

PHYSICS HOLIDAY ASSIGNMENT FORM TWO

1. A meter rule is suspended by a thread such that it is in equilibrium balanced by a permanent magnet attached to the meter rule and some weight as shown in figure 1 below.

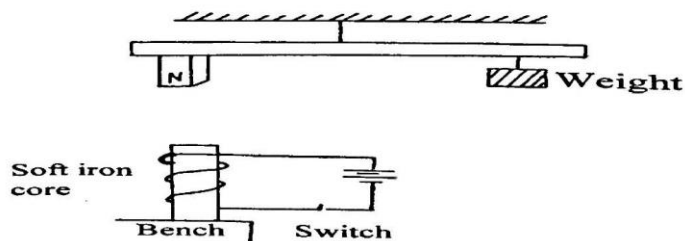


Figure 1

If the soft iron is fixed to the bench, state and explain the effect on the meter rule when the switch is closed.

2. A part from images being formed behind the mirror, state any other two similarities of images formed by a plane mirror and a convex mirror.
3. The frequency of the sound emitted by the loudspeaker is 1020Hz. Calculate the wavelength of the sound wave in air where its velocity is 340m/s
4. A gun is fired and an echo heard at the same place 0.6s later. How far is the barrier, which reflected the sound from the gun? (Speed of sound in air= 330ms^{-1})
5. Explain how the wing below increases the dynamic lift of an airplane.



6. Figure 3 shows a mass of 12g suspended on a set of 6 identical springs. When the mass was hanged on spring A, it extended by 6cm.

Fig. 7

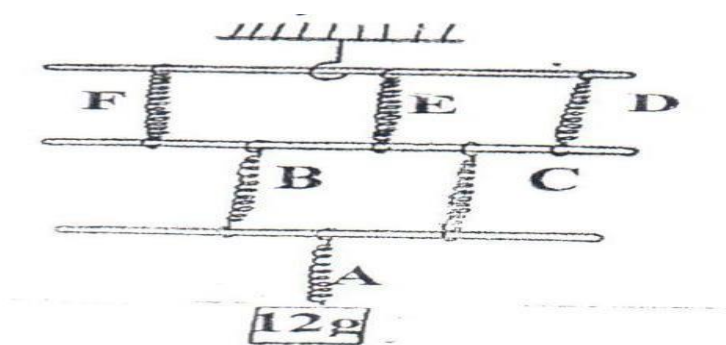


Figure 3

Determine the extension of the combination shown if each spring and rod has negligible weight

7. A uniform bar one meter long is balanced at the 30 cm mark when a load of 3.2 N is hung at the zero mark as shown in the figure 4.

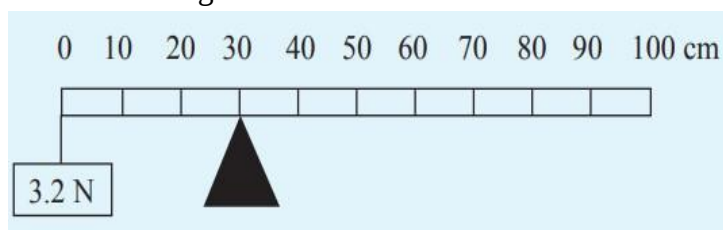


Figure 4

Show the position through which the weight of the bar acts and calculate the weight of the bar

8. The figure 5 shows a micrometer screw gauge used to measure the diameter of a rod in millimeters. Name the parts labelled P, Q, R.

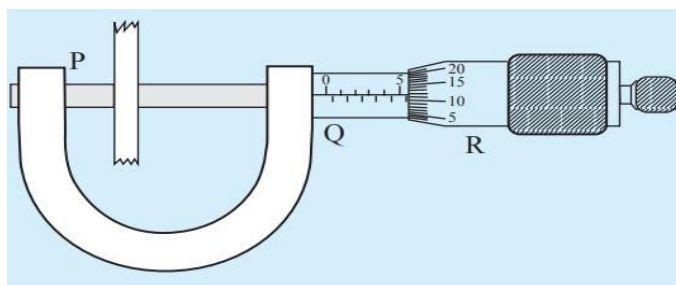


Figure 5

9. The figure 6 below shows a Bunsen burner in three different positions.

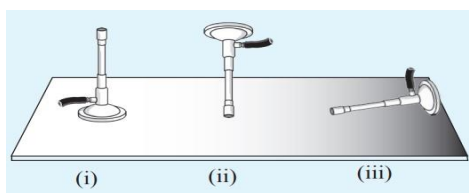


Figure 6

Identify the states of equilibrium in (i) and (ii).

