SSC PUBLIC EXAMINATIONS : 2021

MODEL PAPER - 1

PHYSICAL SCIENCES

Class : X **Max.Marks : 50** **Time : 2 Hr. 45 min.**

Instructions :

i) This question paper contains 4 sections and 33 questions.
ii) Answer all the question in the answer sheet given.
iii) There is internal choice to question in Section-IV
iv) 15 min. time is given to read the question paper.

SECTION – I

Note :

i) Answer all the questions.

ii) Each question carries $^1/_2$ mark. **$12 \times {}^1/_2 = 6M$**

1. The S.I unit of specific heat is .....
2. Bases which are soluble in water are called .....
3. The characteristics of light are not altered by Refraction ?
4. When the value of the focal length of lens is equal to the value of the image distance ?
5. Match the following.

A) Myopia	[	]	P) Bi-focal length
B) Hypermetropia	[	]	Q) Bi-concave
C) Presbyopia	[	]	R) Bi-convex

6. Bohr's Model Explains the following spectra

   A) H B) He^+ C) Li^{2+} D) All the above
7. Write the General configration of Inert gases ?
8. The splitting of a spectral lines is placed in a magnetic field is called ?
9. Atomic number from 90 to 103 elements in periodic table is called .....
10. Write the electric confguration of Cl^- ?
11. Arrange the following in a correct order.

    i) Formation of Anion ii) Electro static forces iii) Formation of Inoic Bond

    iv) Formation of cataion
12. Galena is an ore of .....

SECTION – II

Hints :

i) Answer all questions. ii) Each question carries 1 mark. **$8 \times 1 = 8M$**

13. Between Na and Na^+ which has bigger size ? Why ?
14. Draw the Lewis dot structure for Nobel gases ?

15. Iron gets rust but gold does not ? Why ?
16. Write the four quantum numbers for 21st Electron of scandium atom ?
17. Carbon forms bonds with its own atoms are called .....
18. Why does the soil of agriculture lands get tested for pH ?
19. Net heat lost = Nte heat gas is known as .....
20. The doctor advised using a 2D lens. What is its focal length ?

SECTION – III

Hint :

i) Answer all questions. ii) Each question carries 2 marks. **8 × 2 = 16M**

21. Observe the following table and answer the following questions.

Substance	Copper	Iron	Aluminium	Water
Specific heat	0.095	0.115	0.21	1

i) Which material is suitable on the base of the cooking vessels ?

ii) Why do we prefer water as coolant ?

22. What happen when an acid Reat with mtal and what is the test for the liberated gas ?
23. When we sit at a campfire, object beyond the fire is seen swaying. Give the reason for it.
24. What happens to the image formed by a convex lens it its lower part is black end ?
25. Least distance of a distinct vision at a person is observed as 35 cm. What lens is useful for him to see his surroundings clearly ? Why ?
26. Write the Electronic configuration of the atom at an Element have atomic number 11. Write the names of the rules and the Laws followed by you in writing this Electronic configuration ?
27. Observe the information provided in the table and answer the questions given below it.

Element	Na	C	Ca	P	Ti	Ni
Atomic Number	11	6	20	15	22	28

i) What are s-block Elements in the table ?

ii) What are p-block and d-block elemnts in the table.

28. Ask any two questions to understand the difference between Valency Electron and Valency of the atom ?

SECTION – IV

Hints :

i) Answer all the questions. ii) Internal choice is given for each question

iii) Each question carries 4 marks. **5 × 4 = 20M**

29. Explain the formation of sodium chloride on the basis of the concept of Electron Transfer from one atom to anotherl atom ?

(Or)

Suggest an experiment to prove that the presence of air and water are essential for corrosion explain the procedure.

30. How can you verify that a current carrying wire produces a magnetic field with helped an experiment ?

(Or)

Conduct an Experiment which proves $\frac{\sin i}{\sin r}$ is a constant.

31. Explain the significance of Three Quantum number in predicting the positions of an Electron in an atom.

(Or)

Explain formation of O_2 molecule on Valence Bond Theory.

