Half Yearly Examination 2016-2017

Std. : IX **Full Marks : 80**

Subject : PHYSICS **Time : 2 Hrs.+15min.reading time**

Section A [40 marks]
(Attempt all the questions)

Question - 1 **[2x5]**

a) State the S.I. Units of the following physical quantities.

(i) electric potential (ii) upthrust

(iii) conductance (iv) conductivity

b) Name the material used for making filament of an electric bulb. Give a reason.

c) A wire of resistance 3Ω and length 10 cm is stretched to a length of 30 cm. What is its new resistance.

d) Draw a I-V graph for a linear resistor. What does its slope represent.

e) Name two factors on which the resistivity of a wire depends.

Question - 2 **[2x5]**

a) State Archimedes' principle.

b) Will a body weigh more in air or in vacuum when weighed with a spring balance. Give a reason for your answer.

c) A man first swims in sea water and then in river water.

i) compare the weights of sea water and river water displaced by him.

ii) Where does he find it easier to swim & why ?

d) Explain why the water pipes in colders countries often burst in winter.

e) State two disadvantages of using nuclear energy for producing electricity.

Question - 3 **[2x5]**

a) Name the S. I. Unit of heat and how is it related to the unit calorie.

b) State two technological measure to minimise the impact of global warming.

c) A hollow glass sphere which floats with its entire volume submerged in water at $4^{O}C$, sinks when water is heated above $4^{O}C$. Give reasons.

d) A body weighs 20gf in air and 18.0gf in water. Calculate relative density of the material of body.

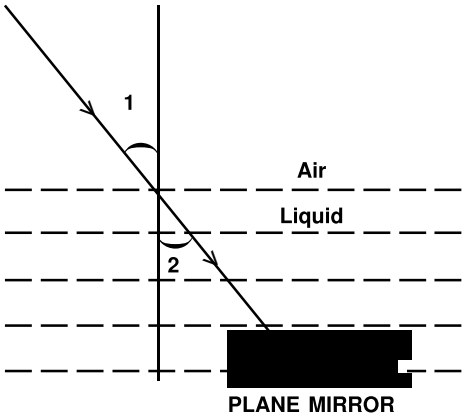
e) A rubber ball floats on water with its 1/3rd volume outside water. What is the density of rubber.

Question - 4 **[2x5]**

a) A ray of light while passing from a medium A to the medium B speeds up. What can you say about the refractive index of medium B relative to the medium A.

b) A ray of monochromatic green light enters a liquid from air. The angle 1 is 45^{O}. and angle 2 is 30^{O}.

Show in the diagram the path of the ray after it strikes the mirror and re-enters in air. mark in the diagram the angles where even necessary.



c) How does the angle of minimum desiration produced by a prism change with increase in

i) the wavelength of incident light and

ii) the refracting angle of prism.

d) Draw a ray diagram to illustrate how a ray of light incident obliquely on one face of a rectangular glass slab of uniform thickness emerges.

e) Name two factors on which the refractive index of a medium depends ? State how does it depend on the factors stated by you.

Section B [40 marks]

(Answer any <u>four</u> questions)

Question - 5 **[3+4+3]**

a) A block of wood is so loaded that it just floats in water at room temperature. What change will occur in the state of floatation, if.

(i) some salt is added to water.

(ii) water is heated ?

Give reason on the basis of upthrust & density.

b) A block of wood floats in brine solution of density 1.20g cm^{-3}, such that $\frac{3}{8}$ th of its volume is above brine. Calculate the density of wood.

c) Explain why a balloon filled with hydrogen rises to a certain height and then stops rising further.

Question - 6 **[3+4+3]**

a) i) Define temperature and write its S.I. Unit.

ii) At what temperature the density of water is maximum ? State its value.

b) An iron cube of side 5cm and of R.D. 7.6 is suspended by a thread in brine solution of relative density 1.20. Find the tension in thread.

c) A sphere of iron and another of wood, both same radius are placed on the surface of water. State which of the two will sink ? Give reason to your answer.

Question - 7 **[4+3+3]**

a) i) Explain the statement 'the potential difference between two points is 1 volt'.

ii) A current of 100 mA flows through a conductor. Find the number of electrons passing per second through the cross-section of the conductor if the charge carried by an electron is -1.6×10^{-19} C.

b) i) Two wires are of the same length and same radius, but one is of copper and the other is of iron. Which will have more resistance & why.

ii) What is a super conductor ? Give one example of it.

c) The resistance of a 5m long wire of a particular material is 5Ω. What will be the resistance :

i) of the same wire when it is stretched to double its length.

ii) of a 10m long wire of the same material.

iii) of a wire of length 5m, but double the diameter.

Question - 8 **[3+4+3]**

a) State Ohm's law. What is the necessary condition for a conductor to obey ohm's law.

b) i) What amount of charge flows through a wire if a current of 0.5A flows in it for 5 minutes.

ii) Give two difference between on ohmic and non-ohmic resistor.

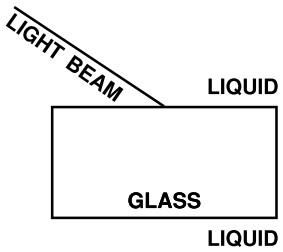
c) Name three factors on which resistance of a wire depends and state how is it affected by the factors stated by you.

Question - 9 **[3+4+3]**

a) i) State the Snell's laws of refraction of light.

ii) The refractive index of glass with respect to air is aμg and of water with respect to air is aμw express the refractive index of glass with respect to water.

b) The adjacent diagram shows a glass plane suspended in a liquid. Light beam of single colour is incident on the glass pane from the liquid on its one side.



i) Draw a diagram to show how light bends when it travels from liquid to glass and then to liquid if light slows down in glass.

ii) State two conditions under which the light ray moving from liquid to glass passes straight without bending. will the glass be visible then.

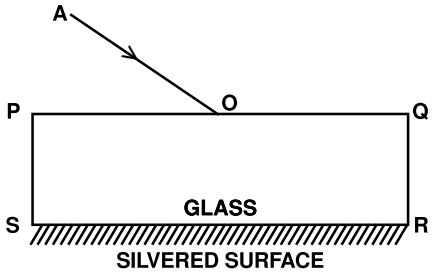
c) i) What is the cause of refraction of light when it passes from one medium to another.

ii) Which of the following quantities of the refracted ray will differ from that of the incident ray for a ray passing from medium 1 to medium 2 speed, intensity, frequency, wavelength.

Question - 10 **[2+4+4]**

a) 'The refractive index of diamond is 2.42.' What is meant by this statement.

b) The figure shows a ray of light AO incident on a rectangular glass block PQRS, which is silvered at the surface RS.



i) Trace the path of reflected and refracted rays.

ii) Show atleast two rays emerging from the surface PQ after reflection from the surface RS.

iii) How many images are formed in the above case ? Which image is the brightest.

c) A solid weighs 30 gF in air and 26gF when completely immersed in a liquid of relative density 0.8. Find :

i) the volume of solid, and

ii) the relative density of solid.