10th Physical Science

Principle of Evaluation

Section-I

1. $\varepsilon = \Delta\Phi/\Delta t$
2. D
3. 1-Q, 2-R
4. Out of the page
5. A, B and C
6. Ethene
7. Reduction
8. Statement I is correct
9. 10 Ω
10. 3.6×10^6 J (OR) 36×10^5 J
11. Ionic bond
12. D

Section-II

13. Electrolysis distillation, poling and liquation
14. Acetic acid
15. Atomic radius (OR) size of the atom
16. 'V' shape and $104^0 31^1$
17. The work done by the chemical force to move unit positive charge from negative terminal to positive terminal of the battery

    (OR)

    The work done by the chemical force to move unit negative charge from positive terminal to negative terminal of the battery
18. Nature of the Material and Temperature
19. A solenoid is a long wire wound in a close packed helix
20. In a period, the ionisation energy increases from left to right

    In a group, the ionisation energy decreases from top to bottom

Section-III

21. a) If the magnetic field lines start at N-pole and end at S-pole, where do the lines go from N-pole?
    b) What is happening within the bar magnet?
    c) Are the magnetic field lines passing through bar magnet?
    d) What is the direction of magnetic field lines inside the bar magnet ?
    e) Can you say now, that the magnetic field lines are open?
    Note:- Write any two questions
22. Thermite process involves the reaction of metal oxides with Aluminium. When highly reactive metals are used as reducing agents, they displace metals of lower reactivity from the compound
    Applications:-i) The reaction of Iron oxide with Aluminium is used to join railings of railway tracks or cracked machine parts   ii) Joining of cracked metal utensils in the house
23. i) alcohol   ii) ketone
24. This element belongs to 4th period and 1st group
    Reason:-i) EC is $1s^2 2s^2 2p^6 3s^2 3p^6 4s^1$ or [Ar]$4s^1$
        ii) The differentiating electron enters into 4th shell. Hence it belongs to 4th period
        iii) The differentiate electron is in s- orbital. So it belongs to s-block
        iv) The outermost orbital has only one electron. Hence it belongs to 1st group.

25.

Ionic bond	Covalent bond
1.It is formed by transference of electrons from one atom to the other	1.It is formed by the sharing of electron pairs by two atoms
2.Electrostatic	2. Not electrostatic,but rigid
3.Ionic substances are formed by ionic bonds Ex:-NaCl, $MgCl_2$	3.Covalent substances are formed by covalent bonds Ex:- Cl_2,HCl
4.Non-directional	4. Directional

   Note:- write any two points

26. Resistance of the 1st bulb(R_1)=V^2/P=220x220/100=484 Ω
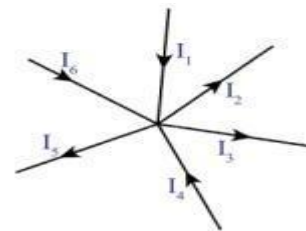   Resistance of the 2nd bulb(R_2)=V^2/P=220x220/60=806.7 Ω
    So 2nd bulb has greater resistance than the 1st bulb

27.At any junction point in a circuit where the current can divide, the sum of the currents into the junction must equal the sum of the currents leaving the junction.
 Example:-

> From the figure
>
> I_1+ I_4+ I_6= I_2+ I_3+ I_5

28. Examples of Dobereiner triads

   a) Li, Na and K   b)Ca, Sr and B   c)Cl, Br and I   d) S, Se and Te   e) Mn,Cr and Fe

   Note: Any two examples are enough

29. Ohm's law:-The potential difference between the ends of a conductor is directly proportional to the electric current passing through it at constant temperature

Verification :

Aim : To verify Ohm's law or to show that $\dfrac{V}{I}$ = constant for a conductor.

Materials required :

6V Battery eliminator, 0 to 1A Ammeter, 0 – 6V volt meter, copper wires, 50 cm manganin coil, Rheostat, switch and 3V LED, etc.