32. List out the material required in the Expriment to show that the Electric Resistance depends upon the nature of the material and write Experimental procedure ?

(Or)

Explain the Myopia using the diagram ?

33. Draw the ray diagram for the following positions and Explain the nature and position at image.
    i) Object is palced at C
    ii) Object is placed between F_2 and optic centre P.

(Or)

Draw the shapes of d-orbitals.

ANSWERS

SECTION – I

1. The S.I unit of specific heat is $J/Kg - K$
2. Alkali
3. Frequency
4. Parallel tothe Pirncipal Axis
5. A–Q, B–R, C–P
6. D
7. $ns^2 np^6$
8. Zeeman Effect
9. Octinoids
10. Configuration of Cl^- is $1s^2 2s^2 2p^6 3s^2 3p^6$
11. iv, i, ii, iii
12. Pb

SECTION – II

13. Na has more size than Na^+ ion.

    Because Na has II Electrons and Na^+ ion has only 10 Electrons and Increase in nuclear altraction.

14. 

15. Gold is a less Reactive Metal and Iron is a Moderative Reactive Metal. So Iron gets Rusts easliy.

16.

n	l	m_l	m_s
3	2	2	$+\frac{1}{2}$

17. Catination

18. 1. Plants required a special pH Range for their healthy growth.
    2. So, Finding the pH of a soil suggested the farmers. Treat the fields which acidic or Basis substance to maintain the required pH Range.

19. This is known as principle of methode of mixtures.

20. Power of lens $P = \frac{100}{f\ (\text{in cm})}$, Given P = 2D

$$f = \frac{100}{2} = 50 \text{ cm}$$

SECTION – III

21. i) Copper ii) Water has a greater specific heat value.

22. Acids react with metal they can liberated Hydrogen gas. When a burning match stick is brought nearer to the Hydrogen gas it lights off with pop-up sound.

23. 1. From the campfire, heat is carried into the surrounding air by the process of convecton.
    2. During this process, the density of surrounding air changes continuously thus changes its Refractive Index Slightly.
    3. The continuous change in Refraction Index gives rise to continuous change in the angle of Refraction.
    4. Due to this Result, the object beyond the campfire is seen swaying.

24. 1. Every part of lens forms a complete image.
    2. If the lower part of the lens is blackened the complete image will be formed but its intensity will decreases.

25. 1. The least distance of a distinct vision of a healthy human being is about 25 cm.

2. The person least distance of a distinct vision is 35 cm. Which is greater than 25 cm.
3. So he suffering from the vision deect hypermetropia.
4. To correct one hypermetropia we need to use a bio-convex lens.

26. 1. The Electronic configuration of an Element whose atomic number 11 is $1s^2\ 2s^2\ 2p^6\ 3s^1$
2. Followed principles i) Aufbau Principle ii) Hund's Rule iii) Pauli Exclusion Principle.

27. s-block Elements : Na, Ca
p-block Elements : C, P
d-block Elements : Ti, Ni

28. 1. What is valency of the atom ?
2. What is meant by valency Electron ?
3. In which situation an atom valency and valency Electrons are Equal ?
4. When valency and valent Electrons are Equal ?

SECTION – IV

29. **Formation of Sodium Choride (NaCl) :** Sodium Chloride is Formed from the elements Sodium (Na) and Chlorine (Cl^-). It can be explained as follows.

$Na_{(s)} + Cl_{(g)} \rightarrow NaCl_{(s)}$

Cation Formation : $_{11}Na \rightarrow Na^+ + e^-$

2, 8, 1 2, 8

(or)

[Ne] $3s^1$ [Ne]

Anion Formation : $_{17}Cl + e^{\Theta} \rightarrow {}_{17}Cl^-$

2, 8, 7 2, 8, 8

(or)

[Ne] $3s^2 3p^5$ [Ne] $3s^2 3p^6$ (or) [Ar]

These two oppositely charged ions Na^+ and Cl^- gets attracted each other due to electrostatic forces and forms sodium chloride.

