

BOARD OF SECONDARY EDUCATION (AP)
SUMMATIVE ASSESSMENT – I
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 hours 45 minutes, 15 minutes of time is allotted to read and understand the question paper.
- ii) Answer the questions under Part – A on a 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.

PART – A

Marks: 30

SECTION – I

INSTRUCTIONS:

- i) Answer ALL the questions.
 - ii) Each question carries ONE mark.
 - iii) Answer each question in 1 – 2 sentences. 4 × 1 = 4
1. Two students While walking on the road in the afternoon found image of water on the road. when they went near nothing was found. Guess what could be the reason for this?
 2. Give an example to explain, that evaporation is a cooling process.
 3. An electron in an atom has the following set of four quantum numbers, to which orbital it belongs?

n	l	m _l	m _s
2	0	0	+ $\frac{1}{2}$
 4. Roasting and Calcination are the methods to extract crude metals from ores. What is the difference between Roasting and Calcination?

SECTION – II

INSTRUCTIONS:

- i) Answer ALL the questions.
 - ii) Each question carries TWO marks.
 - iii) Answer each question in 4 – 5 sentences. 5 × 2 = 10
5. Why Dobereiner, newlands and Mendeleev were not 100% successful in their classification of Elements ? why the modern table is relatively a better classification? Predict the reason.

INSTRUCTIONS:

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

$$20 \times \frac{1}{2} = 10$$

14. The rear view mirror used in vehicles is ()
 A) plane Mirror
 B) Convex Mirror
 C) Reflecting glass plate
 D) Concave Mirror
15. 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) become Zero
16. The Lens maker's formula is ()
 A) $\frac{1}{f} = (n - 1) \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$
 B) $\frac{1}{f} = (n + 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$
 C) $\frac{1}{f} = (n + 1) \left(\frac{1}{R_1} + \frac{1}{R_2} \right)$
 D) $\frac{1}{f} = (n - 1) \left(\frac{1}{R_1} - \frac{1}{R_2} \right)$
17. Yellow light is produced by sodium vapours. Green colour flame is produced by ()
 A) Strontium Chloride
 B) Mercury
 C) Cupric Chloride
 D) potassium Chloride
18. Two resistors each of resistance 1Ω and 99Ω respectively are connected in Parallel. The equivalent resistance is ()
 A) 100Ω
 B) 98Ω
 C) 0.001Ω
 D) 0.99Ω
19. A lens has a power of 0.5D. It is ()
 A) a convex lens of focal length 5 m
 B) a concave Lens of focal length 5 m
 C) a convex Lens of focal length 2 m
 D) a concave Lens of focal length 2 m
20. This is suitable for use in the heating elements of electric stove ()
 A) Nichrome
 B) Copper
 C) Nickel
 D) Iron
21. Substance having highest specific heat is ()
 A) Ice
 B) water
 C) Sea water
 D) kerosene
22. The resistivity of silver is $1.59 \times 10^{-8} \Omega -m$ at $20^\circ c$. And the resistivity of air is $1.3 \times 10^{16} -m$ at $20^\circ c$. So with reference to electric current ()
 A) Silver is a good conductor
 B) Air is a good conductor
 C) Both Silver and air are good conductors
 D) Silver is a bad conductor

23. The unit of refractive index is. ()
 A) centimetre B) Diapter C) Degree D) no units
24. sidwick and Powell proposed VSPERT.... valence bond theory was suggested by ()
 A) Linus Pawling B) Lewis C) Kossel D) pauli
25. The maximum number of carbon atoms in a hydrocarbon to show isomerism ()
 A) 2 B) 3 C) 1 D) 4
26. A Student added a few drops of universal inductor to a given colourless sample and he observed the sample turns to red. The nature of the sample is ()
 A) neutral Solution B) Acid
 C) Base D) either acid or base
27. i) $2 \text{H}_2\text{O} \xrightarrow{\text{Electricity}} 2 \text{H}_2 + \text{O}_2$
 ii) $2 \text{AgBr} \xrightarrow{h\nu} 2 \text{Ag} + \text{Br}_2$
 The above reactions are examples for ()
 A) Chemical combination B) Double displacement
 C) Chemical Decomposition D) Chemical displacement
28. Auban: lowest energy orbital : : Hund:..... ()
 A) Exclusion Principle B) Quantum number
 C) Elliptical D) Degenerate orbital
29. Principal quantum number is related to ()
 A) Size of the orbit
 B) Spin angular momentum
 C) orbital angular momentum
 D) Orientation of orbital in Space
30. A Solution turns red litmus into blue. its pH value is likely to be ()
 A) 1 B) 4 C) 5 D) 10
31. What happens when dil Hel is added to iron filing? ()
 A) Hydrogen gas is released
 B) Chlorine gas is released
 C) No reaction takes place
 D) Iron Salt and water are produced
32. An element A forms a Chloride Acl_4 , The number of electrons in the valence shell of A is ()
 A) 1 B) 2 C) 4 D) 3
33. Galena is an ore of ()
 A) Zinc (Zn) B) Lead (Pb)
 C) Mercury (Hg) D) Aluminium (Al)

ANSWERS

PART – A

SECTION – I

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

- A: ★ They saw the mirage due to total internal reflection.
 ★ The illusion is due to virtual image of the sky (mirage) and an inverted image of tree on the road.

