

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:

- i) In the time duration of 2 hrs. 45 mins. 15 minutes of time is allotted to read and understand the question paper.
- ii) Answer the questions under PART – A in separate answer book.
- iii) 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

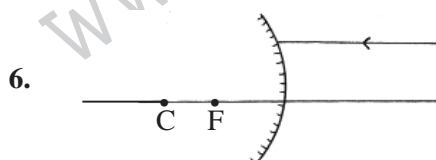
INSTRUCTIONS:

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

SECTION – I

INSTRUCTIONS:

- i) Answer ALL the questions.
 - ii) Each question carries ONE Mark.
 - iii) Write the answers in 1 – 2 sentences. $7 \times 1 = 7$
1. "Whenever there is a continuous change of magnetic flux linked with a closed coil, a current is generated in the coil". Name the law related to this.
 2. The distance between vertex and radius of curvature is 30 cm. The focal length of mirror is how much?
 3. Write electronic configuration of following elements.
a) Boron b) Chlorine
 4. In the modern periodic table, which are the metals among the first ten elements?
 5. Arrange Zn, Ag, K, Fe, Na, Ca in descending order of their reactivity series.



Draw the reflected ray for the beside diagram.

7. Which is a good motor fuel?

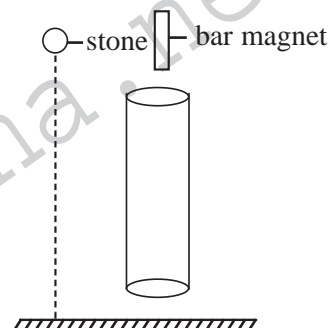
SECTION - II

INSTRUCTIONS:

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

6 × 2 = 12

8. Take a long cylindrical Copper tube. Hold it so that it is perpendicular to the horizontal. A stone and a bar magnet are left freely, so the bar magnet pass through the tube and stone outside the tube. Which one reaches the earth first. Guess why it is so? Give proper reasons.
9. Substance X turns blue litmus into red. Substance Y turns red litmus into blue. If the reaction takes place between X and Y, guess what are the substances to be formed? Give reason.



10. Suggest an experiment to produce a rainbow in your class room and explain the procedure.
11. Observe the following equations and answer the questions given below.
- a) $\text{Na}_2\text{SO}_4 + \text{BaCl}_2 \longrightarrow \text{BaSO}_4 + \text{NaCl}$
- b) $\text{AgNO}_3 + \text{NaCl} \longrightarrow \text{AgCl} \downarrow + \text{NaNO}_3$
- i) Mention the products in equation 'a'.
 - ii) Which is the precipitate in equation 'b'.
12. Draw a figure showing sub-energy levels of fourth energy level ($n = 4$) of Sommerfeld's model and state the values of 'l' and 'n'.
13. In house hold circuits, why do we use fuses? What is the use of fuses?

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 × 4 = 16

14. Explain the effects of electric shock on human body.

(OR)

The radius of curvature of two faces of a double convex lens are 10 cm, 15 cm and its focal length is 12 cm. Then determine the refractive index of the lens.

15. Mention the unique properties of Carbon.

(OR)

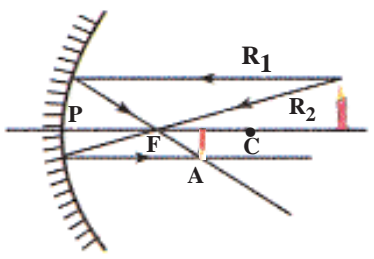
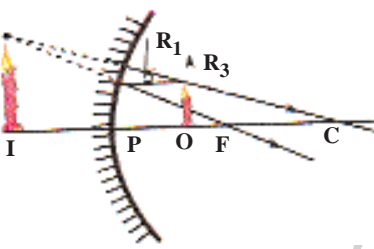
Mention the factors affecting the formation of Cations and Anions.