Procedure :

1) Complete the circuit as shown in figure. Knob should be adjusted to 4.5V at battery eliminator.
2) Using Rheostat change the potential difference between two ends of manganin wire from 0V to 4.5V (maximum).
3) By using Rheostat adjust the potential difference 1V between two ends of manganin wire.
4) Now observe the electric current through Ammeter in the circuit and note down in the following table.
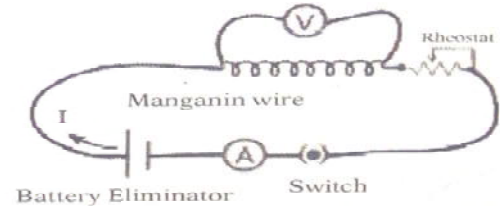
S.No.	Potential difference (V)	Current (I)	V/I

5) Using Rheostat change the potential difference with different values upto 4.5V and note down the current value (I) in the table.
6) Take atleast five values of V and I and note down in the table.
7) Find $\dfrac{V}{I}$ for each set of values.
8) We notice that $\dfrac{V}{I}$ is a constant.

$$V \alpha I \Rightarrow \dfrac{V}{I} = constant$$

This constant is known as resistance of the conductor, denoted by R.

$$\Rightarrow \dfrac{V}{I} = R.$$

∴ Ohm's law is verified.

(OR)

Experiment :

1) Take a thermocol sheet and fix two thin wooden sticks of height 1 cm which have small slit at the top of their ends.
2) Arrange a copper wire of 24 gauge so that it passes through these slits and make a circuit.
3) This circuit consists of a 3 or 9V battery, key and copper wire which are connected in series as shown in figure.
4) Now, keep a magnetic compass below the wire bring a bar magnet close to the compass.
5) The needle in the compass deflects. This deflection is due to magnetic field produced by bar magnet.
6) Take the bar magnet far away from the circuit and switch on the circuit. Observe the changes in compass.
7) The compass needle deflects.
8) This deflection is due to the magnetic field produced by current carrying wire.
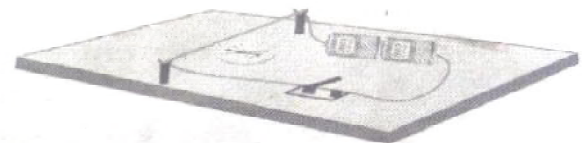
30. a) Q and R
    b) Q and R
    c) S (Neon)
    d) IV A(16) group and 2 period

(OR)

a) Alkanes
b) C_nH_{2n+2}
c) The series of carbon compounds in which two successive compounds differ by $-CH_2$ unit is called homologous series
d) C_6H_{14}

31. It is phenomenon of intermixing of atomic orbitals of almost equal energy which are present in the outermost shells of the atom and their reshuffling or redistribution into the same number of orbitals but with equal properties like energy and shape

b) **Formation of BF_3 molecule :**

1) $_5B$ has electronic configuration $1s^2 \, 2s^2 \, 2p_x^1$.
2) The excited electronic configuration of $_5B$ is $1s^2 \, 2s^1 \, 2p_x^1 \, 2p_y^1$.
3) As it forms three identical B-F bonds in BF_3.
4) It is suggested that excited 'B' atom undergoes hybridisation.
5) There is an intermixing of 2s, $2p_x$, $2p_y$ orbitals and their redistribution into three identical orbitals called sp^2 hybrid orbitals.

6) For three sp^2 orbitals to get separated to have minimum repulsion the angle between any two orbitals is 120° at the central atom and each sp^2 orbital gets one electron.
7) Now three fluorine atoms overlap their $2p_z$ orbitals containing unpaired electrons (F_9 $1s^2 \, 2s^2 \, 2p_x^2 \, 2p_y^2 \, 2p_z^1$) the three sp^2 orbitals of 'B' that contain unpaired electrons to form three σsp^2-p bonds.
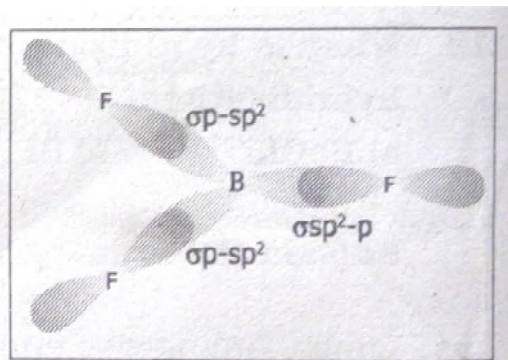
(OR)

