ST. JOSEPH'S ACADEMY, DEHRADUN

CYCLIC TEST OCTOBER, 2022-23

SUBJECT: PHYSICS **CLASS: X** **M.M.: 40 TIME: 1 ½ HOURS**

NAME OF THE STUDENT.....CLASS/SECTION.....ROLL NO.....

ATTEMPT ***ALL*** QUESTIONS. THE INTENDED MARKS FOR QUESTIONS OR PARTS OF QUESTIONS ARE GIVEN IN [ ]

Q1. Choose the correct answers to the questions from the given options: [6]

(i) The deviation produced by the prism when light is incident on it, does not depend on
(a) size of the prism (b) material of the prism
(c) angle of incidence (d) wavelength of light

(ii) Which of the following is the source of ultraviolet light?
(a) electric bulb (b) carbon arc
(c) red hot iron ball (d) sodium vapour lamp

(iii) Resonance of sound waves results in
(a) large amplitude (b) large frequency
(c) absorption of sound (d) energy loss

(iv) SI unit of resistivity is
(a) ohm (b) volts
(c) ohm m (d) ohm m^{-1}

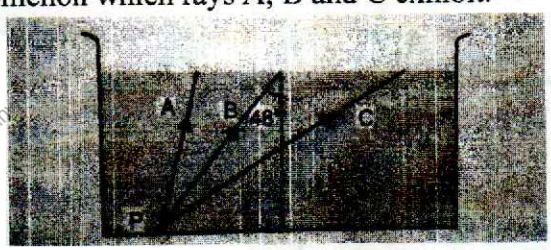
(v) The current flowing through a resistor of 5 ohms when connected across a potential difference of 12 volts is:
(a) 5 A (b) 12 A
(c) 2.4 A (d) 0.48 A

(vi) If a wire of uniform area of cross-section is stretched to triple its length then its new resistance will become (in comparison to its original resistance)
(a) two times (b) half
(c) three times (d) nine times

Q2. (a) (i) Which of the two prisms, A made of crown glass and B made of flint glass, deviates a ray of light more?
(ii) State Snell's laws of refraction of light. [2]

(b) (i) For which colour of light, the refractive index of transparent medium is the least?
(ii) What should be the angle of incidence for a ray of light which suffers minimum deviation of 36^0 through an equilateral prism? [3]

(c) The diagram below shows a point source P inside the water container. Three rays of light A, B and C starting from the point source P are shown up to the surface. [3]
(i) Show in the diagram the path of these rays after striking the water surface. The critical angle of water air surface is 48^0.
(ii) Name the phenomenon which rays A, B and C exhibit.



Q3. (a) Draw a diagram to show that a convex lens can form a real and enlarged image of the object. [2]

(b) What are infrared radiations? How are they detected? Give one use of these radiations. [3]

(c) An object is placed at a distance of 10 cm in front of a concave lens of focal length 10 cm. Find (i) the position of the image. (ii) size of the image in relation to the object. [3]

Q4. (a) A RADAR sends a signal to an aeroplane at some distance and is received back after reflection in 0.002 seconds. If speed of the signal is 3×10^8 ms^{-1}, find the distance of the aeroplane from the radar. [2]

(b) A certain sound has a frequency 256 Hz and a wavelength of 1.3 m.

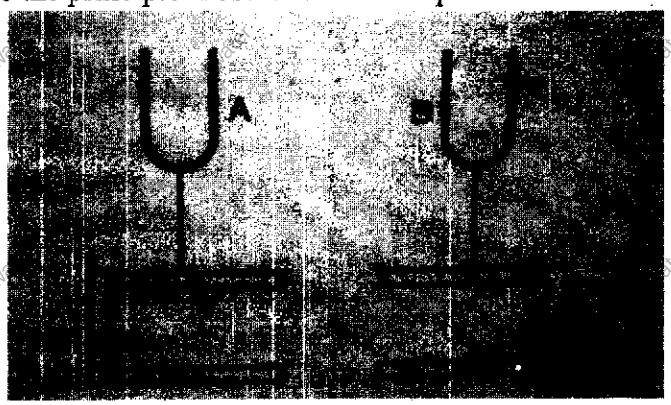
(i) Calculate the speed of the sound

(ii) What difference will be felt by a listener between the sound above and another sound travelling at the same speed but of wavelength 2.6 m. [3]

(c) The diagram shows two tuning forks A and B of the same frequency mounted on two separate sound boxes with their open ends facing each other. The fork A is set into vibration:

(i) Describe your observation

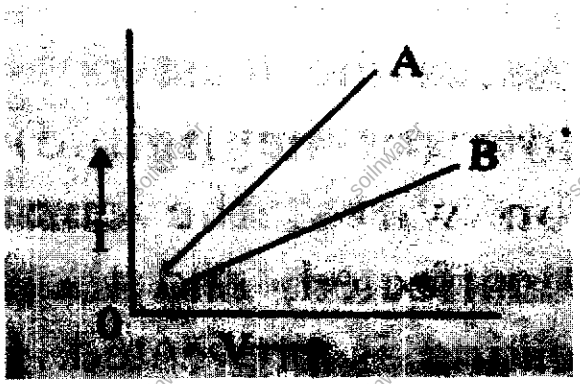
(ii) State and define the principle illustrated in the experiment. [3]



Q5. (a) Figure shows I-V graph for two conductors A and B.

(i) Which conductor is ohmic?

(ii) Which conductor has more resistance? Give reason for your answer. [3]



(b) (i) Define specific resistance.

(ii) Name the material used for making a fuse wire

(iii) Name the material used for filament of an electric bulb. [3]

(c) Three resistors 8 Ω, 12 Ω, and 6 Ω are connected to a 12 V battery as shown in the figure.

Find: (i) total resistance of the circuit

(ii) current in the circuit

(iii) potential difference across the parallel combination.

(iv) current through 6 Ω resistor. [4]

