ANDHRA PRADESH PUBLIC EXAMINATIONS

PUBLIC EXAMINATIONS-MARCH-2016

GENERAL SCIENCE , Paper – I

(Physical Sciences)

(English Version)

Time: $2\frac{1}{2}$ Hours **Parts A and B** **Maximum Marks : 50**

Class-10 - KEY SHEET - PART-A

Section - I

Group -A

1. In the following cases the light ray does not deviate at the interface.

Case(i): If the refractive indexes of two mediums are equal.

Case(ii): When the incident ray coincides with the normal drawn to the interface.

2. When wet clothes kept in open place, due to large area exposed to air, the water molecules absorb heat from surroundings and change its state by leaving the clothes dry on wind blows. This process is evaporation.

3. As light moves through the atmosphere, most of the longer wavelengths pass straight through. Little of the red, orange and yellow light is affected by the air.

The sky appears blue due to atmospheric refraction and scattering of light through different size molecules like N_2 and O_2. Because molecules act as scattering centres. The sizes of these molecules are comparable to the wave length of blue light. Due to this reason the sky appears in blue colour.

4. Applications of Faraday's law of electromagnetic induction.

Electromagnetic induction is all around us.

(i) It is useful in electric bells.

(ii) It is useful in tape recorder which we use to listen to songs (or) record voices

(iii) It is useful in the case of using ATM card when its magnetic strip is swiped through a scanner.

(iv) An induction stove works on the principle of electromagnetic induction.

Group –B

5. Pure acetic acid is a weak acid. The concentration of hydrogen ions in acetic acid is less. So it does not turns blue litmus in to red.

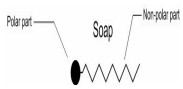
6. nl^x method represents the arrangement of electrons in an atom. It is the short hand notation consists of the principal energy level (n-value) and the sub energy level (l-value) and the number of electrons in the sub energy level (x-value).

7. Variation of Metallic character:

(i) In periods, metallic character decreases from left to right.

(ii) In groups, metallic character increases from top to bottom.

8. Diagram of soap molecule :



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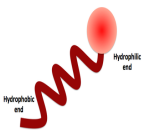

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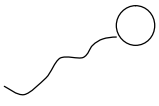

Section - II

9. The heat energy required to change one gram of solid to liquid at constant temperature is called latent heat of fusion.

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10. R = 2f

(Or)

Radius of curvature is double than focal length.

(Or)

Focal length is half of radius of curvature.

(Or)

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

11. The current passing through our body when we touch a live wire of 240V is given by I = 240/100000 = 0.0024A. When a quantify 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 flow continues further, it damages the tissues of the body which leads to decrease in resistance of the body. Sometimes it may cause to death also.

12. Iron articles when exposed to moist air, corrosion will takes place. To prevent iron from corrosion, it is better to apply paint on them. The painting helps to slow down the oxidation process.

13. IV A group (14 group) elements are called carbon family..

14. The compounds have same molecular formula but different in structure. This is called Isomerism.

(Or)

The compounds have same molecular formula but different in properties. This is called Isomerism..

Section - III

Group -A

15. a) 1gm of boiling water at 100^{o}C condenses to water at 100^{o}C.

Heat transferred (Q_1) = mL = 1x540 = 540 cal

The latent heat of vaporization of water is (L) = 540 cal/gm.

b) 1gm of boiling water at 100^{o}C cools to water at 0^{o}C.

Heat transferred (Q_2) = m.s.ΔT = 1x1x100 = 100 cal

c) 1gm of water at 0^{o}C freezes to ice at 0^{o}C.

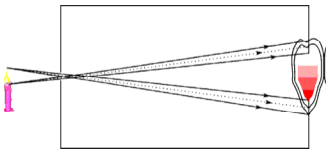
Heat transferred (Q_3) = mL = 1x80 = 80 cal

The latent heat of fusion of ice is (L) = 80 cal/gm.

d) 1gm of steam at 100^{o}C turns to ice at 0^{o}C.