Froth Floatation process :
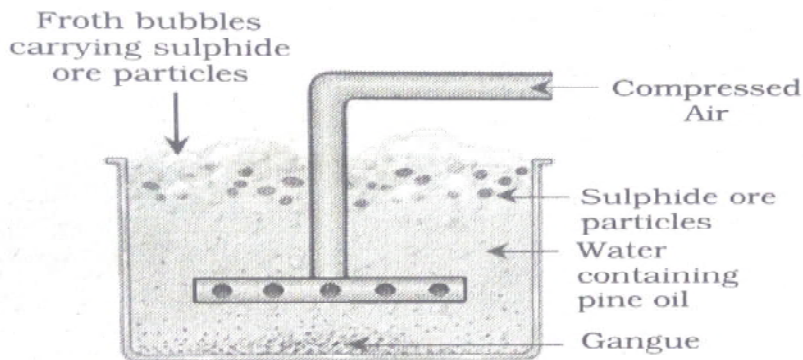
Froth floatation process for the concentration of sulphide ores

1) This method is mainly useful for sulphide ores which have no wetting property whereas impurities get wetted.
2) The ore with impurities is finely powdered and kept in water taken in a floatation cell.
3) Air under pressure is blown to produce froth in water.
4) Froth so produced takes the ore particles to the surface whereas impurities settle at the bottom.
5) Froth is separated and washed to get ore particles.

32.

1) Soaps and detergents make oil and dirt present on the cloth come out into water, thereby making the cloth clean.

2) Soap has one polar end (the end with $-\overset{\overset{O}{\|}}{C}-O$ carboxy) and one non - polar end (the end with hydrocarbon chain) as shown here.

3) The polar end is hydrophilic in nature and this end is attracted towards water.

4) The non-polar end is hydrophobic, in nature and it is attracted towards grease or oil on the cloth, but not attracted towards water.

5) When soap is dissolved in water, its hydrophobic ends attach themselves to dirt and remove it from cloth, as shown sequentially in the figure.

6) The hydrophobic end of the soap molecules move towards the dirt or grease particle.

7) The hydrophobic ends attached to the dirt particle and try to pull out.

8) The molecule of soap surround the dirt particles at the centre of the cluster and form a spherical structure called micelle.

9) These micelles remain suspended in water like particles in a colloidal solution.

10) The various miscelles present in water do not come together to form a precipitate as each micelle repels the other because of the ion-ion repulsion.

11) Thus, the dirt particles remain trapped in micelles and are easily rinsed away with water. Hence, soap micelles remove dirt by dissolving in water.


A soap of molecule

Representing the cleansing action of soap
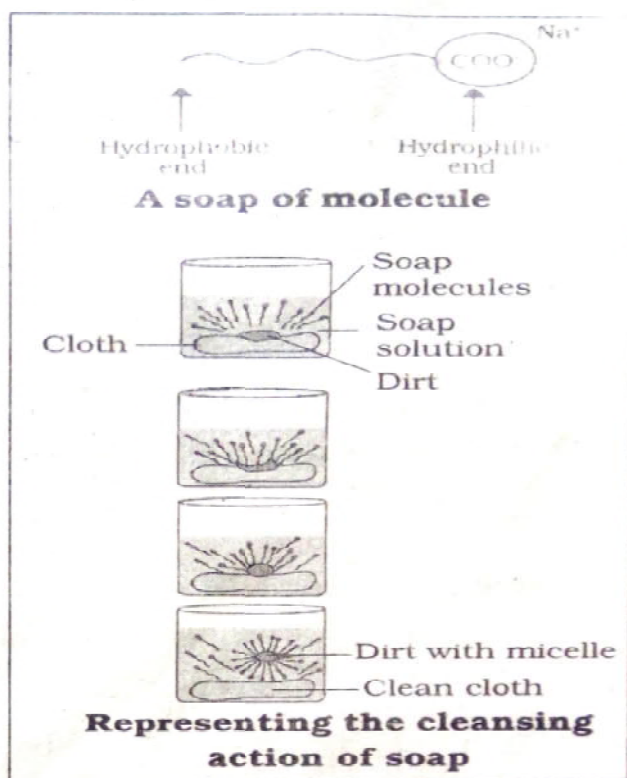
(OR)

Whenever transfer of electrons takes place between two atoms which results formation of opposite charges on the atoms. The electrostatic force attraction is called ionic bond.