2. Give an example to explain that evaporation is a cooling process.

- A: The examples to explain that evaporation is a cooling process are.
 ★ Drying of Wet clothes.
 ★ When the floor is washed with water, the water on the floor disappears.
 ★ Sweating etc;

3. An electron in an atom has the following set of 4 quantum numbers, to which orbital it belongs to.

n	l	m _l	m _s
2	0	0	+ $\frac{1}{2}$

- A: ★ n = 2, l = 0 is 2S orbital.
 ★ Given electron belongs to 2S orbital.

4. Roasting and calcination are the methods to extract crude metals from ores. What is the difference between roasting and calcination.

- A: ★ Roasting is a process of heating the ore strongly in a free supply of air or oxygen.
 ★ Calcination is a process of heating the ore strongly in the absence of air or oxygen.

SECTION – II

5. Why doberiner, newlands and Mendaleev were not 100% successful in their classification of elements? Why the modern table is relatively a better classification? Predict the reason?

- A: ★ All the known elements at the time of Dobereiner could not be arranged in the form of triads.
 ★ Newland's periodic table was restricted only for 56 elements.
 ★ As Mendeleev's classification is based on atomic weight, his classification lead to two defects like anomalous pair of elements and dissimilar elements placed together.
 ★ Modern periodic table was prepared on the basis of atomic number. So the periods and groups are clearly defined.
 ★ Hence Dobereiner, Newlands and Mendeleev's classifications were not 100% successful but modern classification is successful.

6. i) $\text{CH}_3 - \text{CH}_2 - \text{CH}_2 - \text{CH}_3$ ii) $\begin{array}{c} \text{CH}_3 - \text{CH} - \text{CH}_3 \\ | \\ \text{CH}_3 \end{array}$

We can see that number of carbons and hydrogens is the same in both the substances shown above. What do you understand by the given shapes? Explain.

- A: ★ Both the substances have the same molecular formulas C_4H_{10} .
 ★ As these are having different structures, we call them as structural isomers.

7. A convex lens is made of five different materials as shown in the figure.

How many images does it form. Why?



- A: ★ The Lens has been made up of five different materials.
 ★ These five different materials will have five different refractive indices.
 ★ Hence five different images will be formed.
 ★ Because $\frac{1}{f} \propto (n - 1)$ where f is the focal length and n is the refractive index.

8. How could we use the Principle of electromagnetic induction in the case of using ATM Card. When the magnetic strip is swiped through a scanner.

- A: ★ If the ATM Card is moved through a card reader, then a change in magnetic flux is produced in one direction, which induces potential or E.M.F.
 ★ The current received by the Pickup Coil goes through signal amplification and translated into binary code which can be read by the computer.

9. Potassium, Sodium, Magnesium are high reactive metals and occur as Chlorides in nature. Suggest and explain the suitable method for the extraction of the above metals from their ores.

- A: ★ The suitable method to extract these metals from their chlorides is electrolysis of their fused compounds.
 ★ It is not feasible for method of reduction, electrolysis of their aqueous solutions.

SECTION – III

10. a) Write any 4 characteristic features of homologous series of organic compounds.

- A: **Homologous series:** The series of carbon compounds in which two successive compounds differ by $-CH_2$ unit is called homologous series.

Characteristic features of homologous series:

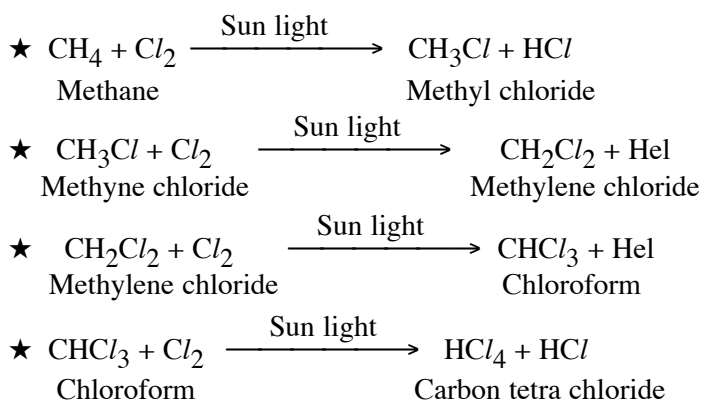
- They have one general formula.
 e.g.: Alkane $[C_nH_{2n+2}]$, Alkene $[C_nH_{2n}]$, Alkyne $[C_nH_{2n-2}]$
- Successive Compounds in their series possess a difference of $(-CH_2)$ unit.
- They possess similar chemical properties due to the same functional group.
- They show a regular graduation in their physical properties.

