

**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

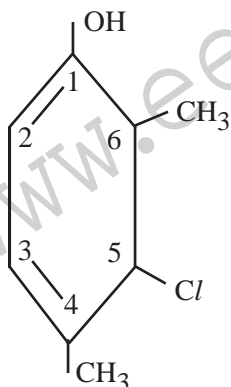
**INSTRUCTIONS:**

- 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.  $7 \times 1 = 7$
- Li, Na, K are Dobereiner's triad. The atomic weight of Li is 7 and that K is 39, then find the atomic weight of Na.
  - Write the IUPAC name of the given compound.



3.  $\text{Cr}_2\text{O}_3 + \text{NaOH} + \text{O}_2 \longrightarrow \text{Na}_2\text{CrO}_4 + \text{H}_2\text{O}$   
Balance the above chemical equation
4. What is the nature of the image formed on the retina?
5. The potential difference across a bulb is 240 V and a current of 5 A flows through it. Find the resistance of the bulb.
6. Draw the figure of  $\text{BeCl}_2$  molecule which has linear structure and identify the bond angle.
7. Which instrument is used to measure electric current?

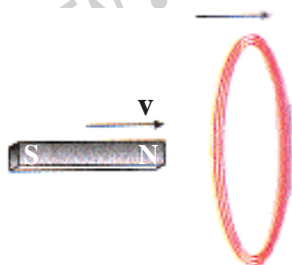
### SECTION - II

#### INSTRUCTIONS:

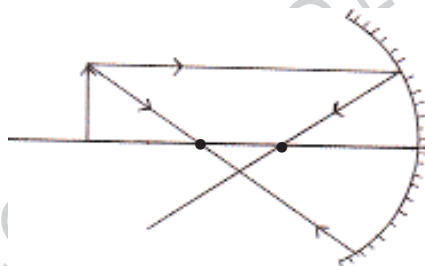
- i) Answer ALL the questions.
- ii) Each question carries TWO Mark.
- iii) Answer the questions in 4 – 5 sentences.

6 × 2 = 12

8. Can a convex mirror burn a paper?  
Imagine why it happens?
9. Imagine what happens if electron transfer is not possible in between of atoms.
10. Explain an activity showing the formation of precipitate in chemical reactions
11. As shown in figure if a bar magnet is moved towards a coil, current is induced then



- a) What is the direction of induced current?
  - b) Draw the magnetic field lines created by bar magnet's pole at coil and also lines formed by the coil.
12. In the given ray diagram mention the pole of mirror, Focus, centre of curvature, position of image.



13. Write the uses of nanotubes.

## 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.  $4 \times 4 = 16$

14. Describe the image formation by a convex lens for various positions of the object.

(OR)

Sky appears sometimes white and sometimes blue in colour, and Sun appears red in colour during Sunrise and Sunset. State the reasons.

15. Explain the formation of Ionic Compounds  $\text{NaCl}$ ,  $\text{MgCl}_2$  through Lewis electron dot symbol.

(OR)

What are the different stages of extraction of metal from an ore? Write a note on any one of the stages.

16. List out the apparatus required to verify that  $\frac{V}{I}$  is constant for a conductor. Explain the experiment with help of a diagram.

(OR)

Write an experimental method in measure the distances of object and image using concave mirror and write the table for observations.

17. In the following table the salts which are formed by Acids and bases and pH values are given. Observe the following table and answer the questions given below.

Acid	Base	Salt	pH Value
$\text{HCl}$	$\text{NH}_4\text{OH}$	$\text{NH}_4\text{Cl}$	$< 7$
$\text{HCl}$	$\text{NaOH}$	$\text{NaCl}$	$7$
$\text{HNO}_3$	$\text{KOH}$	$\text{KNO}_3$	$7$
$\text{H}_2\text{CO}_3$	$\text{NaOH}$	$\text{Na}_2\text{CO}_3$	$> 7$

- (i) Name the salt with acidic nature.  
 (ii) What is the nature of  $\text{Na}_2\text{CO}_3$  salt?  
 (iii) Which acid and base neutralise each other to form  $\text{NaCl}$  Salt.  
 (iv) Which are the neutral salt?