Formation of sodium chloride (NaCl) :

Sodium chloride is formed from the elements Na and Cl.

Cation formation : When sodium (Na) atom loses one e^- to get octet electron configuration it form a cation (Na^+) and gets electron configuration that of Neon (Ne).

$$Na \longrightarrow Na^+ + e^-$$
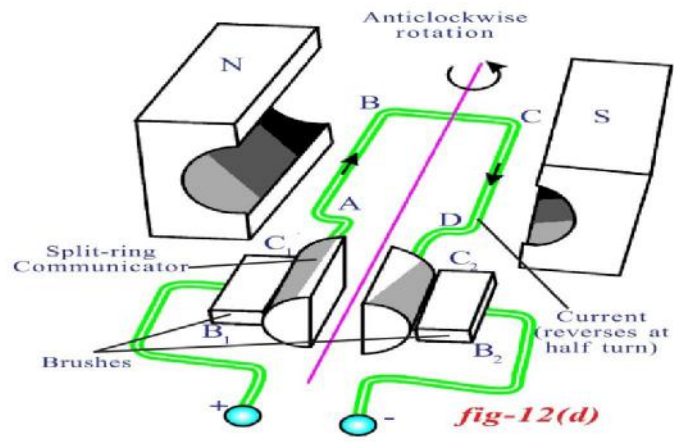$$(2, 8, 1) \qquad (2, 8)$$
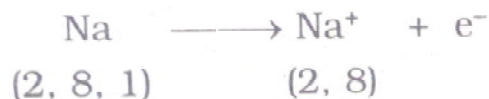
Anion formation : Chlorine has shortage of one electron to get octet in its valence shell so it gains the electron from Na atom to form anion and gets electron configuration as that of Argon (Ar).

$$Cl + e^- \longrightarrow Cl^-$$
$$(2, 8, 7) \qquad (2, 8, 8)$$

Formation of NaCl : These oppositely charged ions get attracted towards each other due to electrostatic forces and form the compound NaCl.
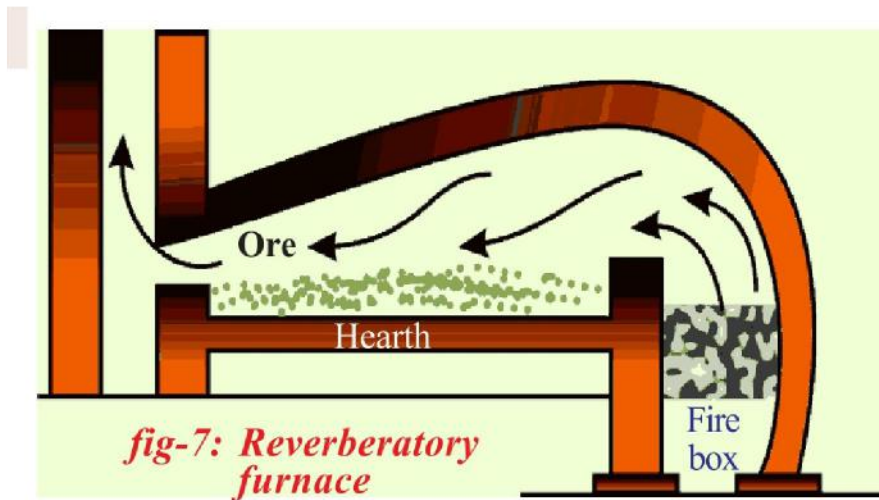
$$Na^+ + Cl^- \longrightarrow NaCl$$

33.Electric motor

Anticlockwise rotation

fig-12(d)

(OR)

Reverboratary furnace

fig-7: *Reverberatory furnace*