

NALGONDA 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. Pure acetic acid is a weak acid. The concentration of hydrogen ions in acetic acid is less. So it does not turn blue litmus into red.
2. Due to refraction, the coin in water appears at some height in water.
3. **Interpreting a balanced chemical equation: (any 2 points)**
 - (i) A chemical equation gives information about reactants and products and their formulae.
 - (ii) It gives the ratio of molecules of reactants and products.
 - (iii) It gives the information about relative masses of reactants and products.
 - (iv) It gives the molar ratios of reactants and products.
 - (v) We can calculate the number of molecules or atoms of various substances by using Avogadro's number.
 - (vi) we can calculate the masses and volumes of gases liberated in the reaction.
4. We should not add water to an acid.
We must add acid to water drop by drop to prepare dilute acid.
5. The precipitate formed due to reaction of Lead nitrate and Potassium Iodide is Lead Iodide.
It is in Yellow colour.
6. If specific heats of different substances are same. We can not imagine our life. All substances attain same temperature for providing same heat. We can not handle cooker as it heated same as metallic vessel. **(any related answer)**
7. 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.

Section - II

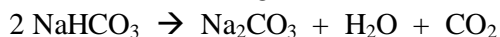
8. Mirage is an optical illusion. During a hot summer day, air just above the road surface is very hot, acts as rarer medium. And the air at higher altitudes is cool, acts as denser medium.
Thus the refractive index of the cooler air at the top is greater than the refractive index of hotter air just above the road. When the light from a tall object such as tree passes through 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.
9. If condensation does not occur on earth, the water vapour is not condensed. In general as the water vapour present in air cools down and rain falls due to condensation. If there is no condensation, no rain falls on earth. If there is no rain, no plant can live on earth. Then no man can live on earth. Condensation is a useful process on earth.
10. (a) Benzene has more refractive index.
(b) Light travels faster in Ice.

11. Concave and convex surfaces (They may not be reflective surfaces).

Concave surfaces	Convex surfaces
Inner part of a spoon	Outer part of a spoon
Inner part of a basin	Outer part of a basin
Inner part of a bangle	bottom edge of a test tube
Surface of a curved U-shaped TV	Outer part of a bangle
Inner surface of Dish antennae	Surface of a ball

12. If we heat 'X', it produces the products A, B and C. h

A is used for washing clothes.



(a) formula of A is Na_2CO_3

Uses: i) Sodium carbonate (washing soda) is used in glass, soap and paper industries.

ii) It is used in the manufacture of sodium compounds such as borax.

iii) Washing soda can be used as a cleaning agent for domestic purposes.

iv) It is used for removing permanent hardness of water.

(b) The name of gas C is hydrogen.

If we put a burning match stick near the gas, the stick will put off with pop sound.

This way we determine the evolved gas is hydrogen.

13. Uses of Optical fibres:

(i) The doctor inserts an optical fiber pipe into the stomach through the mouth. Light is sent down through one set of fibres in the pipe. This illuminates the inside of the stomach. The light from the inside travels back through another set of fibres in the pipe and the viewer gets the image at the outer end (generally fed to the computer screen).

(ii) The important use of fibre optics is to transmit communication signals through light pipes. For example, about 2000 telephone signals, appropriately mixed with light waves, may be simultaneously transmitted through a typical optical fibre.

Section - III

14A. (i) Specific heat : The amount of heat required to raise the temperature of unit mass of substance by one unit is called Specific heat.

(ii) **Applications of specific heat in daily life :(any related points)**

*Watermelon brought out from a fridge retains its coolness for a long time than other fruits.

Because the watermelon consists of more water and water has greater specific heat.

*A samosa appears to be cool outside but the curry may be hot inside. Because the ingredients in the samosa have high specific heat values.

14B. (i) **Evaporation** : The process of escaping of molecules from the surface of a liquid at any temperature is called evaporation. Evaporation is a cooling process. It is a surface phenomenon.

Boiling : The process in which the liquid phase changes to gaseous phase at a constant temperature and pressure is called boiling. Boiling does not cause cooling.

Boiling is a bulk phenomenon.