(OR)

Group/Period	Electro Negativity Values of elements
VIIA (Halogens)	F(4.0), Cl(3.0), Br(2.8), I(2.5)
2 <sup>nd</sup> period	Li(1.0), Be(1.4), B(2.0), C(2.5), N(3.0), O(3.5), F(4.0), Ne(0)

Electronegativity values of certain elements belonging to VIIA (17<sup>th</sup>) group and 2<sup>nd</sup> period are given observe them and answer the questions.

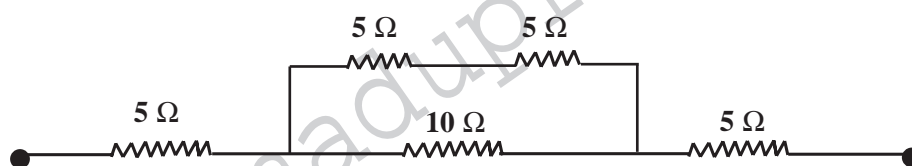
- (i) Arrange the elements of 17<sup>th</sup> group in the increasing order of their electro negativities.
- (ii) Which is the element with highest electronegativity value?
- (iii) Name the element of lowest electgro negativity.
- (iv) How do the values of electronegativity values vary in a group and in a period?

## 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. The equivalent resistance of the combination shown in below diagram is ( )



- A)  $30\ \Omega$       B)  $20\ \Omega$       C)  $15\ \Omega$       D)  $10\ \Omega$

19. The sensation of vision in the retina is carried to the brain by ( )

- A) Cornea      B) Optic nerve      C) Ciliary muscles      D) None of these

20. In an AC generator the direction of current changes because of ( )

- A) Slip rings      B) Carbon brushes  
C) External Magnet      D) All the above

21. Which of the following is against of Hund's rule ( )

- A)  $\begin{array}{|c|} \hline \uparrow\downarrow \\ \hline \end{array}$        $\begin{array}{|c|c|c|} \hline \uparrow & \uparrow & \\ \hline \end{array}$       B)  $\begin{array}{|c|} \hline \uparrow\downarrow \\ \hline \end{array}$        $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow & \uparrow \\ \hline \end{array}$
- C)  $\begin{array}{|c|} \hline \uparrow\downarrow \\ \hline \end{array}$        $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow & \\ \hline \end{array}$       D)  $\begin{array}{|c|} \hline \uparrow\downarrow \\ \hline \end{array}$        $\begin{array}{|c|c|c|} \hline \uparrow\downarrow & \uparrow\downarrow & \uparrow \\ \hline \end{array}$

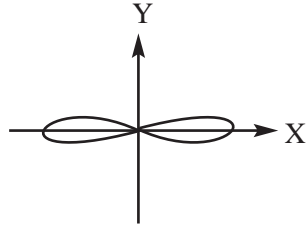
22. Select the correct balanced chemical equation of the following ( )

- A)  $\text{C}_3\text{H}_8 + 2\text{O}_2 \longrightarrow 3\text{CO}_2 + 4\text{H}_2\text{O}$   
B)  $4\text{K}_2\text{Cr}_2\text{O}_7 \longrightarrow 4\text{K}_2\text{CrO}_4 + 3\text{Cr}_2\text{O}_3 + 2\text{O}_2$   
C)  $2\text{NaOH} + 2\text{Zn} \longrightarrow \text{Na}_2\text{ZnO}_2 + \text{H}_2$   
D)  $2\text{HCl} + \text{Zn} \longrightarrow \text{ZnCl}_2 + \text{H}_2$

23. The substitution reaction in the following is ( )

- A)  $\text{CH}_2 = \text{CH}_2 + \text{H}_2 \longrightarrow \text{CH}_3\text{CH}_2\text{OH}$   
B)  $\text{C} + \text{O}_2 \longrightarrow \text{CO}_2$   
C)  $\text{CH}_4 + \text{Cl} \longrightarrow \text{CH}_3\text{Cl} + \text{HCl}$   
D)  $\text{C}_2\text{H}_5\text{OH} + 3\text{O}_2 \longrightarrow 2\text{CO}_2 + 2\text{H}_2\text{O}$

