ANANTHAPUR DISTRICT COMMON EXAMINATION BOARD
QUARTERLY EXAMINATIONS-OCTOBER-2015
GENERAL SCIENCE , Paper – I
(Physical Sciences)

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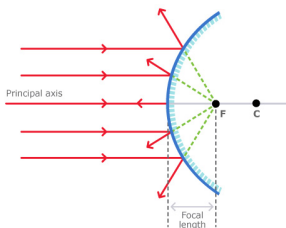
Time: $2\frac{1}{2}$ Hours **Parts A and B** Maximum Marks : 50

Class-10 - KEY SHEET - PART-A
Section - I
Group -A

1. If parallel rays incident on convex mirror

2. Lens maker's formula : $\frac{1}{f} = (n_{ba}\text{-}1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

f = Focal length of the lens

$n_{ba} = \frac{n_b}{n_a}$ = Relative refractive index of lens with respect to surrounding medium

n_b = Refractive index of lens material n_a = Refractive index of surrounding medium

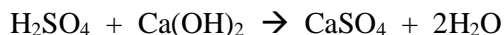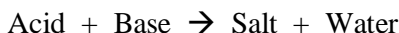R_1 = Radius of curvature of first surface R_2 = Radius of curvature of second surface

If surrounding medium is air then $n_a = 1$, Then

n_b=n is the absolute refractive index of the lens. Now : $\frac{1}{f} = (n\text{ -}1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

3. 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.

4. Refractive index of diamond is very high (2.42). It is more than normal glass. Due to high refractive index, critical angle for diamond is very less. So most of the ray incident on the diamond surface, gets total internal reflection. So it shines more.

Group –B

5. The reaction between an acid and a base to produce salt and water is called neutralization reaction.

$$\text{Acid } + \text{ Base } \rightarrow \text{ Salt } + \text{ Water}$$

Ex: $HCl + NaOH \rightarrow NaCl + H_2O$

$H_2SO_4 + Ca(OH)_2 \rightarrow CaSO_4 + 2H_2O$

Note: Any one example. No need of equation.

6. Applications of bleaching powder:

(i) For bleaching cotton (ii) For bleaching wood pulp (iii) For bleaching clothes

(iv) For oxidizing substances (v) For disinfecting water (vi) For preparing chloroform

Uses of Washing soda (Na_2CO_3) :

i) Used in glass, soap and paper industries.

ii) Used in the manufacture of sodium compounds such as borax.

iii) Used as a cleaning agent for domestic purposes.

iv) Used for removing permanent hardness of water.

Note : Any two points in each are sufficient.

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7. (a) $Zn + 2 AgNO_3 \rightarrow 2 Ag + Zn(NO_3)_2$

(b) $H_2 + Cl_2 \rightarrow 2 HCl$

8. When some metals are exposed to moisture, acids, etc., they tarnish due to the formation of respective metal oxide on their surface. This process is called corrosion.

Corrosion can be prevented by shielding the metal surface, painting, oiling, greasing, galvanizing, chrome plating or making alloys.

Section - II

9. The water molecules present in air touches the surface of the bottle and lose their kinetic energy. As a result the temperature of water molecules decrease and condenses on the surface of the bottle. These water droplets are seen as dew.

10. The distance between pole and focus is called focal length of the spherical mirror.

(or)

The distance at which the image of object of infinite distance is collected, is called focal length.

11. If a precipitate is formed in a chemical reaction, it is called precipitate reaction.

12. The scale that shows the strength of acids and bases with respect to the concentration of H^+ ions and OH^- ions is called P^H scale.

13. The ratio of speed of light in vacuum to the speed of light in medium is called refractive index of that medium.

14. Lens can form image by the process of refracting the light rays.

Note: Any related point.

Section - III
Group -A

15. Specific heat of a solid can be measured by using calorimeter. To perform this experiment we need calorimeter, water, hot water, thermometer and metal bob.

Procedure: (1) First we have to find the mass of the calorimeter vessel (m_1).

(2) Fill half of the calorimeter with water and find the mass of calorimeter with water (m_2).

(3) Measure the initial temperature with laboratory thermometer ($T_1{}^oC$). This is the temperature of both water and also calorimeter.

(4) Take a metal bob and place it in hot water. Heat it nearly 100^oC. So measure the temperature of metal bob ($T_2{}^oC$).

(5) Transfer the metal bob into calorimeter quickly with minimum loss of heat.

(6) Stir the mixture well.

(7) Note the final temperature ($T_3{}^oC$).

(8) Measure the final mass of calorimeter vessel along with water and metal bob (m_3).

Heat $(Q) = m.s.\Delta T$

According to the method of mixtures :

Heat lost by the solid = Heat gained by calorimeter + Heat gained by water

$(m_3-m_2).S_l.(T_2-T_3) = m_1.S_c.(T_3-T_1) + (m_2-m_1).S_w.(T_3-T_1)$

$$S_l = \frac{[m_1 S_c + (m_2 - m_1)S_w][T_3 - T_1]}{(m_3 - m_2)(T_2 - T_3)}$$

This way we can find the specific heat of a solid.

Take $S_w = 1$ cal/gm -^oC

$S_c = 0.095$ cal/gm -^oC

16.

	Convex Mirror		Concave Mirror
1	This is a spherical mirror whose reflecting surface is curved outward is called convex mirror.	1	This is a spherical mirror whose reflecting surface is curved inward is called called concave mirror.
2	The focus lies behind the mirror.	2	The focus lies infront of the mirror.
3	It is also known as diverging mirror.	3	It is known as converging mirror.
4	Used as rear view mirror, ……	4	Used as reflectors in head lights of vehicles

Note: Any four related points.