(ii) Problem : $m_1 = 100$ units

$$T_1 = 40^\circ\text{C}$$

$m_2 = 100$ units

$$T_2 = 20^\circ\text{C}$$

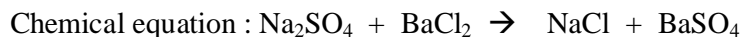
$$\begin{aligned} \text{Final temperature: } (T) &= \frac{m_1 T_1 + m_2 T_2}{m_1 + m_2} \\ &= \frac{100 \times 40 + 100 \times 20}{100 + 100} \\ &= \frac{4000 + 2000}{200} \\ &= \frac{6000}{200} \\ &= 30^\circ\text{C} \end{aligned}$$

- 15A. (i) $2 \text{Al} + \text{Fe}_2\text{O}_3 \rightarrow \text{Al}_2\text{O}_3 + 2 \text{Fe}$
 (ii) $6 \text{CO}_2 + 6 \text{H}_2\text{O} \rightarrow \text{C}_6\text{H}_{12}\text{O}_6 + 6 \text{O}_2$
 (iii) $2 \text{Na} + 2 \text{H}_2\text{O} \rightarrow 2 \text{NaOH} + \text{H}_2$
 (iv) $2 \text{Pb}(\text{NO}_3)_2 \rightarrow 2 \text{PbO} + 4 \text{NO}_2 + \text{O}_2$

15B. (i) Calcium carbonate decomposes into calcium oxide and carbon dioxide.

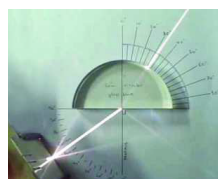
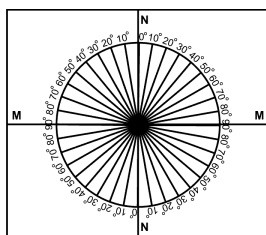


(ii) Sodium sulphate solution reacts with barium chloride solution to form sodium chloride and barium sulphate solutions.



16A. **Required :** wooden plank, white chart, scale, protractor, pencil, laser light source

Procedure: Take a wooden plank. Cover with white chart. Draw two perpendicular lines, passing through the middle of the paper. Mark one line as NN which is normal to the another line marked as MM. Here MM represents the line drawn along the interface of two media and NN represents the normal drawn to this line at 'O'.



Take a protractor and place it along NN (its centre coincides with O). Then mark the angles from 0° to 90° on both sides of the line NN. Repeat the same on the other side of the line NN. Now place a semi-circular glass disc so that its diameter coincides with the interface line (MM) and its center coincides with the point O. Point a laser light along NN in such a way that the light propagates from air to glass through the interface at point O and observe the path of laser light coming from other side of disc..

Send Laser light along a line which makes 15° (i) with NN and see that it passes through point O. Measure its corresponding angle of refraction (r). Note these values in table.

Find **sin i**, **sin r** and also the ratio $\frac{\sin i}{\sin r}$.

Do the same experiment for the angles of incidence such as $20^\circ, 25^\circ, 30^\circ$, and 35° .

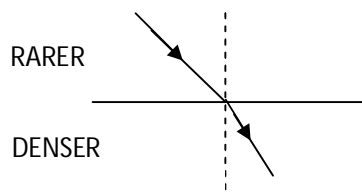
In each and every case, we get the ratio $\frac{\sin i}{\sin r}$ as a constant.

Sl. No.	(i)	(r)	Sin i	Sin r	$\frac{\sin i}{\sin r}$
1	15°				
2	20°				
3	25°				
4	30°				
5	35°				

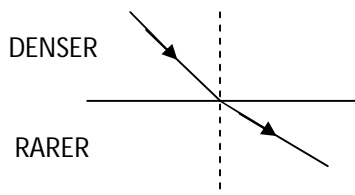
This way we find the relation between angle of incidence and angle of refraction.

Note : Any related experiment they can answer.

- 16B.** In the experiment of reaction of acids on carbonates and hydrogen carbonates,
- We observe that the acids reacts with either carbonates or bi carbonates to produce carbon dioxide gas.
 - While doing experiment we have to add acid slowly and in less quantity to the other compound. Also we should not smell the liberated gases directly. Maintain some distance to the apparatus to our face.
 - In this experiment carbon dioxide gas is evolved.
 - If we send the gas into lime solution, it converts it into white colour. This way we identify the gas.
- 17A.** (a) Light ray travels from rarer medium to denser medium.



- (a) Light ray travels from denser medium to rarer medium.



17B. Note: Full marks should be awarded for the students who attempt the question.

Given question: Draw the ray diagrams for the following conditions.

But not given for which optical device the student has to draw.

18. A

19. B

20. B

21. C

22. B

23. D

24. C

25. A

26. B

27. C