energy consumed by the fans in a day = no. of fans  $\times$  Wattage  $\times$  hours of use per day  
 $= 2 \times 80 \times 12$   
 $= 1920 \text{ WH}$

Energy consumed by the television in a day = no. of Televisions  $\times$  Wattage  $\times$  hours of use per day  
 $= 1 \times 100 \times 6$   
 $= 600 \text{ WH}$

Total power consumption in a day =  $800 + 1920 + 600$   
 $= 3320 \text{ WH}$

Total energy consumption in KWHS per month =  $\frac{3320 \times 30}{1000}$   
 $= 99.6 \text{ KWH or } 99.6 \text{ units}$

cost of 1 unit = Rs 2.00

$\therefore$  cost of 99.6 units =  $99.6 \times 2$   
 $= \text{Rs } 199.20$

15. Explain different factors which influence the Ionization energy?

A: Factors effect the ionization energy:

i) **Nuclear charge:** More the nuclear charge more is the ionization energy.

e.g.: Between  $_{11}\text{Na}$  and  $_{17}\text{Cl}$ , Chlorine atom has more ionization energy.

ii) **Screening effect or Shielding effect:** More the shells with electrons between the nucleus and the valence shell, they act as screens and decrease nuclear attraction over valence electron. This is called the screening effect. More the screening effect, less is the ionization energy.

e.g.: Between  $_{3}\text{Li}$  and  $_{55}\text{Cs}$ , the element  $_{55}\text{Cs}$  with more inner shells has less ionization energy.

iii) **Penetration power of the orbitals:** Orbitals belonging to the same main shell have different piercing power towards the nucleus, for example  $4s > 4p > 4d > 4f$  in the penetration. Therefore it is easier to remove  $4f$  electron than  $4s$ .

iv) **Stable configuration:** It is easier to remove one electron from  $_{8}\text{O}$  ( $1s^2 2s^2 2p^4$ ) than  $_{7}\text{N}$  ( $1s^2 2s^2 2p^3$ ). This is because,  $_{7}\text{N}$  has stable half filled configuration.

v) **Atomic radius:** More the atomic radius, less is the ionization energy of 'F' is greater than that of 'I'.

(OR)

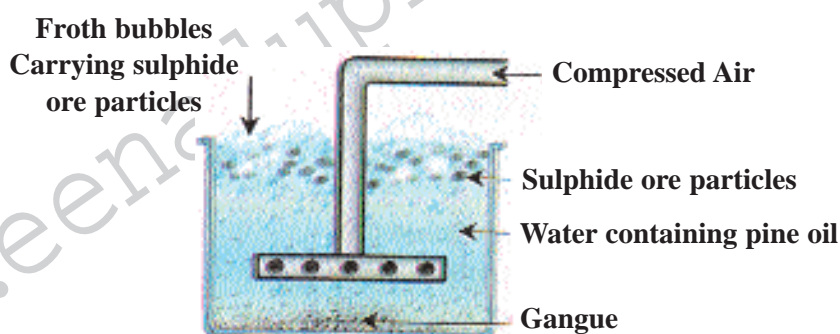
Q: What are the methods of concentration of ores and explain.

A: The physical methods adopted in dressing of the ore or enriching of the ore depends upon difference between physical properties of ore and gangue.

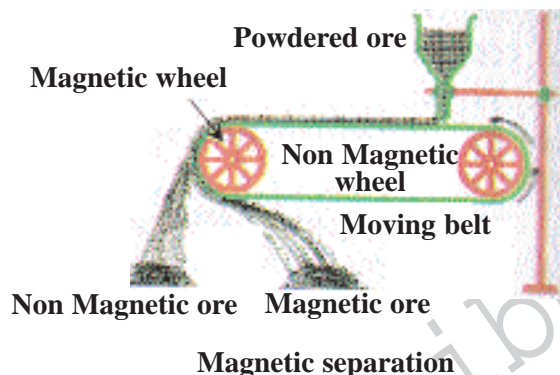
1) **Hand picking:** If the ore particles and the impurities are different in one of the properties like colour, size etc, using that property the ore particles are handpicked separating them from other impurities.