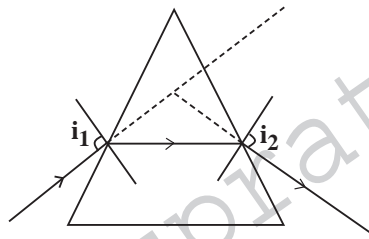
24. Arrangement of p – orbital indicate in the picture is ( )



- A)  $P_x$                       B)  $P_y$                       C)  $P_z$                       D)  $P_{xy}$

25. In the figure  $i_1$  represents ( )

- A) angle of reflection  
B) angle of incidence  
C) angle of emergence  
D) angle of prism



26. Heater coils are prepared with ( )

- A) Silver                      B) Copper  
C) Gold                      D) Nichrome, Manganin

27. The fatal dose of denatured alcohol to an adult is ( )

- A) 200 ml                      B) 300 ml                      C) 180 ml                      D) 250 ml

## ANSWERS

### PART - A

#### SECTION - I

1. Li, Na, K are Dobereiner's triad. The atomic weight of Li is 7 and that K is 39, then find the atomic weight of Na.

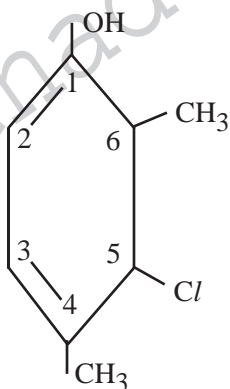
A: Atomic weight of Na =  $\frac{\text{Atomic weight of Li} + \text{Atomic Weight of K}}{2}$

$$= \frac{7 + 39}{2}$$

$$= \frac{46}{2}$$

$$= 23$$

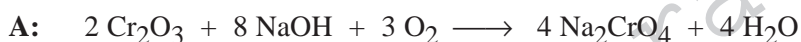
2. Write the IUPAC name of the given compound.



- A: 5 - Chloro 4, 6 - dimethyl Cyclo hexa - 1, 3 diene - 1 - ol.



Balance the above chemical equation.



4. What is the nature of the image formed on the retina?

A: Real, inverted and diminished image is formed on the retina.

5. The potential difference across a bulb is 240 V and a current of 5A flows through it, then find the resistance of the bulb.

A: Given V = 240 V

$$I = 5A$$

$$R = ?$$

According Ohm's Law  $R = \frac{V}{I}$

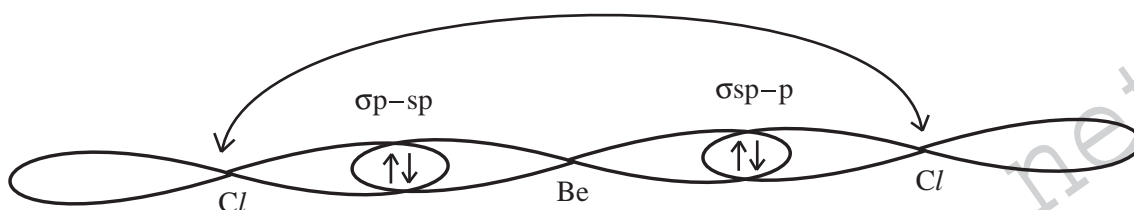
$$R = \frac{240}{5}$$

$$= 48 \Omega$$

6. Draw the figure of  $\text{BeCl}_2$  molecule which has Linear structure and identify the bond angle.

$180^\circ$

A:



7. Which instrument is used to measure electric current?

A: Ammeter

## SECTION – II

8. Can a convex mirror burn a paper? Imagine.

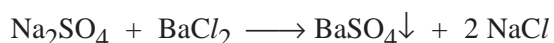
A: The rays coming parallel to principal axis after reflection diverge from the mirror. So, we cannot burn a paper by using a convex mirror.

