

# Pre-Final Examinations

(2019-2020)

## 10<sup>th</sup> Physical Science

### Principles of Evaluation

#### Section-I

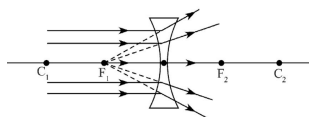
(12x $\frac{1}{2}$  = 6 Marks)

1. C)Both P and Q are correct
2. Tooth decay starts
3. b)Due to total internal reflection
4. a)concave lens always forms virtual images
5. d) lens
6. B) 1-c,2-d,3-b,4-a
7. Kossel and Lewis
8. c)  $MgCl_2$
9. Nature of the material, Temperature , length and area of cross section
10. Power(P)=VI=23x2=46 W
11.  $Fe_2O_3$  /  $Fe_3O_4$
12. Sodium Chloride (NaCl)

#### Section-II

(8x1=8Marks)

13. Water absorb more heat energy due to high specific heat
14. The reaction of acid with a base to give a salt and water is known as a neutralization reaction  
 $HCl + NaOH \rightarrow NaCl + H_2O$
15. Copper sulphates crystals, test tube holder, Boiling tube, Burner,
16. The ratio of speed of light in the first medium to the speed of light in the second medium is known as relative refractive index
17.  $R_1=R_2= R$   
 $n=1.5$   
$$\frac{1}{f} = (n - 1) \left( \frac{2}{R} \right) = (1.5 - 1) \left( \frac{2}{R} \right) = \frac{\left( \frac{1}{2} \right) \times 2}{R} = \frac{1}{R}$$
 $f=R$
18. Surgical equipments, cooking utensils (write any two uses)
- 19.



20. Electronegativity of an element is the average value of its ionization energy and electron affinity (OR)

$$\text{Electronegativity} = \frac{\text{ionization energy} + \text{electron affinity}}{2}$$

#### Section-III

(8x2=16 Marks)

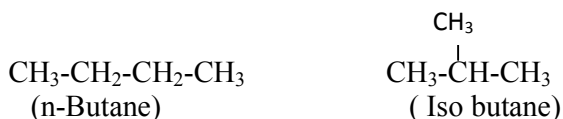
21.

Orbital	4s	3d
(n+l) value	(4+0)=4	(3+2)=5

According Aufbau principle electron enters least (n+l) value orbital. So electron enter into 4s, instead of 3d after 3p

22. Due to total internal reflection. Light rays before striking the air bubbles have to travel through water. These light rays which strike the air bubbles at angles greater than critical angle for water-air interface are totally reflected. So the air bubbles appear silvery.
23. 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

- 24.i) The direction of the field lines of the outside the magnet is from N-pole to S-pole  
 ii) The direction of the field lines of the inside the magnet is from S-pole to N-pole  
 iii) Magnetic lines are closed loops  
 iv) Magnetic lines are curved lines  
 v) Any magnetic lines are cannot coincide each other  
 (Write any two points )
25. The phenomenon of possessing same molecular formula but different properties by the compounds is known as Isomerism.  
 Ex: Butane can exhibit two different isomers



- 26.i) Esters are used for making artificial flavours and essences  
 ii) Esters are used for making perfumes  
 iii) Esters are used as plasticizers  
 iv) Esters are used as solvents for oil,fats,gums etc  
 ( Write any two uses)
27. Total internal reflection is the main reason for brilliance of diamonds. The critical angle of a diamond is very low( $24.4^\circ$ ).So if a light ray enters a diamond it is very likely to undergo total internal reflection which makes the diamond shine  
 Note: Write explanation of mirage/ Working of optical fibres

28.

S.No	Functional group	Structural formula	Example
1	Amine		$\text{CH}_7\text{NH}_2$
2		$\text{R-C=O-R}$	$\text{CH}_3\text{O CH}_5$
3	Alcohol	$\text{R-OH}$	

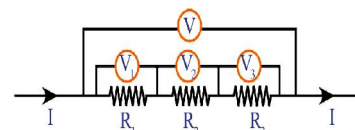
### Section-IV

(5x4=20Marks)