2) **Washing:** Ore particles are crushed and kept on a sloppy surface. They are washed with controlled flow of water. Less dense impurities are carried away by water flow, leaving the more dense ore particles behind.

3) **Froth floatation:** This method is mainly useful for Sulphide ores which have no wetting property where as the impurities get wetted. The ore with impurities is finely powdered and kept in water taken in a flotation cell. Air under pressure is blown to produce froth in water. Froth so produced, takes the ore particles to the surface where as impurities settle at the bottom. Froth is separated and washed to get ore particles.

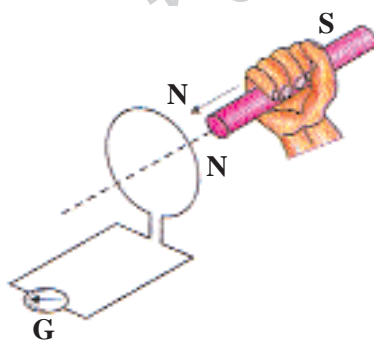


- 4) **Magnetic Separation:** If the ore or impurity, one of them is magnetic substance and the other non-magnetic substance they are separated using electromagnets.



16. How can you verify the Faraday's law of induction with the help of an experiment

A:



- ★ Connect the terminals of a coil to sensitive ammeter (galvanometer) as shown in the figure given above.
- ★ Push a bar magnet towards a coil, with its north pole facing the coil, the needle in the galvanometer, deflects.
- ★ It shows that a current has been set up in the coil.
- ★ The galvanometer does not deflect if the magnet is at rest.
- ★ If the magnet is moved away from the coil, the needle in the galvanometer again deflects, but in the opposite direction, which means that a current has been set up in the coil in the opposite direction.
- ★ If we use the end of south pole of a magnet instead of north pole, the experiment works just as described but the deflections are exactly reversed.
- ★ Further experimentation enable us to understand that relative motion of the magnet and coil set a current in the coil. It makes no difference whether the magnet is moved towards the coil or the coil towards the magnet.
- ★ Whenever there is a continuous change of magnetic flux linked with closed coil, the current is generated in the coil. This is one form of Faraday's law.

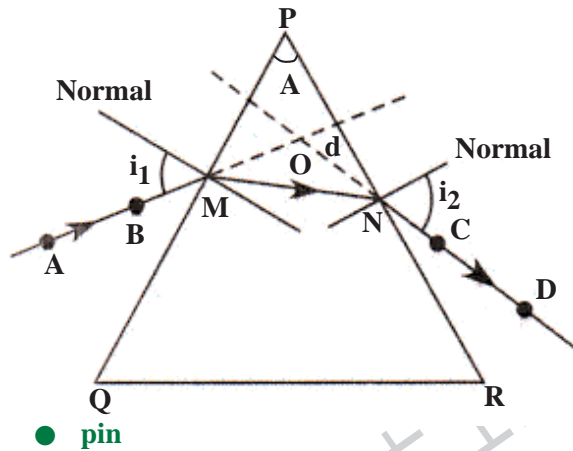
(OR)

- Q: List out the apparatus required to find the refractive index of a prism experimentally.  
Explain the procedure with the help of a rough diagram.

A: **AIM:** Finding the refractive index of a prism.