9. Imagine what happens if electron transfer is not possible in between atoms.

- A:
- (i) Atoms cannot achieve octate configuration.
  - (ii) Atoms will not get stability.
  - (iii) Ionic bond will not be formed between the atoms.
  - (iv) The salts like  $\text{NaCl}$  will not be formed.

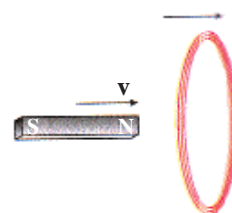
10. Explain an activity showing the formation of precipitate in chemical reactions.

- A:
- (i) Take about 100 ml of water in a beaker and dissolve a small quantity of Sodium Sulphate ( $\text{Na}_2\text{SO}_4$ )
  - (ii) Take about 100 ml of water in another beaker and dissolve a small quantity of Barium Chloride ( $\text{BaCl}_2$ )
  - (iii) Add  $\text{Na}_2\text{SO}_4$  solution to  $\text{BaCl}_2$  solution.
  - (iv) We will get a white precipitate of Barium Sulphate



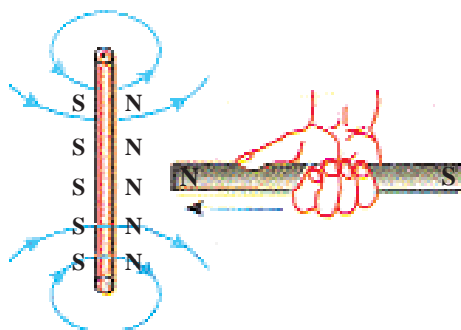
11. As shown in figure if a bar magnet is moved towards a coil, current is induced then

- (a) What is the direction of induced current?  
 (b) Draw the magnetic field lines created by bar magnets' pole at coil and also lines formed by the coil.



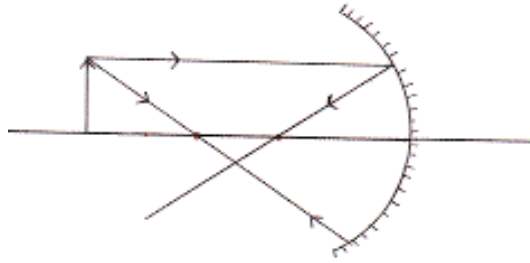
A: (a) In the coil North pole will be created to indicate North pole and backside South pole. The direction of induced is anti-clockwise.

(b)

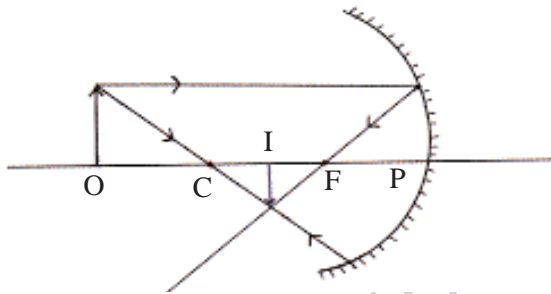




12. In the given ray diagram mention the pole of mirror, Focus, centre of curvature, position of image.



A:



P – Pole of mirror

F – Focus

C – Centre of curvature

Image position between F and C.

13. Write the uses of nanotubes?

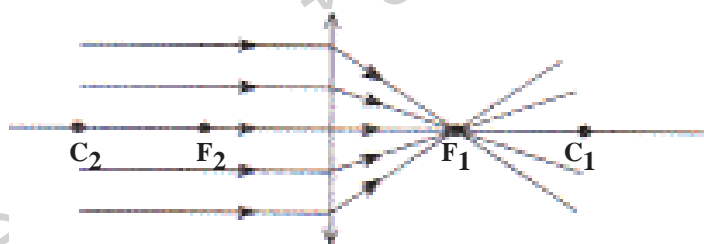
- A: (i) Nanotubes are electrical conductors and can be used as molecular wires.  
 (ii) In integrated circuits nanotubes are used instead of Copper to connect the components together.  
 (iii) Scientists inserted biomolecules into nanotubes to inject them into a single cell.