- 29.a)
- i) **Boiling:** Boiling is a process in which the liquid phase changes to gaseous phase at a constant temperature at a given pressure, This temperature is called boiling point of the liquid.  
 Boiling point of water is  $100^\circ\text{C}$  or  $373\text{K}$
- ii) **Melting:** Melting is a process in which the solid phase changes to liquid phase at constant temperature at a given pressure. This temperature is called Melting point of the solid.  
 Melting point of ice is  $0^\circ\text{C}$  or  $273\text{K}$
- iii) **Freezing:** The process in which the substance in liquid phase changes to solid phase by losing some of its energy is called freezing  
 Freezing of water takes place at  $0^\circ\text{C}$  temperature and one atmospheric pressure
- iv) **Humidity:** The amount of water vapour present in air is called humidity  
 Some of vapour may comes from evaporation of water from the surfaces of rivers, lakes, ponds etc

(OR)

- b) i) As shown in figure,  $R_1$ ,  $R_2$  and  $R_3$  resistors are connected in series  
 ii) Let  $V_1$ ,  $V_2$  and  $V_3$  are the potential differences across the three resistors  
 iii) In series connection, same amount of current(I) flows in the three resistors  
 iv) According to Ohm's law  $V_1 = IR_1$   
 $V_2 = IR_2$   
 $V_3 = IR_3$   
 v) In series,  $V = V_1 + V_2 + V_3 = IR_1 + IR_2 + IR_3 = I(R_1 + R_2 + R_3)$   
 vi) Let R be the equivalent resistance of the combination of resistances in series  
 $V = IR_{eq}$   
 vii)  $IR_{eq} = I(R_1 + R_2 + R_3)$   
 $R_{eq} = R_1 + R_2 + R_3$   
 viii) The sum of the individual resistance is equal to their equivalent resistance when the resistors are connected in series



30. a) **Aim:** Finding the refractive index of a prism  
**Material required:** Prism, piece of white chart, pencil, pins, scale and protractor.

**Procedure:** i) Place the prism on the white chart and draw the outline of the prism by using pencil

ii) Remove the prism and identify the vertices of prism are P,Q and R

iii) Measure the prism angle(A) iv) Mark M on the side of PQ and draw the normal to PQ at M

v) Draw a line making some angle to the normal at M. This is angle of Incident

vi) Now place the prism in its position again. Fix the two pins A and B on the incident ray

vii) Now identify the images of A, B are C and D on the other side (PR) of the prism

viii) Draw a line joining C, D and extend it to meet PR. This is emerging ray.

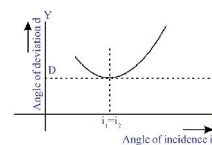
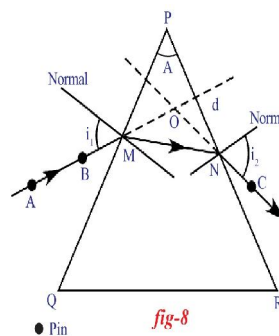
ix) Draw a normal to PR at N

x) Join M and N. Extends incident ray and. emerging ray, they are meet at O. Also extends two normals

xi) Repeat this experiment with different incident angles and measures the corresponding emerging angles and deviation angles

xii) Measure the angle of minimum deviation(D) by I-d graph

xiii) Now calculate the refractive index of the prism by using the formula  $n = \frac{\sin(A+D)}{\sin\left(\frac{A}{2}\right)}$



(OR)

b) Explain Faraday's law of induction

i) Connect the terminals of a coil to a sensitive galvanometer as shown in the figure

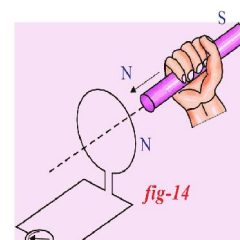
ii) Normally, we would not expect any deflection of needle in the galvanometer because there is no EMF in the circuit.

iii) Now, if we push a bar magnet towards the coil, with its N-pole facing the coil, we observe the deflections in the galvanometer

iv) If the magnet is moved away from the coil, again we observe the deflections in the galvanometer in opposite direction

v) If we use S-pole of a magnet, same results but opposite in previous one

vi) From this activity we conclude that the change in magnetic flux linked with a closed coil, produces current.