16. Explain with an activity to know whether the acid (or base) is strong or weak.

(OR)

Write the list of apparatus required to verify experimentally that the resistance of a conductor is inversely proportional to cross section area. Write the procedure of the experiment with the help of a diagram.

17. Fill the table with given ray diagrams information.

Ray diagrams formed by a concave mirror	Object Place	Image Position	Elarged/ Diminished	Real image/ Virtual image
				
				

(OR)

The electron affinity values of elements of VII A and VI A groups are given in the table with the help of table answer the questions given below the table.

Group	Electron affinity Values in kJ/mole
VIIA (Halogens)	F(-328), Cl(-349), Br(-325), I(-295), At(-270)
VIA (Chalcogens)	O(-141), S(-200), Ge(-195), Te(-190), Po(-174)

- What are the units of electron affinity?
- Arrange the elements of Halogen group as per the decreasing order of their electron affinity values?
- What happens to the energy value when electron affinity values will be either positive or negative?
- How do the electron affinity values vary in a group and in a period?

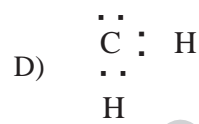
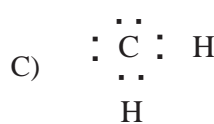
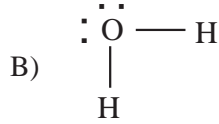
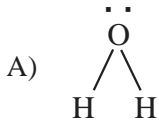
INSTRUCTIONS:

- 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 showing the correct answer for the following questions in the brackets provided against them.

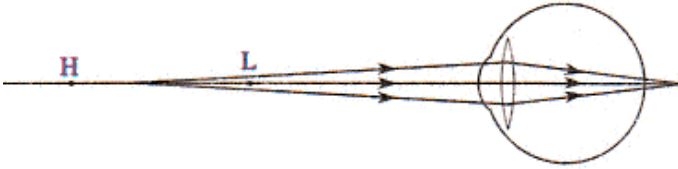
$$10 \times \frac{1}{2} = 5$$

18. Which of the following phenomena of light are involved in the formation of a rainbow ()
- A) Refraction, dispersion
 B) Refraction, dispersion and total internal reflection
 C) Reflection, refraction and dispersion
 D) Dispersion, scattering and total internal reflection
19. A diverging mirror is ()
- A) a plane mirror
 B) a convex mirror
 C) a concave mirror
 D) All of the above
20. A uniform wire of resistance $R \Omega$ is divided into 10 parts and all of them are connected in parallel. The equivalent resistance will be ()
- A) 1Ω
 B) $0.1 R \Omega$
 C) $0.01 R \Omega$
 D) 10Ω
21. The IUPAC Name of $\text{CH}_3 - \underset{\text{CH}_3}{\text{CH}} - \underset{\text{OH}}{\text{CH}} - \text{CH}_3$ ()
- A) 2-methyl 3-butanol
 B) 3-methyl 3-butanol
 C) 2-methyl 2-butanol
 D) 3-methyl 2-butanol
22. Match the following. ()
- A) Zinc Blende
 B) Magnesite
 C) Zincite
 D) Carnallite
- a) ZnO
 b) ZnS
 c) $\text{KCl} \cdot \text{MgCl}_2 \cdot 6 \text{H}_2\text{O}$
 d) MgCO_3
- A) 1-b, 2-d, 3-a, 4-c
 B) 1-a, 2-b, 3-c, 4-d
 C) 1-c, 2-d, 3-a, 4-b
 D) 1-c, 2-a, 3-d, 4-b
23. Froth flotation is method used for the purification of ()
- A) Oxide
 B) Carbonate
 C) Sulphide
 D) Nitrate

24. Lewis dot structure of water (H_2O) is ()



25. The defect of vision indicated in the below diagram is ()



A) Myopia

B) Hypermetropia

C) Presbyopia

D) There is no defect of vision

26. The material used in preparation of diodes, transistors and integrated circuits are ()

A) Carbon

B) Lead

C) Nichrome

D) Silicon, Germanium

27. Which is used in cough syrups ()

A) Methanol

B) Ethanol

C) Gasoline

D) Iodine

PART - A

ANSWERS

SECTION - I

1. "Whenever there is a continuous change of magnetic flux linked with a closed coil, a current is generated in the coil". Name the law related to this.