### SECTION – III

14. Describe the image formation by a convex lens for various positions of the object.

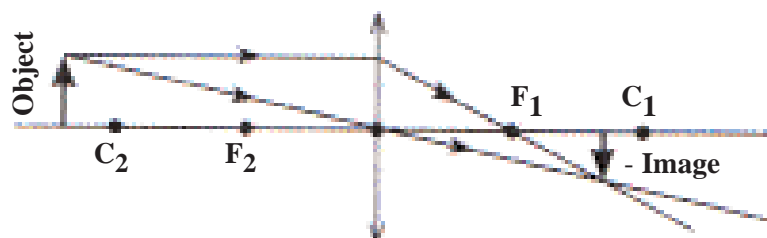
- A: (i) Object at infinity:

The rays coming from the object at infinity are parallel to principal axis and converge to the focal point after refraction. So, a point sized image is formed at the focal point.



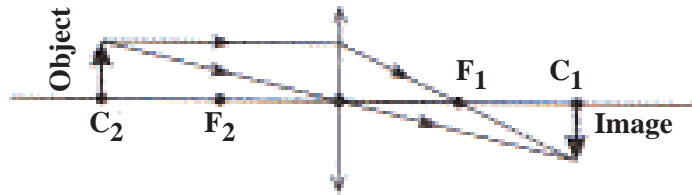
- (ii) Object placed beyond the centre of curvature on the principal axis:

When an object is placed beyond the centre of curvature, a real, inverted and diminished image is formed on the principal axis between  $F_1$  and  $C_1$ .



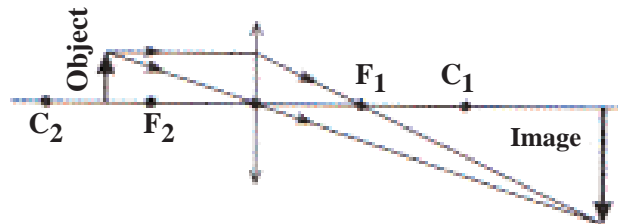
**(iii) Object placed at the centre of curvature:**

When an object is placed at the centre of curvature ( $C_2$ ) on the principal axis, a real, inverted image is formed at  $C_1$  which is same size as that of the object.



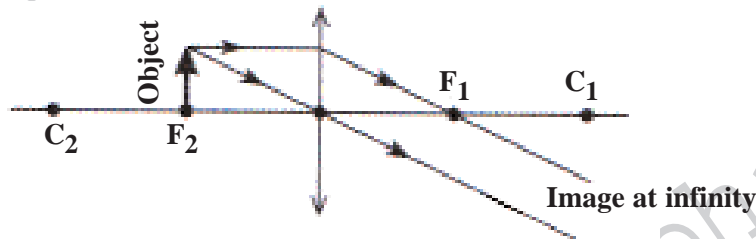
**(iv) Object placed between the centre of curvature and focal point:**

When an object is placed between centre of curvature ( $C_2$ ) and focus ( $F_2$ ) we will get an image which is real, inverted and magnified. This image will form beyond  $C_1$ .



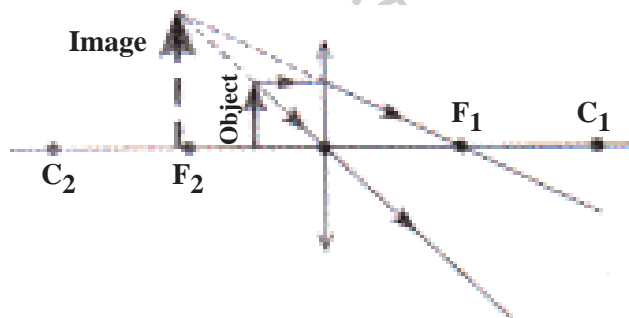
**(v) Object located at focal point:**

When an object is placed at focus ( $F_2$ ), the image will be at infinity.



**(vi) Object placed between focal point and optic centre:**

If we place an object between focus and optic centre we will get an image which is virtual, erect and magnified.