(OR)

b) Alkanes are considered as paraffins. So they undergo substitution reactions but not addition reactions. Explain with suitable example.

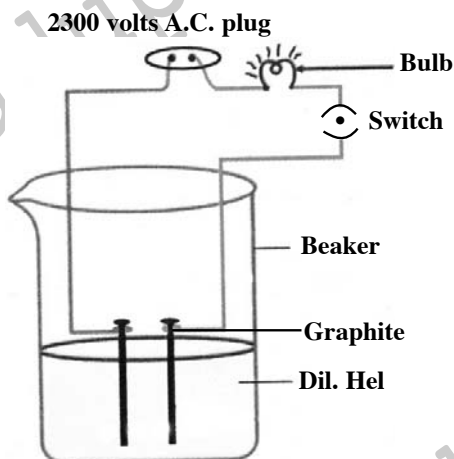
- A: ★ A reaction in which an atom or group of atoms in a given compound is replaced by other atom or group of atoms is called a substitution reaction.
 ★ Alkanes called paraffins are chemically least reactive as they are saturated hydro carbons.
 ★ However under suitable conditions they undergo substitution reactions.

For example: Methane (CH_4) reacts with chlorine in the presence of sun light. Hydrogen atoms of CH_4 are replaced by chlorine atoms.



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

- A: \star Connect two different coloured electrical wires to graphite rods separately in a beaker as shown in the figure.
- \star Connect free ends of the wire to 230 volts A.C. Plug and complete the circuit by connecting a bulb and switch in the circuit.



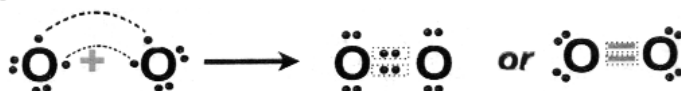
Acid solution in water Conducts electricity

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

(OR)

b) Explain the formation of double bond and triple bond according to lewis theory.

- A: \star Formation of double bond according to lewi's formation of oxygen molecule double bond.



- \star Oxygen has 8 electrons in its valence shell ($z = 8$ – electronic Configuration $1s^2 2s^2 2p^4$).
- \star Oxygen atom requires 2 more electrons to get octet in its valence shell.
- \star Two Oxygen atoms Come close and each atom contributes two electrons to the other atoms for bonding.

- ★ It means there exists two covalent bonds between two oxygen atoms in O_2 molecule.
- ★ This is because two Pairs of electrons are distributed between two oxygen atoms.
- ★ The diagram drawn above illustrates the formation of double bond.

ii) Formation of triple bond according to Lewis theory:

Formation of Nitrogen molecule – Triple bond



- ★ Nitrogen has 5 electrons in its valence shell ($z = 7$, electronic configuration: $1s^2 2s^2 2p^3$).
- ★ Nitrogen atom requires 3 more electrons to get octet in its valence shell.
- ★ Two nitrogen atoms come close and each atom contributes three electrons to the other atom for bonding.
- ★ It means there exists three Covalent bonds between two nitrogen atoms in N_2 Molecule this is because six electrons are shared between two nitrogen atoms in N_2 molecule.
- ★ The diagram above illustrates the formation of triple bond.

12. a) Sudheer wants to verify the Laws of reflection. What apparatus he requires to prove them? State the laws of reflection and write the experimentation process he follows.

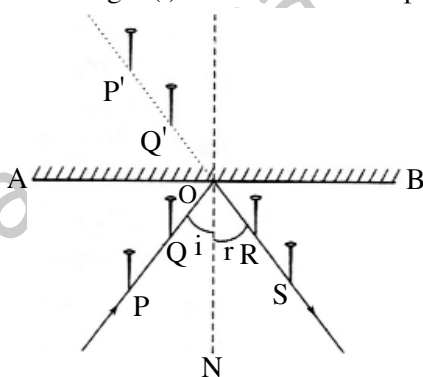
1) **Apparatus required:** Mirror strip, drawing board, white paper, pins, clamps, Scale, Pencil and protector.

2) **Laws of reflection:**

- The angle of reflection is equal to the angle of incidence.
- The incident ray, the normal and the reflected ray lie in the same plane

Procedure:

- ★ Fix a white paper on a drawing board and draw a straight line AB. Draw a normal ON at the Centre of the line AB.
- ★ Draw a line that makes a certain angle (i) with ON. Fix two pins P, Q on the line vertically.