10. State Fleming's left hand rule.

11. State how the speed of sound in air is affected by increase in humidity

12. a) State one reason why diffusion in gases is faster than diffusion in liquids.

b) In an experiment to estimate the diameter of an oil molecule, an oil drop of radius $2.5 \times 10^{-4}\text{m}$ spreads over a circular patch whose diameter is 20cm. Determine:

- i. The volume of the oil drop
- ii. The area of the patch covered by the oil.
- iii. The thickness of the oil molecule.
- iv. State one assumption made in (b) (iii) above.

13. The figure 7 below shows a wave profile.

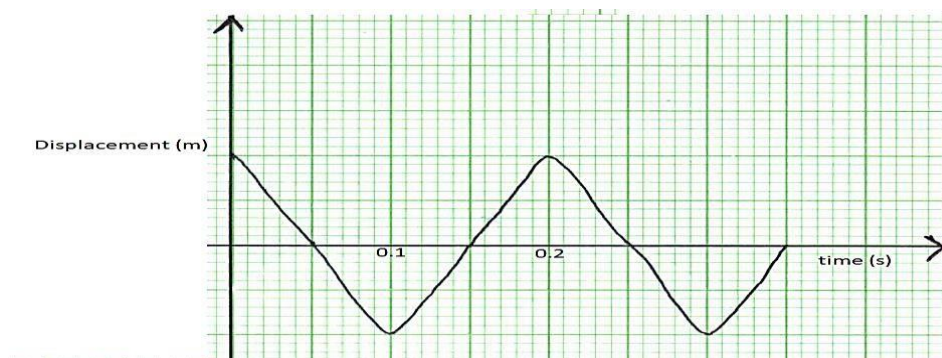


Figure 7

i) Explain what is meant by amplitude in this context.

ii) From the figure determine

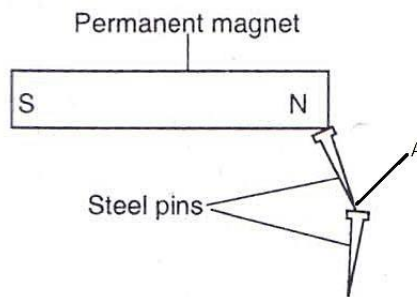
I) The period

II) The frequency

iii) Calculate the wavelength of the sound wave in the figure. Take the velocity of sound in the gas to be 340m/s

- iv) State two factors that can increase the speed of sound in solids
- v) A student stands some distance from a high wall and claps his hands
 - I. What two measurements would need to be made in order to determine the speed of sound?
 - II. Describe how you would make use of these measurements

14. The fig below shows the magnetization method



- (i) State the method of magnetization shown above
- (ii) State the polarity of point A in the pin attached to the magnet
- (iii) The figure 8 below shows an electromagnetic relay.

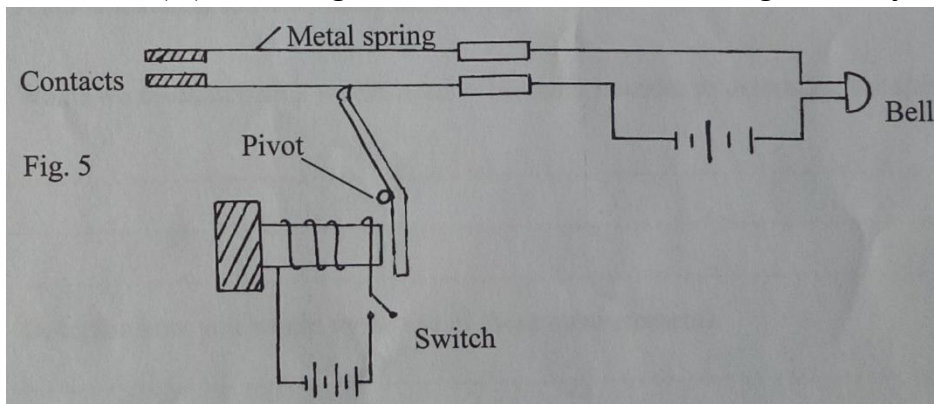


Figure 8

Explain what happens when the switch is closed.

iii) A bar magnet can be used as compass. Describe how you would achieve this.

iv) The figure 9 below shows a straight conductor AB carrying current in a magnetic field.