(OR)

**Q:** Sky appears sometimes white and sometimes blue in colour, and sun appears red in colour during sunrise and sunset. State the reasons.

**A:** (i) The sky appears sometimes White when you view in certain direction on hot days.

On the hot day, due to rise in the temperature water vapour enters into atmosphere which leads to abundant presence of water molecules in the atmosphere. These water molecules scatter the colours of other frequencies (other than blue). All such colours of other frequencies reach our eye and the sky appear White.

(ii) **Sky appears in blue colour:** Sky appears in blue colour due to scattering of light. Atoms or molecules which are exposed to light absorb light energy and emit some part of the light energy in different directions. This is the scattering of light.

We know that our atmosphere contains different types of molecules and atoms. The reason for blue sky is due to the molecules  $N_2$  and  $O_2$ . The sizes of these molecules are comparable to the wavelength of blue light. These molecules act as scattering centres for scattering of blue light.

(iii) **The Sun appears the red colour during Sunrise and Sunset:**

Sunlight has to travel more distance through the atmosphere during sunset/sunrise than during other times of the day. A molecule which scatter a light of given colour when its size is comparable to the wavelength of that colour. The number of molecules that can scatter red light is less. So, red colour light travels through the atmosphere unscattered, where as other colour scatters away making the Sun look red during Sunset and Sunrise.

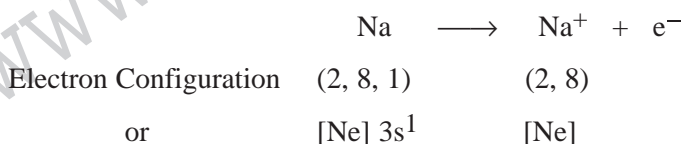
During noon hours sunlight travels less distance through the atmosphere than the morning and evening times. Therefore all the colours reach us without much scattering thus making the noon Sun to appear white.

**15. Explain the formation of Ionic compounds NaCl,  $MgCl_2$  through Lewis electron dot Symbol.**

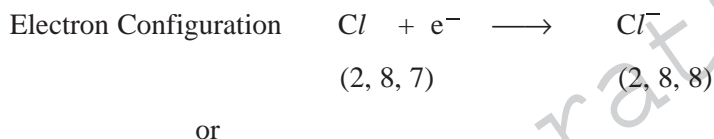
**A: (i) Formation of Sodium Chloride (NaCl):** Sodium Chloride is formed from the element Sodium and Chlorine



**Cation Formation:** When Sodium (Na) atom loses one electron to get octet electron configuration it forms a cation ( $Na^+$ ) and gets electron configuration that of Neon (Ne) atom

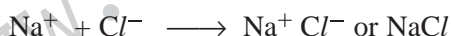


**Anion formation:** Chlorine has shortage of one electron to get octet in its valence shell. So, it gains the electron from Na atom to form anion and gets electron configuration as that of organ (Ar).

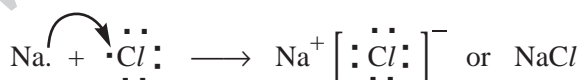


**Formation of the compound NaCl from its ions:**

Transfer of electrons between Na and Cl atoms results in the formation of  $Na^+$  and  $Cl^-$  ions. These oppositely charged ions get attracted towards each other due to electrostatic forces and form the compound Sodium Chloride (NaCl)



Electron transfer

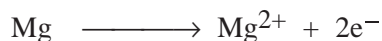


**ii) Formation of Magnesium chloride (MgCl<sub>2</sub>):**

Magnesium chloride is formed from the elements Magnesium and Chlorine.