A: Faraday's Law.

2. The distance between vertex and radius of curvature is 30 cm. The focal length of mirror is how much?

A: Radius of curvature (R) = 30 cm.

Focal length (f) = ?

$$R = 2f$$

$$f = \frac{R}{2}$$

$$f = \frac{30}{2} = 15 \text{ cm.}$$

3. Write electronic configuration of following elements.

a) Boron

b) Chlorine.

A: a) Boron (Z = 5) $1s^2 2s^2 2p^1$

b) Chlorine (Z = 17) $1s^2 2s^2 2p^6 3s^2 3p^5$

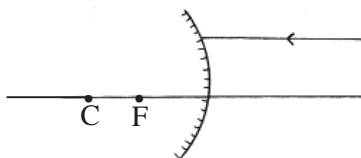
4. In the modern periodic table, which are the metals among the first ten elements?

A: Lithium, Beryllium.

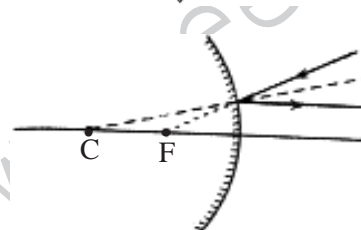
5. Arrange Zn, Ag, K, Fe, Na, Ca in descending order according to their reactivity series.

A: $K > Na > Ca > Zn > Fe > Ag$

6. Draw the reflected way for the beside diagram.



A:

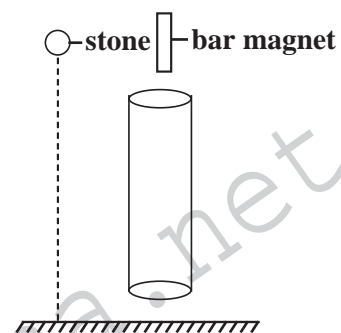


7. Which is a good motor fuel?

A: Solution of about 10% ethanol in gasoline is a good motor fuel.

SECTION - II

8. Take a long cylindrical Copper tube. Hold it so that it is perpendicular to the horizontal. A stone and a bar magnet are left freely, so the bar magnet pass through the tube and stone outside the tube. Which one reaches the earth first.

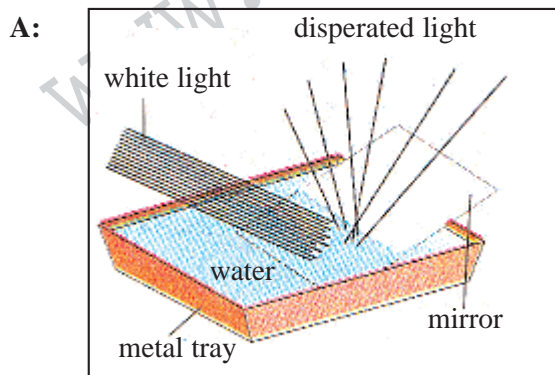


Guess why it is so? Give proper reasons.

- A: ★ Stone will reach the ground quickly. Because when magnet moves through the Copper cylinder, assume the Copper cylinder is a combination of Copper rings.
- ★ When the magnet moves through the rings current is induced in the rings.
- ★ It opposes the movement of the magnet according to Lenz's Law.
9. Substance X turns blue litmus into red. Substance Y turns red litmus into blue. If the reaction takes place between X and Y, guess what are the substances to be formed? Give reason.
- A: X turns blue litmus into red so it is an acid similarly Y turns red litmus into blue so it is base so when X reacts with Y that means an acid reacts with base which form salt and water. So the products formed are salt and water because it is a neutralisation reaction.