17. Applications of total internal reflection:

(i) Diamonds have high refractive index (2.42). The critical angle of diamond is very less (24.4^o). By cutting the faces of diamond in such a way that most of the incident rays at every face get total internal reflection. This is the reason for shining of diamonds.

(ii) During a hot summer day, air just above the road surface is very hot, acts as rarer medium. And the air at higher altitudes is cool, acts as denser medium. Thus the refractive index of the cooler air at the top is greater than the refractive index of hotter air just above the road.

   When the light from a tall object such as tree passes through denser medium to rarer medium, gets total internal reflection. Hence we feel the illusion of water being present on road which is the virtual image (mirage).

   Note: Any details of two concepts.

18. Let the centre of curvatures of double convex lens are $R_1 = 30$ cm and $R_2 = -60$ cm

   (R_1 is positive and R_2 is negative.)

   Focal length of lens (f) = ?

   Refractive index of the lens (n) = 1.5

   Lens maker's formula : $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

   ➔ $\frac{1}{f} = (n-1)\left(\frac{1}{R_1} - \frac{1}{R_2}\right)$

   ➔ $\frac{1}{f} = (1.5-1)\left(\frac{1}{R_1} - \frac{1}{2R_1}\right)$

   ➔ $\frac{1}{f} = (0.5)\left(\frac{1}{30} - \frac{1}{-60}\right)$

   ➔ $\frac{1}{f} = \left(\frac{1}{2}\right)\left(\frac{2}{60} + \frac{1}{60}\right)$

   ➔ $\frac{1}{f} = \left(\frac{1}{2}\right)\left(\frac{3}{60}\right)$

   ➔ $\frac{1}{f} = \left(\frac{1}{40}\right)$

   f = 40cm

Group -B

19. <u>Water crystallization:</u> The water molecules which form part of the structure of a crystal are called water of crystallization. The salts which contain water of crystallization are called hydrated salts.

   Activity: Take a few crystals of copper sulphate in a dry test tube and heat the test tube. In the above activity copper sulphate crystals which seem to be dry contain the water of crystallization. When these crystals are heated, water present in crystals is evaporated and the salt turns white. When the crystals are added with water, the blue colour reappears.

20. (i) Tooth enamel, made of calcium phosphate is the hardest substance in the body. Bacteria present in mouth produce acids by degradation of sugar and food particles remaining in mouth. This acids attack on the enamel. So Tooth decay starts when pH of the mouth is lower than 5.5.
(ii) It is very interesting to note that our stomach produces hydrochloric acid. It helps in the digestion of food without harming the stomach. During indigestion the stomach produces too much acid and this causes pain and irritation. To get rid of this pain, people use bases called antacids. These antacids neutralize the excess acid in the stomach.

21. <u>**Chemical decomposition reaction:**</u> In a decomposition reaction one substance (reactant) decomposes into two or more new compounds.

**Ex:** $CaCO_3 \rightarrow CaO + CO_2$

Experiment: Take some pieces of calcium carbonate in a test tube. Heat it with a spirit burner. A gas liberated. Send the gas into lime water. It turns into milk white. The liberated gas is carbon dioxide. This is due to decomposition of calcium carbonate into calcium oxide and carbon dioxide.

Note : Any related experiment about decomposition.

22. <u>**Chemical displacement reaction:**</u> In a displacement reaction one element replaces another element from its compound.

Ex: $Zn + CuSO_4 \rightarrow ZnSO_4 + Cu$
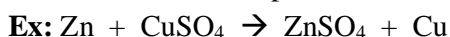
<u>**Chemical double displacement reaction:**</u> In a double displacement reaction the reactants exchange their constituents chemically and form two new compounds.
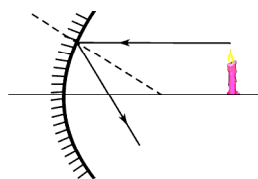
Ex: $BaCl_2 + Na_2SO_4 \rightarrow BaSO_4 + 2NaCl$
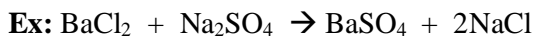
Note: Any related examples – one for each are sufficient.
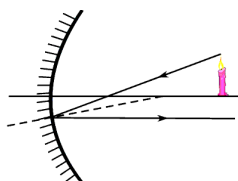
<div align="center"><u>Section - IV</u></div>

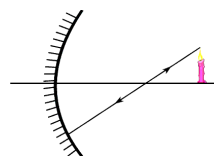**23. Ray diagrams for concave mirror:**

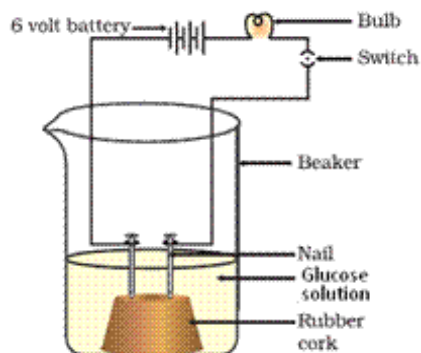**(a)** If rays incident parallel on the mirror

(b) If rays incident on the mirror and passes through focus

(c) If rays incident on the mirror and passes through centre of curvature

24. **Acidic solutions allow the flow of current:**

6 volt battery — Bulb
— Switch
— Beaker
— Nail
— Glucose solution
— Rubber cork

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KEY SHEET - PART-B

Sl No.	Ans.	Sl No.	Ans.	Sl No.	Ans.
1	B	11	A	21	0°
2	C	12	B	22	Oxidation
3	C	13	B	23	H^+ ions
4	C	14	D	24	3×10^8 m/s
5	A	15	B	25	Convex lens
6	C	16	B	26	C
7	C	17	B	27	D
8	B	18	A	28	A
9	B	19	D	29	B
10	C	20	B	30	E

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