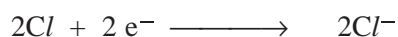
**Cation formation:**



**Electron Configuration** (2, 8, 2) (2, 8)

or [Ne] 3s<sup>2</sup> [Ne]

**Anion formation:**



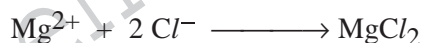
**Electronic configuration** (2, 8, 7) (2, 8, 8)

or [Ne] 3s<sup>2</sup> 3p<sup>5</sup> [Ne] 3s<sup>2</sup> 3p<sup>6</sup> or [Ar]

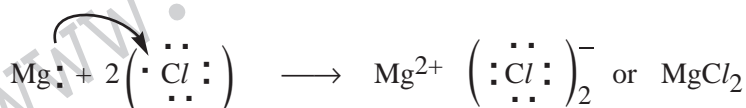
**The Compound MgCl<sub>2</sub> formation from its ions:**

Mg<sup>2+</sup> gets 'Ne' configuration and each Cl<sup>-</sup> gets 'Ar' configuration

One Mg atom transfers two electrons one each to two Cl atoms and So formed Mg<sup>2+</sup> and 2 Cl<sup>-</sup> attract to form MgCl<sub>2</sub>



Electron transfer



(OR)

**Q: What are the different stages of extraction of metal from an ore? Write a note on any one of the stages.**

**A:** The extraction of a metal from its ore involves mainly three stages

They are i) Concentration or Dressing

ii) Extraction of crude metal

iii) Refining or purification of the metal

**Purification of the crude metal:**

Refining of the metal involves several types of processes.

Methods used for refining of metals are

(a) Distillation

(b) Poling

(c) Liquation

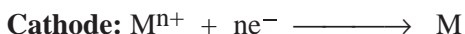
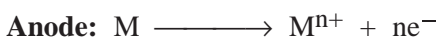
(d) Electrolysis etc

The process that has to be adopted for purification of a given metal depends on the nature of the metal and its impurities.

(a) **Distillation:** This method is very useful for purification of low boiling like Zinc and Mercury containing high boiling metals as impurities. The extracted metal in the molten state is distilled to obtain the pure metal as distillate.

- (b) **Poling:** The molten metal is stirred with logs (poles) of green wood. The impurities are removed either as gases or they get oxidised and form scum (slag) over the surface of the molten metal. Blister Copper is purified by this method. The reducing gases, evolved from the wood, Prevent the oxidation of Copper.
- (c) **Liquation:** In this method a low melting metal like tin can be made to flow on a sloppy surface to separate it from high melting impurities.
- (d) **Electrolytic refining:** In this method, the impure metal is made to act as anode. A strip of the same metal in pure form is used as cathode. They are put in a suitable electrolytic bath, containing soluble salt of the same metal. The required metal gets deposited on the cathode in the pure form. The metal, constituting the

**Impurity, goes as the anode mud. The reactions are:**



(M = Pure metal)

Where n = 1, 2, 3, .....

16. **List out the apparatus required to verify that  $\frac{V}{I}$  is constant for a conductor. Explain the experiment with help of a diagram.**

**A: AIM:** To show that the ratio  $\frac{V}{I}$  is constant for a conductor.

**Material required:** 5 Dry cells of 1.5 V each, conducting wires, an ammeter, a volt meter, thin – manganin spoke of length 10 cm and key.

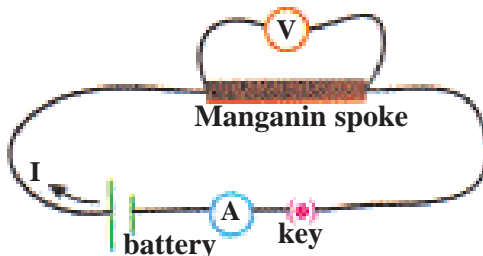
**Procedure:**

(i) Connect a circuit as shown in the figure.

(ii) Solder the conducting wires to the end of the manganin spoke.

(iii) Close the key. Note the readings of

current (I) from ammeter and potential difference (V) from voltmeter in the table given below.



S.No.	Potential Difference (V)	Current (I)	$\frac{V}{I}$

(v) Now connect two cells in the circuit and note the respective readings of ammeter and voltmeter in the above table.

(vi) Repeat the above procedure using three cells and four cells and five cells respectively.

Record the values of potential difference (V) and current (I) corresponding to each case in the above table.

(vii) Find  $\frac{V}{I}$  for each set of values.