10. Suggest an experiment to produce a rainbow in your class room and explain the procedure.



- ★ Take a metal tray and fill it with water.
- ★ Place a mirror in the water such that it makes an angle to the water surface.
- ★ Now focus the white light on the mirror, through the water as shown in the figure.
- ★ Try to obtain colour on a white card board sheet kept above the water surface.
- ★ We know that white light is splitting into certain different colours as rainbow.

11. Observe the following equations and answer the questions given below.



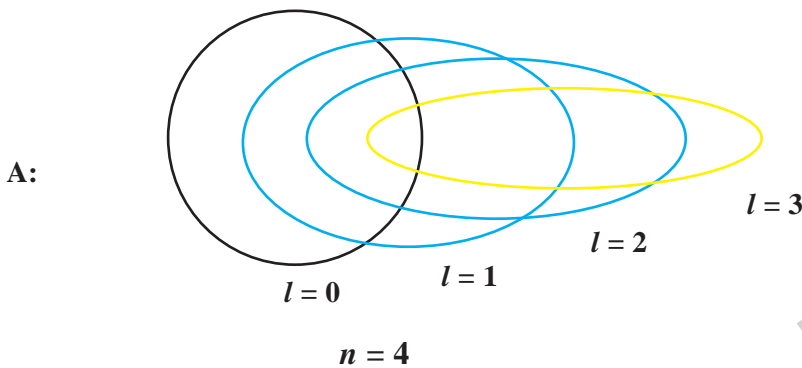
i) Mention the products in equation 'a'.

A: $\text{BaSO}_4, \text{NaCl}$

ii) Which is the precipitate in equation 'b'.

A: AgCl

12. Draw a figure showing sub-energy levels of fourth energy level ($n = 4$) of Sommerfeld's model and state the values of 'l' and 'n'.



13. In house hold circuits, why do we use fuses? What is the use of fuses?

- A:
- ★ The fuse consists of a thin wire of low melting point.
 - ★ When the current in the fuse exceeds 20 A the wire will heat up and melt.
 - ★ The circuit then becomes open and prevents the flow of current into the household circuit.
 - ★ Hence all the electric devices are saved from damage that could be caused by overload.
 - ★ Thus we can save the house holding wiring and devices by using fuses.

SECTION - III

14. Explain the effects of electric shock on human body.

- A: The current passing through our body when we touch a live wire of 240 V is given by $I = 0.0024$ A. When this quantity of current flows through the body the functioning of organs inside the body gets disturbed. This disturbance inside the body is felt as electric shock.

If the current flows continuously further it damages the tissues of the body which leads to a decrease in resistance of the body. When this current flows for a longer time damage to the tissues increases and thereby the resistance of the human body decreases further. Hence, the current through the human body will increase. If this current reaches 0.07 A, it affects the functioning of the heart and if this much current passes through the heart for more than one second it could be fatal. If this current flows for a longer time, the person in electric shock is being killed.

Effects of the Electric Current on Human Body

Current in ampere	Effect
0.001	Can be felt
0.005	Is painful
0.010	Causes involuntary muscle contractions (Spasms)
0.015	Causes loss of muscle control
0.070	If through the heart, causes serious disruption, probably fatal if current lasts for more than 1 sec

(OR)

Q: The radius of curvature of two faces of a double convex lens are 10 cm, 15 cm and its focal length is 12 cm, then determine the refractive index of the lens.