Heat transferred (Q) = Q_1+ Q_2+ Q_3 = 540+100+80 = 720 cal.

16. Pinhole camera:



Take two barrels or boxes so that one can be immersed through another. Place a dark, thick black paper at one end of the big barrel, and tie it with rubber band. Make a hole with pin at the centre of the paper. Tie a oiled paper which is semi transparent to the second small barrel. Immerse small barrel into big barrel and observe the flame of the candle.

The light which comes from the top of the flame goes straight towards the bottom of the screen. Similarly the rays from the bottom of the flame goes straight towards the top of the screen. This leads to the formation of an inverted image. If we increase the size of the pin hole camera, we get blurred image with big size. If the size of the hole is equal to the size of the flame , we get no image on the screen.

17. When light travels from one medium to another medium, its direction changes at the interface. This phenomenon is called refraction.

If light travels from rarer medium to denser medium, it bends towards the normal and if light travels from denser medium to rarer medium, it bends away to the normal.

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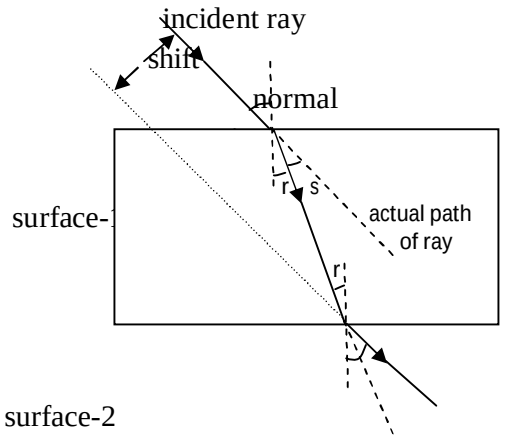
The refracting surfaces of glass slab are parallel to each other. When light ray incident on one surface of the glass slab, it refracted twice and finally emerges from the second surface.

At first refraction it travels from rarer medium to denser medium. And at the second refraction it travels from denser medium to rarer medium.

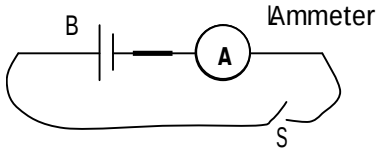


The perpendicular distance between the incident ray and emergence ray is called as lateral shift, if the slab is placed horizontally on the plane.

The perpendicular distance between the incident ray and emergence ray is called as vertical shift, if the slab is placed vertically on the plane.

The angle between the actual path of ray and refracted ray is called angle of deviation (s).

18. Experiment to verify that resistance of a conductor is proportional to the length of the conductor for constant cross section area and temperature :



Collect iron spokes of different lengths with the same area of cross section. Make a circuit with battery, Ammeter, iron spoke and switch. Connect one of the iron spokes, say 10cm length in the circuit. Switch on to allow the flow of current. Measure the value of the current using the ammeter. Repeat this for other lengths of the iron spokes.

The current decreases with increase in the length of the spoke. Thus the resistance of each spoke increases with increase in the length for a constant potential difference.

We can conclude that the resistance (R) of a conductor is directly proportional to its length (l) for a constant potential difference.

i.e. $R \propto l$ (at constant temperature and area of cross section)

Group -B

19. Chemical displacement reaction: In a displacement reaction one element replaces another element from its compound.

Ex: $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$

Chemical decomposition reaction: In a decomposition reaction one substance (reactant) decomposes into two or more new compounds.

Ex: $CaCO_3 \rightarrow CaO + CO_2$

20. **Hund's rulu of maximum multiplicity:** The electron pairing takes place only after all the available degenerate orbitals are occupied by one electron each.

Ex:(i) Oxygen atom (Z=8) has eight electrons. Electronic configuration is $1s^2 2s^2 2p^4$.

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(ii) The first electron goes into the 1s orbital and the second electron will be paired up with the first electron in the same 1s orbital.