31. a)

i) Atomic radius: In group, atomic radius increases from top to bottom. Because a new shell is added, the distance between nucleus and the outer shell increases

In period, atomic radius decreases from left to right. Because same number of shells, the nuclear attraction on the outershell increases. As a result atomic radius decreases .

ii) Electro positivity: In group, Electro positivity increases from top to bottom. Because atomic radius increases

In period, Electro positivity decreases from left to right. Because atomic radius decreases

iii) Ionization energy: In group, Ionization energy decreases from top to bottom. Because atomic radius increases

In period, Ionization energy increases from left to right. Because atomic radius decreases

iv) Electron affinity: In group, Electron affinity decreases from top to bottom. Because atomic radius increases

In period, Electron affinity increases from left to right. Because atomic radius decreases

(OR)

b) **Hybridisation** is a phenomenon of intermixing of atomic orbitals of almost equal energy which are present in the outer shells of the atom and their reshuffling or redistribution into the same number of orbitals but with equal properties

**Formation of NH<sub>3</sub>:**

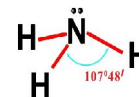
i) N has electronic configuration  $1s^2 2s^2 2p_x^1 2p_y^1 2p_z^1$

ii) N atom is said to undergo  $sp^3$  hybridisation. In this process 2s and  $2p_x, 2p_y, 2p_z$  orbitals of nitrogen intermix and redistribute into four identical  $sp^3$  orbitals.

iii) One of the four  $sp^3$  orbitals get a pair of electrons and the other three  $sp^3$  orbitals get one electron each.

iv) Now hydrogen atoms overlap their 1s orbitals containing unpaired electrons the  $sp^3$  orbitals of N atom containing unpaired electrons to give three  $\sigma$ - $sp^3$  bonds.

v) Bond angle in HNH is  $107^\circ 48'$



32.a)

S.No	Electron entering orbital	Principle quantum number	Angular momentum quantum number	Magnetic quantum number	Spin quantum number
1	$3s^1$	3	0	0	+1/2 or -1/2
2	$2p^1$	2	1	-1	+1/2 or -1/2
3	$4f^1$	4	3	-3 or -2 or -1 or 0 or 1 or 2 or 3	+1/2 or -1/2
4	$5s^1$	5	0	0	+1/2 or -1/2

(OR)

- b) i) Gold(Au), Silver(Ag) and Copper (Cu)  
 ii) Aluminum  
 iii) Very reactive  
 iv)  $Al_2O_3 \cdot 2H_2O$  or  $MgSO_4 \cdot 7H_2O$  or  $CaSO_4 \cdot 2H_2O$  or  $KCl \cdot MgCl_2 \cdot 6H_2O$

33.a) i) Object at Infinity

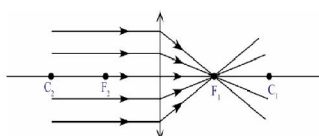


fig-8(c)

ii) Object placed at centre of curvature(2F)

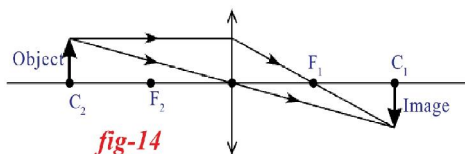


fig-14

iii) Object placed between the centre of curvature and focal point

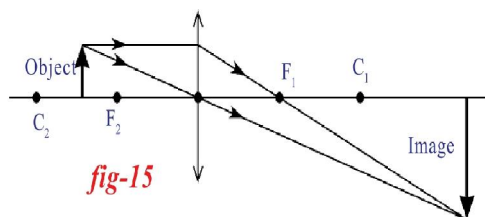


fig-15

iv) Object placed between focal point and optic centre

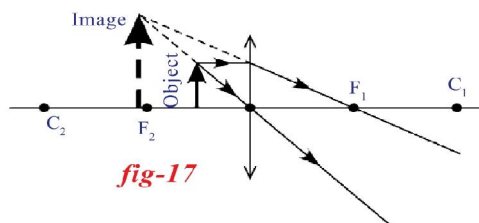


fig-17

(OR)

b)

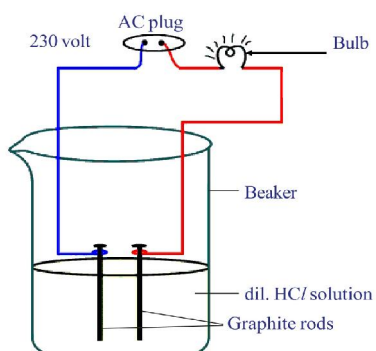


fig-3: Acid solution in water conducts electricity

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