A: $f = +12 \text{ cm}$

$R_1 = 10 \text{ cm}$

$R_2 = -15 \text{ cm}$

Take the refractive index of air = 1

Substitute the above values in

$$\frac{1}{f} = (\mu - 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$$

$$\frac{1}{12} = (\mu - 1) \left(\frac{1}{10} - \frac{1}{-15} \right)$$

$$\frac{1}{12} = (\mu - 1) \left(\frac{1}{10} + \frac{1}{15} \right)$$

$$\frac{1}{12} = (\mu - 1) \left(\frac{5}{30} \right)$$

$$\frac{1}{12} = (\mu - 1) \times \frac{1}{6}$$

$$(\mu - 1) = \frac{6}{12}$$

$$\mu - 1 = \frac{1}{2}$$

$$\mu - 1 = 0.5$$

$$\mu = 0.5 + 1$$

$$\mu = 1.5$$

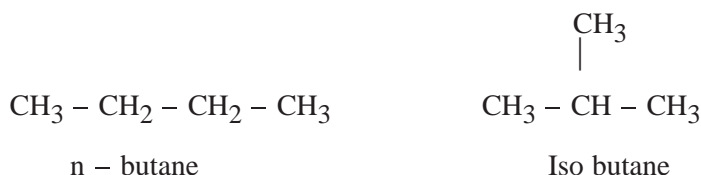
∴ Refractive index of the glass = 1.5

15. Mention the unique properties of Carbon.

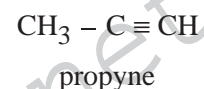
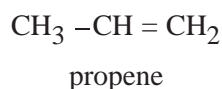
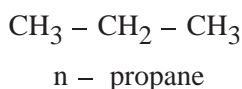
A: The unique properties of Carbon are catenation, isomerism and formation of multiple bonds.

Catenation: Catenation is the phenomenon in which atoms of same element join together to form long chains. Carbon exhibits maximum catenation because of strong Carbon – Carbon bonds and tetravalence. Due to catenation, Carbon atoms can form various types of straight chains, branched chains and ring structures, thus giving rise to a large number of compounds.

Isomerism: Compounds having same molecular formula but different structures are called isomers and the phenomenon is called isomerism. Carbon compounds exhibit isomerism i.e., for a particular molecular formula two or more compounds may exist. For example for the molecular formula C_4H_{10} , the following isomers are possible.



Formation of multiple bonds: Carbon atoms are capable of forming multiple bonds with other Carbon atoms. This further gives rise to a large variety of compounds. The following examples show Carbon compounds with single, double and triple bonds.



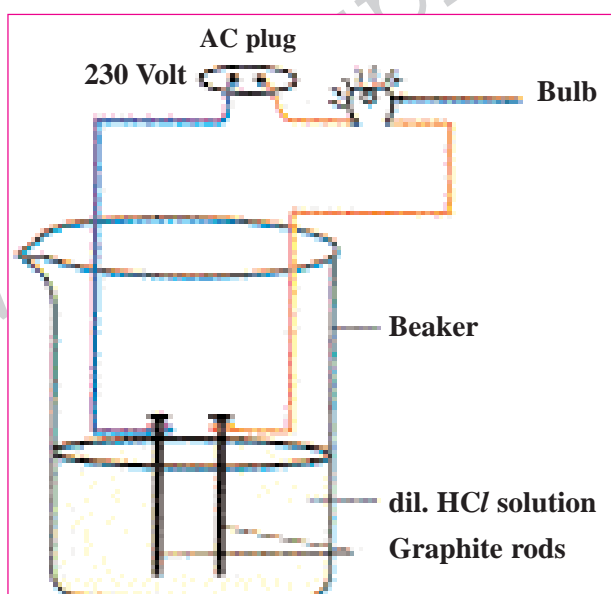
(OR)

Q: Mention the factors affecting the formation of Cations and Anions.

- A:**
- ★ The tendency of elements by losing electrons is called the metallic character or electropositively.
 - ★ Elements with more electropositive character form Cations.
 - ★ The tendency of elements by gaining electrons is called the non-metallic character or electronegativity.
 - ★ Elements with more electronegative character form Anion.
 - ★ Ionic bond is formed between atoms of elements with electronegativity difference equal to or greater than 1.9.
 - ★ Ionic bond is formed by transfer of electrons from low ionisation potential atom to high electronegativity atom.
 - ★ The tendency of losing electrons to form cations or gaining electrons to form anions depends on
 - i) Atomic Size ii) Ionisation Potential
 - iii) Electron affinity iv) Electronegativity.
 - ★ The atoms of elements with low ionisation potential, low electron affinity, high atomic size and low electronegativity form Cations.
 - ★ The atom of elements with high ionisation potential, high electron affinity, small atomic size and high electronegativity form Anions.

