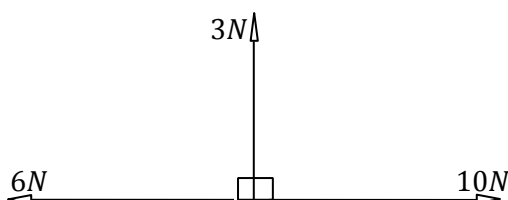


Discussion Questions
Senior Two Term ONE
SET ONE

Topic: Forces

Question One

- a) What is meant by the terms *scalar* and *vector* quantities? Give two examples of each.
- b)



Forces of $3N$, $6N$ and $10N$ act on a body of mass $2kg$, initially at rest. Find the magnitude of the acceleration with which the body moves.

- c) State the differences between mass and weight.
- d) i) What is meant by *dynamic friction*.
ii) Describe, with the aid of a diagram, an experiment to determine the limiting friction between two surfaces in contact.
- e) i) State any **one** factor which affects friction.
ii) Give **one** application of friction.

Topic: Molecular properties of matter

Question Two

- a) i) Describe an experiment to estimate the thickness of an oil molecule.
ii) What assumptions are made in the experiment described in (a) (i) above
- b) A drop of olive oil of volume 0.1 mm^3 is placed on the surface of clean water. It spreads out completely into a patch of area 100 cm^2 .
i) Calculate the thickness of the oil patch.
ii) Estimate the number of molecules in 0.1 mm^3 of the oil.
- c) A solution is made by dissolving 1 cm^3 of cooking oil in 199 cm^3 of methanol. When 0.004 cm^3 of the solution is dropped on the surface of water, an oil film of diameter 12 cm is obtained.
Estimate the thickness of a molecule of the cooking oil.
- d) When a thin capillary tube is dipped in a basin of water, the water level in the tube rises.
i) Explain why this happens.
ii) Name one practical application of this effect.

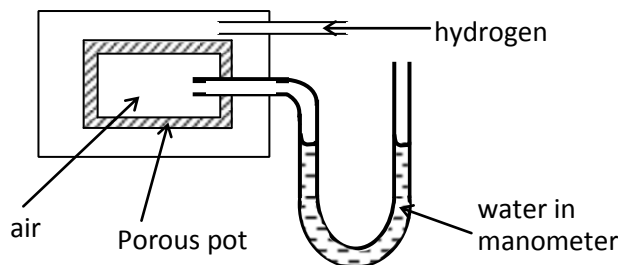
Question Three

- a) Distinguish between cohesion and adhesion.
- b) i) Define **density** and state its SI unit.
ii) With the aid of a labeled diagram, describe the motion of a ball bearing which is dropped centrally into a tall jar containing oil.
- c) i) Describe a simple experiment to show the existence of surface tension in water.
ii) State an assumption made in (b) (i).

- d) Smoke confined in an illuminated cell is observed through a microscope.
- State what is observed.
 - What conclusion can be drawn from the observation in (c) (i)?

Question Four

- What is meant by *diffusion*?
 - State the factors on which diffusion depends.
- Describe an experiment to show diffusion in liquids.
-



- A porous pot containing air is connected to a water manometer. Explain what happens if hydrogen is let in the space surrounding the pot as shown in figure above.
 - State **two** factors which affect surface tension.

Topic: Light

Question Five

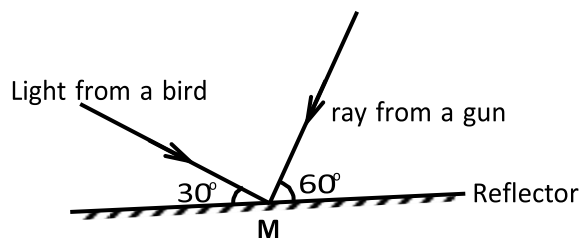
- State the laws of reflection of light.
- With the help of ray diagrams,
 - explain the action of a pin-hole camera.
 - distinguish between partial and total eclipses of the moon.
- Describe a simple experiment to show that light travels in a straight line.

Question Six

- Describe an experiment to demonstrate the laws of reflection of light.
- With the aid of a diagram, illustrate how the shadows are formed when an opaque object is placed between an extended source of light, and a screen.
- An object of height **4 cm** is placed **5 cm** away from a pinhole camera. The screen is **7 cm** from the pinhole.
 - Draw to scale a ray diagram to show the formation of the image by the pinhole camera.
 - What is the nature of the image?
 - Find the magnification.
 - Explain what happens to the image if the pinhole is made larger.

Question Seven

- Draw a diagram to show the formation of solar eclipse.
- With the aid of diagrams, distinguish between diffuse and regular reflection.



A ray from a bird makes an angle of 30° with a plane reflector and a ray from the barrel of a gun makes an angle of 60° to the same reflector at the same point, M as shown in figure above. Find the angle through which the reflector must be rotated about M such that the ray from the barrel of the gun falls on the bird.

Topic: Heat

Question Eight

- a) Differentiate between *conduction* and *convection*.
- b) Describe an experiment which can be performed to show convection in liquids.
- c) i) Draw a labeled diagram of a vacuum flask.
 ii) Explain how a vacuum flask minimizes heat losses.
 iii) Why is a car radiator made of fins and painted black?

Question Nine

- a) Distinguish between heat and temperature.
- b) Describe an experiment to determine the fixed points of a thermometer.
- c) i) Mention any **three** reasons for not using water as a thermometric liquid.
 ii) When a Celsius thermometer is inserted in a boiling liquid, the mercury thread rises above the lower fixed point by 19.5 cm. Find the temperature of the boiling liquid if the fundamental interval is 25 cm.
- d) State the kinetic theory of matter.
- e) Use the kinetic theory to explain the following observations:
 - i) Ice melts faster when salt is sprinkled on it.
 - ii) The pressure of a fixed mass of a gas at constant volume increase when the temperature increases.
 - iii) Liquids expand more than equal volumes of solids when heated through the same temperature.