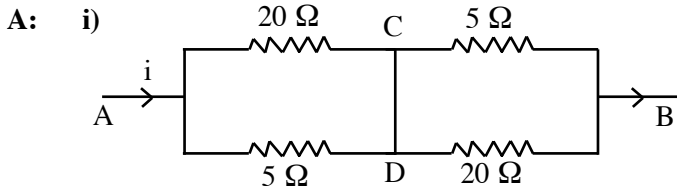
- ★ By observing the reflections of panel Q in the mirror (P, Q) fix two more pins at R and S in such a way that they are in a straight line.
- ★ Measure the angle between RS and ON. ($\angle r$) By changing the values of $\angle i$, find the corresponding values of $\angle r$ in each case
- ★ We find that in all Cases $\angle i = \angle r$ and PQ, RS, ON lie in the same plane is so the laws of reflection are proved.

(OR)

b) An electric Circuit is shown in the figure. 'i' is the current entering in to the circuit at A.

i) What is the potential difference between C and D.

ii) What is the resultant resistance between A and B.



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:

1) 20 Ω and 5 Ω are parallel to each other.

2) Their resultants are in series.

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

$$\frac{1}{R_1} = \frac{1+4}{20} = \frac{5}{20} = \frac{1}{4}$$

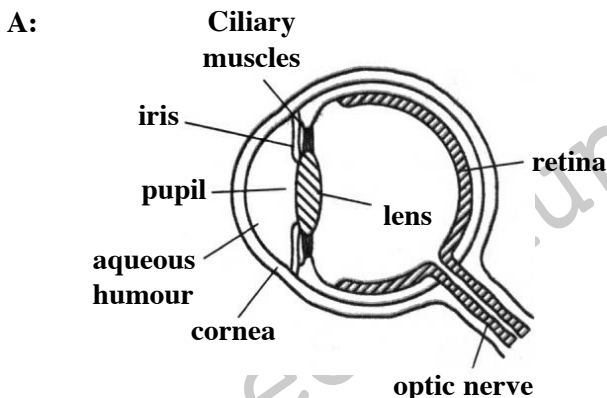
So $R_1 = 4 \Omega$

3) For the other two resistors Resultant $R_2 = 4 \Omega$

4) The resultant resistance between A and B

$$R = R_1 + R_2 \text{ (They are in series)} = (4 + 4) = 8 \Omega$$

13. a) How do you appreciate the working of ciliary muscles in the eye.



★ The Ciliary muscles to which eye lens is attached helps the eye lens to change its focal length by changing the radii of curvature of the eye lens.

★ When the eye is focused on a distant object, the ciliary muscles are relaxed, so that the focal length of the eye lens has its maximum value.

★ The parallel rays coming into the eye are then focussed on to the retina and we see the object clearly.

- ★ When the eye is focused on a closer object, the ciliary muscles are strained and focal length of eye lens decreases.
- ★ The ciliary muscles adjust the focal length in such a way that the image is formed on retina and we see the object clearly. This process of adjusting focal length is called 'accommodation'.
- ★ Really this 'accommodation' is a wonderful phenomenon through which we are able to see the distant and near objects.
- ★ If this mechanism of ciliary muscles is not present, the eye lens cannot adjust its focal length and we can not see the objects beyond a certain distance.
- ★ If we imagine this, we can not guess our normal life.
- ★ Hence the role of ciliary muscles is highly appreciable.

(OR)

b) i) Can we save the house hold wiring and devices by using fuses? Write any four points by appreciating the role of fuse.

ii) A wire of length 1m and radius 0.1 mm has a resistance of 100 Ω. Find the resistivity of the material.

A: i) A wire with high resistance is connected in the household circuit such that the entire current from the mains must pass through this wire called fuse.

- ★ It has a low melting point.
- ★ When the current exceeds certain limit the fuse wire heats up and melts. Then the circuit becomes open. This prevents all electrical appliances from damage due to over load.
- ★ It is available at low cost and protects all electrical appliances from damage due to overload. Hence the role of fuse wire is highly appreciable.

ii) 1) Given Resistance $R = 100 \Omega$

length $l = 1\text{m} = 1000 \text{ mm}$

radius $r = 0.1 \text{ mm}$, Resistivity $\rho = ?$

2) Formula : Resistivity $\rho = \frac{R.A}{l}$

and $A = \text{area of cross section} = \pi r^2$

3) Substituting the values

$$\rho = \frac{100 \times 22 \times (0.1)^2}{7 \times 1000} = 0.00314 \Omega -\text{m}$$

PART - B

ANSWERS

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