$Na^+ + Cl^- \rightarrow NaCl$

(or)

Aim : To prove that the presence of air and water are essential occurrences of corrosion.

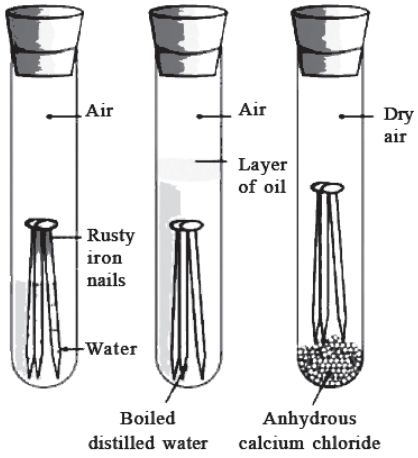
Apparatus : Three test tubes, three corks, Distilled water, anhydrous calcium chloride, clean iron nails and oil etc.

Procedure :

1. Take 3 test tube and place clean iron nails in each of them.
2. Pour some water in test tube A and cork it.
3. Pour boiled distilled water in test tube B, and about, m_1 of oil and cork it.

4. Put some anhydrous calcium chlorides in test tube C and cork it.
5. Leave these tubes for a few days and then observe.
6. After a few days, we will observe that iron nails rust in test tube A, but they do not rust in test tubes B & C.

Conclusion : From the above experiment we can prove that air and water are essential for corrosion.



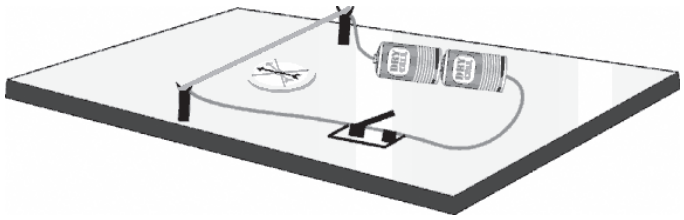
Investigating the conditions under which iron rusts

Precautions :

1. Iron nails must and should be cleaned without rest.
2. The oil layer in the second test tube always floath on the surface of the water.
3. Corks should be fixed tightly to the test tubes.

30. **Aim :** Current carrying wire produces a magnetic field.

Required material : A Thermocole sheet, two small sticks, insulated copper wires, 9V Battery, Switch, Magnetic compare.



Procedure :

1. Take a thermocole sheet and fix two thin wooden sticks of height 1 cm which have small slit at the top of their Ends.
2. Arrange copper wire, so that it passes through these slits and make a circuit.
3. The circuit consists of a 9V Battery, key and copper wires connected in series.
4. Now keep a magnetic compass Below the wire.

5. Now switch on the circuit and observe the compass needle.
6. Change the direction of current and observe the compass needle.

Observation :

1. When curren tis passed through the circuit. We observed deflection of copass needle in one direction.
2. When the direction of current changed, the compass needle deflects in another direction.

31. Each electron in an atom is described by the set of quantum number 'n, *l*, m these numbers indicated the probability of finding electron in the space around the nucleus.

1. Principal Quantum Numbers : It was introduced by Neils Bohr.

2. It is denoted by letter 'n'.
3. The number of electrons in a shell is limited to $2n^2$, where n = 1, 2, 3, ... etc.
4. Shells are denoted by the letter K, L, M, N ..... etc.
5. The principal Quantum number gives the site of energy of the main shell.

Shell	K	L	M	N	O
n	1	2	3	4	5

1. Angular momentum Quantum number (*l*) : It was introduced by Sommerfield.

2. It is denoted by letter, *l*
3. It is also called as Angular momentum quantum number.
4. '*l*' has integer values 0 to (n + *l*) for each value of n. Where *l* = 0, 1, 2, 3
5. The azimuthal quantum number gives the shape of subshell.
6. The subshells are denoted by letter s, p, d, f ..... etc.

l	0	1	2	3	4
Subshell	s	p	d	f	g

3. Magnetic Quantum number : It was introduced by Lande.

It is denotd by letter 'm'.