(viii) We notice that  $\frac{V}{I}$  is a constant.

$$V \propto I$$

(ix) From this we can conclude that the potential difference between the ends of the manganin spoke is directly proportional to the current passing through it. The temperature of the manganin spoke is constant during the flow.

(OR)

**Q:** Write an experimental method in measure the distances of object and image using concave mirror and write the table for observations.

**A:** **Aim:** Observing the types of images and measuring the object distance and image distance from the mirror.

**Material required:** A candle, paper, concave mirror, (Known focal length), V-stand, measuring tape or meter scale.



**Procedure:**

- i) Place the concave mirror on V – stand, a candle and meter scale as shown in figure.
- ii) Keep the candle at different distances from the mirror (10 cm to 80 cm) along the axis and by moving the paper (screen) find the position where you get the sharp image on paper.
- iii) Note down the observations in the following table.

Observation no.	Distance of candle from mirror (Object distance – u)	Distance of paper from mirror (Image distance – v)	Enlarged/ diminished	Inverted or erect
1				
2				
3				
4				

(iv) Group your observations based on the type of image you see [e.g.: Image is bigger and inverted]. It is possible you may not get any image at some positions note down that too.

(v) We know the focal point and centre of curvature, we can classify our observations as shown in the following table.

Position of the candle (object)	Position of the image	Enlarged?/ diminished?	Inverted or erect	Real or virtual
Between mirror & F	Behind the mirror	Enlarged	Erect	Virtual
<b>On focal point</b>	<b>At infinity</b>	<b>-</b>	<b>-</b>	<b>-</b>
Between F and C	Beyond C	Enlarged	Inverted	Real
<b>On centre of curvature</b>	<b>On C</b>	<b>Same size</b>	<b>Inverted</b>	<b>Real</b>
Beyond C	Between F and C	Diminished	Inverted	Real

**Precaution:** Take care that flame is above the axis of mirror, paper is below the axis.

17. In the following table the salts which are formed by Acids and bases and PH values are given. Observe the following table and answer the questions given below.

Acid	Base	Salt	pH Value
HCl	NH <sub>4</sub> OH	NH <sub>4</sub> Cl	< 7
HCl	NaOH	NaCl	7
HNO <sub>3</sub>	KOH	KNO <sub>3</sub>	7
H <sub>2</sub> CO <sub>3</sub>	NaOH	Na <sub>2</sub> CO <sub>3</sub>	> 7

- (i) Name the salt with acidic nature.  
 (ii) What is the nature of Na<sub>2</sub>CO<sub>3</sub> salt?  
 (iii) Which acid and base neutralise each other to form NaCl salt?  
 (iv) Which are the neutral salts?

- A:** (i) The salt having acidic nature is NH<sub>4</sub>Cl.  
 (ii) Na<sub>2</sub>CO<sub>3</sub> salt has basic nature.  
 (iii) Neutralisation of HCl, NaOH each other the salt NaCl forms.  
 (iv) NaCl and KNO<sub>3</sub> are the neutral salts.

(OR)

Group/Period	Electro Negativity Values of elements
VIIA (Halogens)	F(4.0), Cl(3.0), Br(2.8), I(2.5)
2 <sup>nd</sup> period	Li(1.0), Be(1.4), B(2.0), C(2.5) N(3.0), O(3.5), F(4.0), Ne(0)

- Q:** Electronegativity values of certain elements belonging to VIIA (17<sup>th</sup>) group and 2<sup>nd</sup> period are given observe them and answer the questions.

- (i) Arrange the elements of 17<sup>th</sup> group in the increasing order of their electro negativities.  
 (ii) Which is the element with highest electro negativity value?  
 (iii) Name the element of lowest electro negativity.  
 (iv) How do the values of electro negativity values vary in a group and in a period.

- A:** (i) I(2.5), Br(2.8), Cl(3.0), F(4.0)  
 (ii) F(4.0)  
 (iii) Li(1.0)  
 (iv) Electronegativity increases from left to right in a period. Electronegativity values decreases from top to bottom in a group.

**PART – B**

**ANSWERS**

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

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