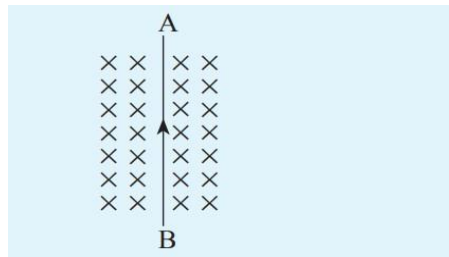


Figure 9

State any two ways in which the force can be:

- increased
- made to change direction

15 a) Define the following terms as applied to curved mirrors:

- Pole
- Centre of curvature
- Principal focus of a convex mirror

b) By ray diagram construction, locate and describe the image fully when the object is between P and F of a concave mirror

c) The figure 10 shows air flowing through a pipe of non-uniform cross sectional area. Two tubes A and B are dipped into the liquid as shown.

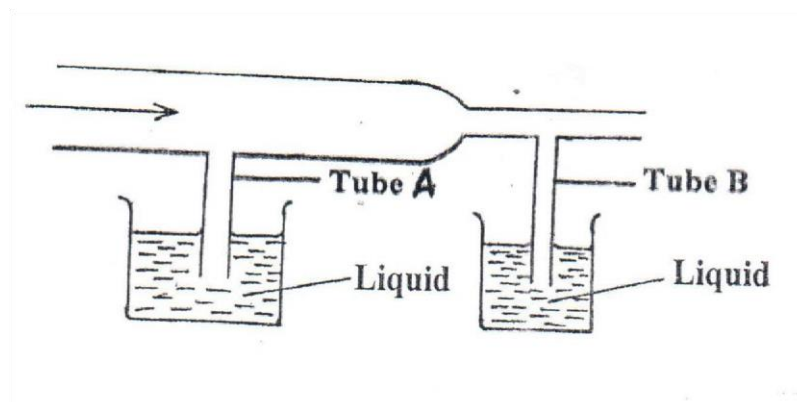


Figure 10

- Indicate the level of the liquid in tubes A and B
- Explain your answer in part (a) above

- d) Figure 11 below shows two pieces of cork fixed on a polished and a dull surface with wax.

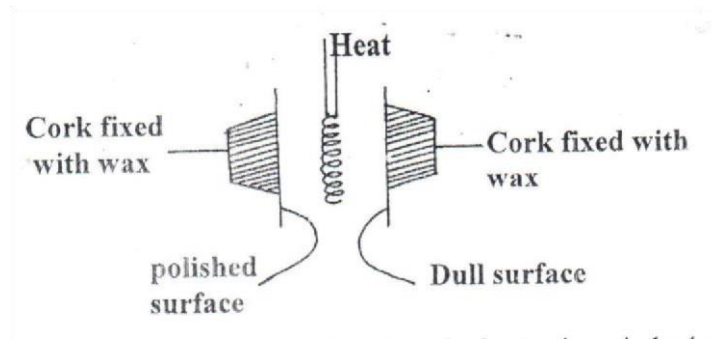


Figure 11

State and explain the observation made, when the heater is switched on for a short time given that the heater is equidistant from the two surfaces)

- 16 a) State Bernoulli's principle.
- b) The On the space below, sketch a graph to show how the mass per unit volume of water varies between 0°C and 10°
- c) Air pressure at the base of a mountain is 70cmHg while at the top of the mountain is 50cmHg. Given that the average density of air is 130kg/m^3 and the density of mercury is 13600kg/m^3 . Determine the height of the mountain.
- d) The diagram below shows a Bunsen burner.

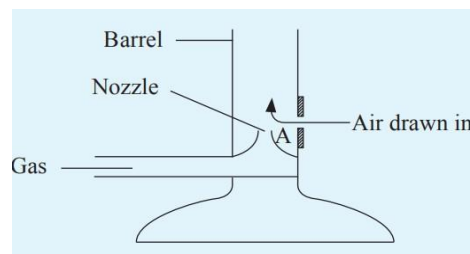


Figure 12

17. Explain the working of the burner as an application to Bernoulli's principle.

- e) Identify 2 modifications that are introduced to the buses to ensure stability?