3. Magnetic quantum number (m_l) has integer values between – 1 + 0 + 1 including 0.
4. For a given (*l*) value the magnetic quantum number (2*l* + 1) integer values of m_l.
5. It gives information about the orientation of orbitals in the presence of magnetic field.
6. For example, the orientation of the p orbitals are p_x, p_y, p_z.

4. Spin Quantum Number (m_s) : It was introduced by Uhlenbeck and Goudsmith.

2. It is denoted by the letter 'm'.
3. This quantum number refers to the two possible orientation of the spin of an electron one is clockwise (↑) and the other is anticlockwise (↓) spin.
4. The spin motion of the electron are representd by $+\frac{1}{2}$ and $-\frac{1}{2}$

Formatinon of O_2 molecule :

i) $_8O$ has electronic configuration $1s^2 2s^2\ 2p_x^2\ \ 2p_y^1\ \ 2p_z^1$

ii) If the 'Py' orbital of one 'O' atom overlaaps the 'P_y' orbital of other 'O' atom the internuclear axis a sigma $P_y - P_y$ $(\sigma_{P_y-P_y})$ is formed.

iii) P_z orbital of one 'o' atom overlaps the P_z orbital of other 'O' atom laterally perpendicularl to the inter nuclear axis giving a $\pi_{P_z-P_z}$ bond.

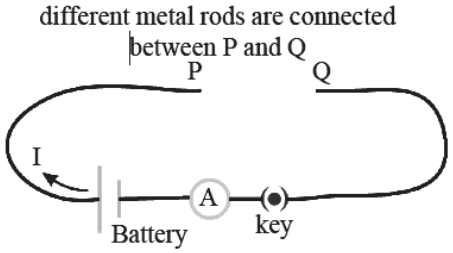
iv) O_2 molecule has a double bond between two oxygen atoms. (O = O)

32. The resistance of a conductor depends on

1. Nature of Material
2. Temperature
3. Length of conductor
4. Area of a crosssection of conductor.

Aim : To verify the resistance of a conductor depends on Nature of a material.

Required Apparatus : Battery, ammeter, key and different metal rods of the same length and same cross sectional area like copper, aluminium, iron etc.



Procedure :

1. Commons made as shown in circuit.
2. Connect one of th metal rods between the ends P & Q. Switch on the circuit.
3. Measure the electric current using the ammeter connected to circuit note in your note book.
4. Repeat this with other metal rods and measurement current in each case.

Observation : The values of current are different for different metal rods for a constant potential difference.

Conclusion : Form this activity, we conclude resistance of a conductor depends on material of a conductor.

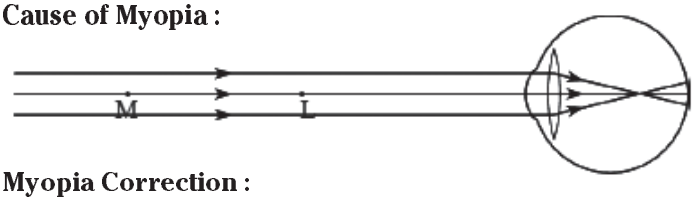
33. 1. Some people cannot see objects at long distances but can sec nearby objects clearly. This type of defect in vision is called 'Myopia' (or) Near sightdness'.
2. Myopia is corrected by using a concave lens of focal length equal to distance of far point F from the eye.
3. The lens diverges the parallel rays from distant object as if they are coming from the far point.

4. Finally the eye lens forms a clear image at the retina
5. Here object distance (4) is infinity and image distance (r) is equal to the far point.

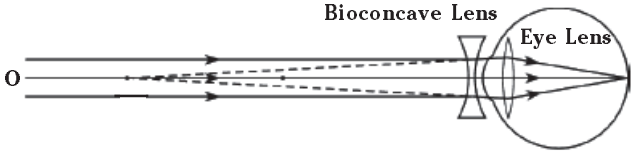
   u = – ∞, v = distance of far point = – D, f = focal length of bi-concave lens.

