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

**Time: 2 Hours 45 Min.**   **Parts A and B**   **Maximum Marks : 50**

Class-10 -   KEY SHEET

Section - I

1. Power of lens= 4D

$P = 100/f$(in cm)

$f = 100/4 = 25$cm

2. The metallic ribbon that gives dazzling brilliance is Magnesium.

The symbol of magnesium is Mg.

3. The properties of image formed by convex lens is virtual, erect and enlarged.

4. Yes, I agree with this. Calcium carbonate ($CaCO_3$) decomposes and give Carbon dioxide. It will put off burning match stick.

$$CaCO_3 \rightarrow CaO + CO_2$$
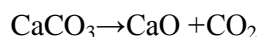
5. If the object placed between F and C before a concave lens, the image can be collected between F and P of same side. The character of image is virtual, erect and diminished.

6. The steel box behaves like convex mirror. The image properties are Virtual , erect and diminished.

7. Rajesh used convex lens to burn paper.
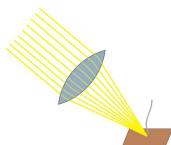

Section - II

8. Aged people is suffering from presbyopia. Presbyopia is vision defect when the ability of accommodation of the human eye usually decreases with ageing.

Reasons – due to gradual weakening of ciliary muscles and diminishing flexibility of the human eye lens.

Correct - To correct this type of defect of vision we need bi-focal lenses which are formed using both concave and convex lenses.

9. (a) B substance reacts with Zinc rapidly to librates H_2 gas.

(b) A substance is strong base.
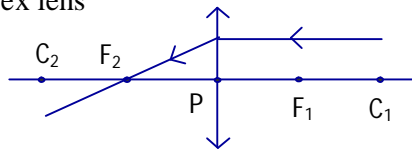
10.(a)The diagram that shows myopia.
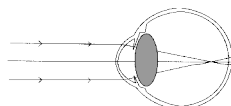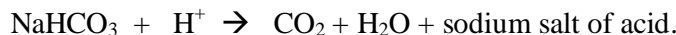

(b) Correction of myopia by using Concave lens.
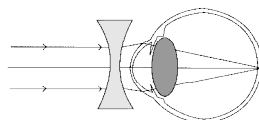
11. Ray diagram for convex lens

12. Sodium bicarbonate (Baking powder) which is used in preparing of Cakes is prepared from common salt.

$$NaCl + H_2O + CO_2 + NH_3 \rightarrow NH_4Cl + NaHCO_3$$

When baking powder is heated or mixed in water, the following reaction takes place.

$$NaHCO_3 + H^+ \rightarrow CO_2 + H_2O + \text{sodium salt of acid.}$$

Carbon dioxide produced during the reaction causes bread or cake to rise making them soft and spongy.

13. Corrosion can be prevented by :

(i) Painting   (ii) Oiling   (iii) Greasing

(iv) Galvanizing   (v) chrome plating   (vi) making alloys.

By this methods the metals protected from corrosion. The layers of paint or grease can prevent the metals from oxidation.

Section - III

14A. The specific heat of a substance is the amount of heat required to raise the temperature of unit mass of substance by one degree.

We have seen that the rise in temperature depends on the nature of the substance. Hence the specific heat of a substance depends on its nature. If the specific heat is high, the rate of rise in temperature or fall in is low for same quantity of heat supplied.

We know that the temperature of a body is directly proportional to the average kinetic energy of particles of the body. The molecules of the system (body or substance) have different forms of energies such as linear kinetic energy, rotational kinetic energy, vibrational energy and potential energy between molecules. The total energy of the system is called internal energy of the system. When we supply heat energy to the system the heat energy given to it will be shared by the molecules among the various forms of energy. This sharing will vary from substance to substance. The rise in temperature is high for a substance, if the maximum share of heat energy is utilized for increasing its linear kinetic energy. This sharing of heat energy of the system also varies with temperature .That is why the specific heat is different for different substances.

14B. Mirage is an optical illusion where it appears that water has collected on the road at a distant place but when we get there, we don't find any water.

The formation of a mirage is the best example where refractive index of a medium varies throughout the medium.
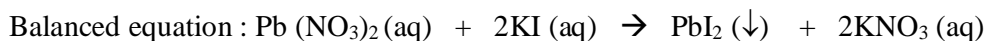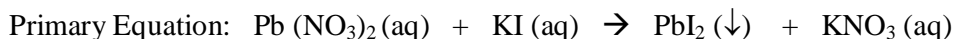
During a hot summer day, air just above the road surface is very hot, acts as rearer medium. And the air at higher altitudes is cool,acts as denser medium.