**Material required:** Prism, piece of white chart of size  $20 \times 20$  cm pencil, pins, scale and protractor.

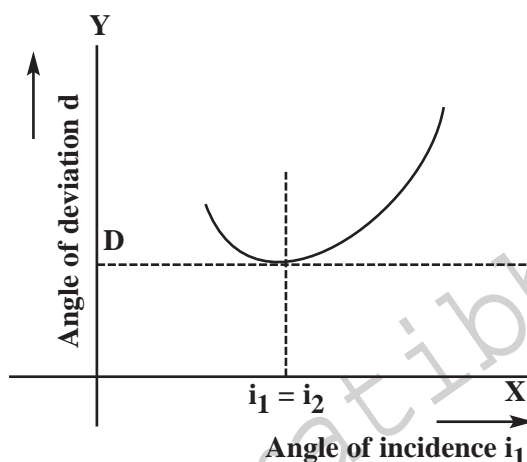
**Procedure:**



- ★ Let us take a prism and place it on the white chart in such a way that the triangular base of the prism on the chart.
- ★ Let us draw a line around the prism, using a pencil, having vertices P, Q and R and remove the prism.
- ★ Measure the angle between PQ and QR which gives the angle of prism (A)
- ★ Let us consider a light ray 'AB' incident on at 'M'. Draw a normal at 'M'.
- ★ Let us mark 'M' on PQ and draw a perpendicular to PQ at M.
- ★ Let us mark an angle of  $30^\circ$  and draw a line 'AB' at M which gives the incident ray. The angle of incidence is ' $i_1$ '.
- ★ Fix two pins vertically on the line AB.
- ★ Now let us look for the images of two pins through the prism on other side and fix another two pins say 'C' and 'D'.
- ★ Remove the prism and draw a line to PR which passes through C and D points. This line gives emerging ray.
- ★ Draw a normal to 'PR' and measure the angle between CD normal, which gives the angle of emergence ( $i_2$ ).
- ★ Now extend, the both incident and emergent ray till they meet at a point 'O'.
- ★ Measure the angle between the extended two rays which gives angle of deviation (d).
- ★ As the angle of incidence changes angle of deviation also changes. Repeat this procedure for various angles of incidence such as  $40^\circ$ ,  $50^\circ$ ,  $60^\circ$  etc.
- ★ Now tabulate the reading of angle of incidence ( $i_1$ ) angle of emergence ( $i_2$ ) and angle of deviation (d).

| Angle of incidence ( $i_1$ ) | Angle of emergence ( $i_2$ ) | Angle of deviation (d) |
|------------------------------|------------------------------|------------------------|
|                              |                              |                        |
|                              |                              |                        |
|                              |                              |                        |

- ★ As the angle of incidence is increases, Angle of deviation decreases and attains a minimum value (Angle of minimum deviation) and further it increases with increasing in angle of incidence.



- ★ By taking angle of incidence along X – axis and the angle of deviation along Y – axis draw a graph, and from this graph find the angle of minimum deviation D.

- ★ Angle of prism is A, Angle of minimum deviation is D then refractive index of

$$\text{prism 'n'} = \frac{\sin\left(\frac{A + D}{2}\right)}{\sin\frac{A}{2}}$$

17. Observe the table and answer the questions.

| → Groups  | 1  | 2  | 13 | 14 | 15 | 16 | 17 |
|-----------|----|----|----|----|----|----|----|
| ↓ Periods |    |    |    |    |    |    |    |
| 3         | Na | Mg | Al | Si | P  | S  | Cl |
| 4         | K  | Ca | Ga | Ge | As | Se | Br |
| 5         | Rb | Sr | In | Sn | Sb | Te | I  |

- Which elements atom has less atomic size?
- Write the electronic configurations of Mg, K.
- Find the elements whose physical and chemical properties are same as of Ca.
- Which is the element of more atomic radius?

**A:** (i) Cl (Chlorine)

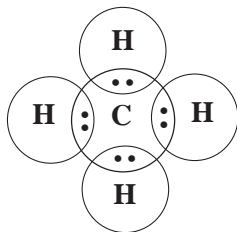


(iii) Mg, Sr

(iv) Rb

(OR)

Q:



Observe the figure given and answer the questions.

- (i) How many valence electrons are there in Carbon atom?
- (ii) What is the valency of Hydrogen?
- (iii) How many covalent bonds are there in this molecule?
- (iv) What is the bond angle between HCH?

- A:
- (i) Four
  - (ii) 1
  - (iii) Four
  - (iv) 109° 28'

PART – B

ANSWERS

18-D; 19-D; 20-C; 21-A; 22-D; 23-B; 24-D; 25-D; 26-A; 27-A.

Writer: K. Gagan Kumar