   We know $\frac{1}{f}=\frac{1}{v}-\frac{1}{u} \Rightarrow \frac{1}{f}=-\frac{1}{D} \Rightarrow f = D$

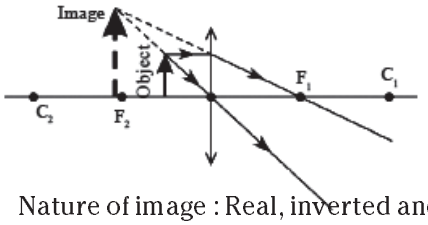
Cause of Myopia :



Myopia Correction :

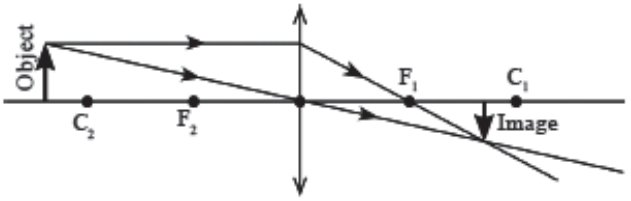


Position of the Object : At 'C'.



Nature of image : Real, inverted and same size.

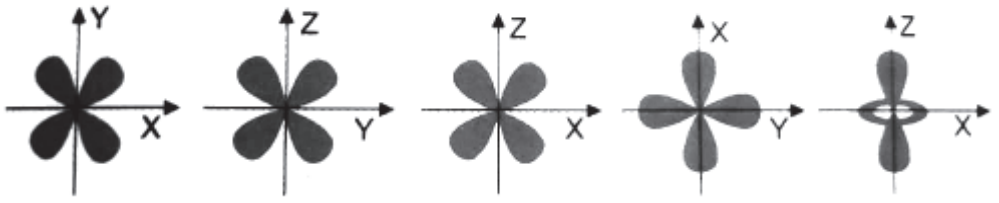
Position of object : Between 'F_2' and P.



Nature of image : Virtual, erect and enlarged

(or)

Shapes of the d-orbital



d_{xy} d_{yz} d_{xz} $d_{x^2-y^2}$ d_{z^2}

SSC PUBLIC EXAMINATIONS : 2021

MODEL PAPER - 2

PHYSICAL SCIENCES

Class : X **Max.Marks : 50** **Time : 2 Hr. 45 min.**

Instructions :

i) This question paper contains 4 sections and 33 questions.
ii) Answer all the question in the answer sheet given.
iii) There is internal choice to question in Section-IV
iv) 15 min. time is given to read the question paper.

SECTION – I

Note :

i) Answer all the questions.
ii) Each question carries $^1/_2$ mark. **$12 \times {}^1/_2 = 6M$**

1. What is 'Q' in $Q = ms\Delta T$?
2. The colour of phenolpthelien indicator in alkali solution is .....
3. $n_1 \sin i = n_2 \sin r$ is ..... law
4. Which of the folowing is a convergent lens
   A) Double concave B) Plano concave C) Double convex
5. If the ciliary muscles doesn't work properly what is the main problems human eye faces ?
6. Match the following.

Group-A		Group-B
A) Principal quantum number	[ ]	i) m_l
B) Angular momentum quantum number	[ ]	ii) m_s
C) Magnetic quantum number	[ ]	iii)'n'
D) Spin quantum number	[ ]	iv)'l'

7. "The physical and chemical properties of elements are the periodic functions of their atomic weights. This is ..... law.
8. Which bond is formed when atomic orbitals overlap side wise ?
9. What are the units of specific resistivity ?
10. Magnetic lines of force are .....
    A) Open loops B) Parallel lines
    C) Closed loops D) Magnets will have no lines of face.
11. Cinnabar is the ore of .....
12. How many number of covalent bonds can a carbon atom form ?