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 a medium just above the road, whose refractive index decreases towards ground, it suffers, refraction and takes a curved path because of total internal reflection.

Hence we feel the illusion of water being present on road which is the virtual image (mirage) and an inverted image of tree on the road.

**15A.** Aqueous solutions of Potassium iodide and Lead nitrate reacts to form Potassium nitrate and Lead iodide.

Primary Equation: $Pb(NO_3)_2$ (aq) + KI (aq) → PbI_2 ($\downarrow$) + KNO_3 (aq)

Balanced equation : $Pb(NO_3)_2$ (aq) + $2KI$ (aq) → PbI_2 ($\downarrow$) + $2KNO_3$ (aq)

This is a chemical double displacement reaction.

15B. The white powder used to clean water tank is Bleaching powder.

Its formula is $CaOCl_2$.

Due to reaction between Chlorine on Slaked lime, bleaching powder is produced.

$$Ca(OH)_2 + Cl_2 \rightarrow CaOCl_2 + H_2O$$
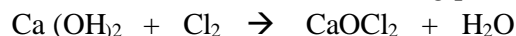
Uses of Bleaching Powder: (any 2)

(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

16A. <u>Verification of first law of reflection:</u>

Fix a white paper on a drawing board with the help of clamps.

Draw a straight line AB at the centre of the paper and a normal (ON) to AB at 'O'.

Draw a straight line PQ making certain angle ($\hat{i}$) with ON.

Fix two pins at P and Q on the paper vertically.

Observe the images P^I and Q^I of the pins P and Q, in the mirror kept along the line AB.
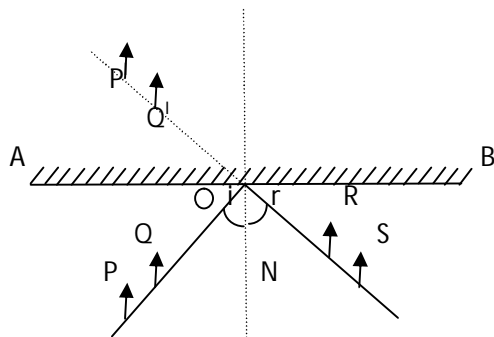
Fix two more pins R and S such that they are in the same line as that of P^I and Q^I.

Join R, S and O Measure the angle between RS and ON (angle of reflection).

We find that   angle of incidence = angle of reflection.

Repeat the experiment for different angles of incidence.

In all cases the angle of reflection equal to the angle of incidence.

16B. Take a lens whose focal length is known.

Take a cylindrical vessel whose height must be greater than (4 times) the focal length of lens.

 Keep a black stone inside the vessel at its bottom.

 Now pour water into the vessel up o a height (equal to 'f').

 Now dip the lens horizontally using a circular lens holder.

 Set the distance between stone and lens that is equal to or less than focal length of lens.
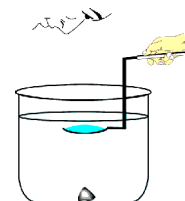
 Now look at the stone through the lens.

We can't see the image of stone.

Now increase the distance between lens and stone until you can see the image of the stone.

This shows that the focal length of lens has increased in water.

Thus we conclude that the focal length of lens depends upon the surrounding medium .

17A. (a) velocity of light in vacuum (c) $= 3 \times 10^8$ m/s

Refractive index of benzene $=1.50$

$$\text{Refractive index } = \frac{c}{v}$$

$$1.5 = \frac{3 \, X \, 10^8}{v}$$

$$V = \frac{3 \, X \, 10^8}{1.5} = 2 \times 10^8 \, \text{m/s}$$

(b) The velocity of light is minimum in Diamond.

(c) Water can be treated as rarer medium because it has less refractive index .

(d) Refractive index of kerosene with respect to water $= \frac{Refractive \ index \ of \ kerosene}{Refractive \ index \ of \ water} = \frac{1.44}{1.33} = 1.08$

17B. (i) Temperature has not changed in two situations.

There is a phase change between B and C from solid Ice to liquid water.

So Temperature is constant between B and C.

There is a phase change between D and E from liquid water to water vapour.

So Temperature is constant between D and E.

(ii) The amount of heat energy provided between BC is the latent heat of fusion of ice.

m = 2 Kg = 2000 g

L = 80 cal/g

The amount of heat energy provided between BC = m L = 2000 x 80 = 160000 cal

The amount of heat energy provided between DE is the latent heat of vaporization of water.

m = 2 Kg = 2000 g

L = 540 cal/g

The amount of heat energy provided between DE = m L = 2000 x 540 = 1080000 cal

18. D	**19.** B	**20.** B	**21.** A
22. D	**23.** A	**24.** D	**25.** C
26. B	**27.** A		