Step-1:  $\mathbf{1s^1}$ step-2:  $\mathbf{1s^2}$

(iii) similarly the third electron and fourth electrons occupies the 2s orbital.

Step-3:  $\mathbf{2s^1}$ step-4:  $\mathbf{2s^2}$

(iv) The fifth electron goes into the $2p_x$ orbital. Since all the three 2p orbitals have the same energy, the sixth electron goes into $2p_y$ orbital but not into $2p_x$. The seventh electron goes into $2p_z$ orbital.

And then the eighth electron will be paired up with one electron in $2p_x$ orbital.

Step-5: Step-6: Step-7: Step-8:

$\mathbf{2p_x\ 2p_y\ 2p_z}$ $\mathbf{2p_x\ 2p_y\ 2p_z}$ $\mathbf{2p_x\ 2p_y\ 2p_z}$ $\mathbf{2p_x\ 2p_y\ 2p_z}$

21. Formation of BF_3 molecule:

(i) Electronic configuration of Boron(Z=5) is $1s^2\ 2s^2\ 2p^1$.

(ii) The configuration in excited state is $1s^2\ 2s^1 2p^2$.

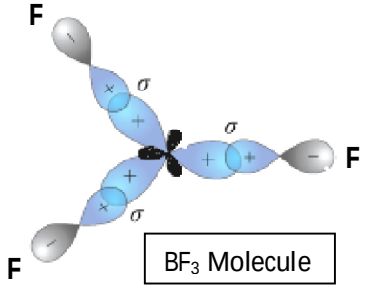
(iii) Due to hybridization of 2s and 2p orbitals, three identical sp^2-hybrid orbitals are formed and Separated in a planar triangular shape.

(iv) Electronic configuration of Flulorine (Z=9) is $1s^2\ 2s^2\ 2p^5$.

(v) It has unpaired electrons in $2p_z$ orbital.

(vi) The three sp^2-hybrid orbitals in boron forms sigma bonds with each of p-orbitals in three Fluorine atoms.

(vii) Thus BF_3 is formed with planar triangular shape.

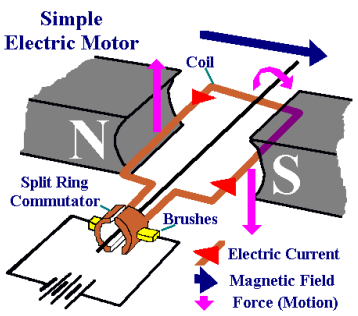


BF_3 Molecule

22. Take two test tubes. Fill one with distilled water and the other with pump water. Add 2ml of soap solution to both the test tubes. Shake the test tubes vigorously for 30 seconds. And leave them for 30 seconds in the stand. Observe the foam formed. The level of foam in distilled water is more than to that of pump water. Thus we declare that pump water is hard water.

Section - IV

23. Diagram of electric motor.



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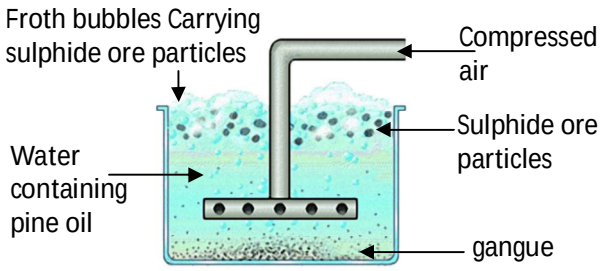
24. The diagram showing Froth floatation:



KEY SHEET - PART-B

Sl No.	Ans.	Sl No.	Ans.	Sl No.	Ans.
1	C	**11**	D	**21**	Convex lens
2	C	**12**	B	**22**	Less
3	D	**13**	C	**23**	Pole
4	B	**14**	D	**24**	90^{o}
5	A	**15**	B	**25**	*Potential difference*
6	B	**16**	B	**26**	D
7	B	**17**	A	**27**	E
8	A	**18**	C	**28**	A
9	A	**19**	Law of conservation of energy	**29**	B
10	A	**20**	Electric power	**30**	C

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