16. Explain with an activity to know whether the acid (or base) is strong or weak.

A:



- ★ Take two beakers A and B.
- ★ Fill the beaker A with dil. CH_3COOH and beaker B with dil. HCl .
- ★ Arrange the apparatus as shown in the figure and pass electricity through the solutions in separate beakers.
- ★ We notice that the bulb glows brightly in HCl solution while the intensity of the bulb is low in Acetic acid solution.
- ★ This indicates that there are more ions in HCl solution and fewer ions are present in Acetic acid Solution.
- ★ More ions in HCl solution means more H_3O^+ ions. Therefore it is a strong acid. Where as Acetic acid has fewer H_3O^+ ions and hence it is weak acid.
- ★ Carry out the same experiment by taking bases like dil. NaOH instead of acids.
- ★ We observe that NaOH is strong base and NH_4OH is weak base.

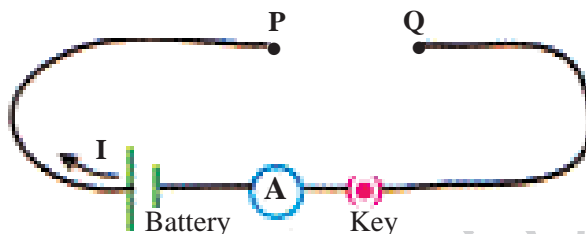
(OR)

Q: Write the list of apparatus required to verify experimentally that the resistance of a conductor is inversely proportional to cross-section area. Write the procedure of the experiment with the help of a diagram.

A: Required Materials:

Battery, Ammeter, Key, Wires, Iron rods with different cross-section areas (length must be same)

Procedure:



- ★ Collect Iron rods of equal lengths but different cross-section area.
- ★ Make a circuit leaving gap between P and Q as shown in figure.
- ★ Connect one of the rods between P and Q and measure the current using ammeter and note the values.
- ★ Repeat this with the other rods and note the corresponding values of current in each case and note them.
- ★ We will notice that the current flowing through the rod increases with increasing in the cross-section area of the rod.
- ★ Thus the resistance of the rod decreases with increasing the cross-section area.
- ★ From this we can conclude that the resistance of a conductor is inversely proportional to its cross-section area (A).

$$\therefore R \propto \frac{1}{A} \text{ (at constant temperature and length of the conductor)}$$

17. Fill the table with the given ray diagrams information.

Ray diagrams formed by a concave mirror	Object Place	Image Position	Elarged/ Diminished	Real image/ Virtual image

A:

Ray diagrams formed by a concave mirror	Object Place	Image Position	Elarged/ Diminished	Real image/ Virtual image
	Beyond C	Between F and C	Diminished	Real image
	Between mirror and F	Behind the mirror	Enlarged	Virtual image

(OR)

Q: The electron affinity values of elements of VIIA and VIA groups are given in the table. With the help of table answer the questions given below the table.

Group	Electron affinity Values in kJ/mole
VIIA (Halogens)	F(-328), Cl(-349), Br(-325), I(-295), At(-270)
VIA (Chalcogens)	O(-141), S(-200), Ge(-195), Te(-190), Po(-174)

- What are the units of electron affinity?
- Arrange the elements of Halogen group as per the decreasing order of their electron affinity values.
- What happens to the energy value when electron affinity value will be either positive or negative?
- How do the electron affinity value vary in a group and in a period?

A: i) kJ/mole

ii) At (-270), I(-295), Br(-325), F(-328), Cl(-349)

iii) Negative sign for energy value in table indicates that energy is liberated or lost, and the positive sign tells that the energy is gained or absorbed.

iv) Electron affinity value increases from left to right in a period. Electron affinity decreases from top to bottom in a group

PART - B

ANSWERS

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

Writer: K. Gagan Kumar