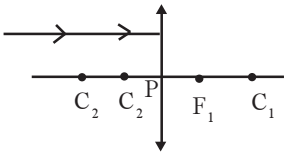
SECTION – II

Hints :

i) Answer all questions. ii) Each question carries 1 mark. **$8 \times 1 = 8M$**

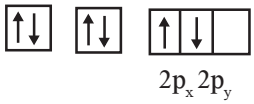
13. Define the relative refractive index.

14. Complete the diagram.



15. Write the electronic configuration of Copper 'Cu'.
16. Give an example for Dobereiner triads.
17. Define the terms in the equation $B = \frac{Q}{A}$
18. Give one example each far i) Ohmic conductor and ii) Non Ohmic conductor.
19. Define gangue.
20. The electronic configuration of carbon in ground state.

    $1s^2$ $2s^2$ $2p^2$ and electron daigram is

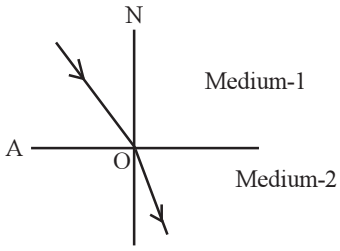


    Then what is electronic configuration and electron diagram in the excited state.

SECTION – III

Hint :

i) Answer all questions. ii) Each question carries 2 marks. **8 × 2 = 16M**

21. Define the principle of method of mixtures.
22. 

    i) Which is the rarer medium ?

    ii) In which medum does the speed of light is less ?
23. Write any two applications of pH in daily life.
24. Your friend seems to have same eye defect. What question do you ask him know the defect.
25. Which principle is violated in the electronic configuration $1s^0\ 2s^2\ 2p^4$? Explain the principle.
26. Show the formation of F_2 molecule with electron dot structure of Lewis.
27. Write the difference between potential difference and Electro motive force.
28. What steps do you suggest to prevent the corrosion of metals.

SECTION – IV

Hints :

i) Answer all the questions. ii) Internal choice is given for each question

iii) Each question carries 4 marks. **5 × 4 = 20M**

29. What is the impartance of specific heat of water in stebilizing the atmospheric temperature.

(Or)

Define the following terms for lenses.

i) Radius of curvature ii) Focus iii) Focal length iv) Optic centre

30. What is a Neutralization reaction ? And give two examples.

(Or)

Explain the formation of BF_3 molecule based on hybridization of atomic orbitals.

31. Write an activity to show the relation between length of the conductor and its resistance.

(Or)

How can you prove that a current carrying conuctor produces magnetism.

32. Observe the following elements and the answer the question given.

Na, Mg, A*l*, C*l*, Ne, K, Ca, Cu, Zn, Ar, F, He

i) Which elements are s-block elements.

ii) Which elements have ns^2, np^6 configuration in the outermost shell.

iii) Which are p-block elements.

iv) Which are called as Halogens.

(Or)

Observe the given Table and answer the question.

Alkanes	Alkenes	Alkynes
CH_4		
C_2H_6	C_2H_4	C_2H_2
C_3H_8	C_3H_6	C_3H_4

i) Name the saturated Compounds.

ii) General formula of Alkenes.

iii) Name the Alkyne with 3 carbon atoms.

iv) Alkanes, Alkenes and Alkynes are collectively called as .....

33. Draw the diagram which gives the information about the increasing order of energies of atomic orbitals.

(Or)

Dipict the human eye with defect myopia and its correction by required lens.

SSC PUBLIC EXAMINATIONS : 2021

MODEL PAPER - 3

PHYSICAL SCIENCES

Class : X **Max.Marks : 50** **Time : 2 Hr. 45 min.**

Instructions :

i) This question paper contains 4 sections and 33 questions.
ii) Answer all the question in the answer sheet given.
iii) There is internal choice to question in Section-IV
iv) 15 min. time is given to read the question paper.

SECTION – I

Note :

i) Answer all the questions.
ii) Each question carries $^1/_2$ mark. **$12 \times {}^1/_2 = 6M$**

1. V = iR equation is suitable for ..... law.
2. The formula for specific heat ?
3. What is the reason is that the pencil placed in the water looks broken.
4. Which rule is violated in the electric configuration $1s^0\ 2s^2\ 2p^4$?
5. Who proposed the modern periodic law to classify elements.
6. The colour of methyl orange indicator in basic solution is .....
7. A = $1s^2\ 2s^2\ 2p^6$; B = $1s^2\ 2s^2\ 2p^6\ 3s^2\ 3p^5$ what is the formula of AB.
8. What is the formula of Cinnabar.
9. What is the minimum focal length of the eye lens ?
10. What are called the rays parallel near to the principal axis.
11. Who established the relation between electricity and Magnetism.
12. What is the band angle of CH_4 molecule ?

SECTION – II

Hints :

i) Answer all questions. ***ii) Each question carries 1 mark.*** **$8 \times 1 = 8M$**

13. What is catination ?
14. Convert 25°C into Kelvin Scale ?
15. List three metals that are found in nature in uncombined form ?
16. What is the cause of refraction of light ?
17. What is the distance of least distinct vision.
18. What is octet rule ?
19. What are lanthanides ?
20. The resistance increases with increasing temperature which materials do not follow this law ?

SECTION – III

Hint :

i) Answer all questions. ii) Each question carries 2 marks. **8 × 2 = 16M**

21. How do you appreciate the role of higher specific value of water in establishing atmospheric temperature during winter and summer seasons.

22. Give some example of daily life situations of refraction.

23. Define presbyopia. How do you correct this defect ?

24. Write the defferences between orbit and orbital ?

25. Why do only valence electrons involve in bond formations.

26. Define homologous series of carbon comounds. Mention any two characteristics of Homologous series.

27. The position of four elements X, Y, Z and W in modern table are shown below.

	Group - I	Group - 17
Period-1	X	Y
Period-5	Z	W

Now answer the following questions.

i) Molecular Formula formed by the combination of the elements X, Y.

ii) Molecular formula formed by the combination of the elements 2y.

28. Distinguish between convex lens and concave lens ?

SECTION – IV

Hints :

i) Answer all the questions. ii) Internal choice is given for each question

iii) Each question carries 4 marks. **5 × 4 = 20M**

29. How do you correct the eye defect Hypermetropia ?

(Or)

Write an activity to show that the resistance of a wire depends upon its area of cross section.

30. Explain how the elements are classified into s, p, d and f block elements in the periodic table.

(Or)

Explain Hund's rule with an example.

31. Explain the procedure of finding specific heat of solid / Lead shots experimentally.

(Or)

State Ohm's law suggest an experiment to verify it and explain the procedure.

32. The arrantement of electrons in different shells of atoms of 18th group elements are given in the table.

Element	Z	Electronic Configuration			
		K	L	M	N
Helium (He)	2	2			
Neon (Ne)	10	2	8		
Argon (Ar)	18	2	8	8	
Krypton	36	2	8	18	8

Answer the following questions.

i) What is the general electronic configurations of the abovel elements. Except He ?

ii) What is the valency of Argon ?

iii) Write Lewis dot structure of Neon ?

iv) Why the above elements do not take part in bond formation.

(Or)

Homologous series of hydrocarbonsis given in the following table.

Alkenes	No.of Carbons	Structural formula	Molecular formula
Ethene	2	$CH_2=CH_2$	C_2H_4
Propene	3	$CH_5-CH=CH_2$	C_3H_6
Butene	4	$CH_3-CH_2-CH=CH_2$	C_4H_8
Pentene	5	$CH_3-CH_2-CH_2-CH=CH_2$	C_5H_{10}

Answer the following questions.

i) Which homologous series of hydrocarbons is given in the table ?

ii) What is the general formula of given hydrocarbons ?

iii) Are the hydrocarbons saturted ? Justify.

iv) Name the next hydrocarbon in the above homologogous series with formula C_6H_{12}.

33. Draw a graph between V and I where V is the potential between the ends of the wire and 'I' is the current through it ? What is the shape of the graph ?

(Or)

Draw a diagram the experiment metal carbonates react with acids.

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