

## Question 3

(39)

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- (a) In the diagram, a plastic bag is placed around the stem of a plant. After some time, droplets of water are seen on the inside of the plastic bag. (15)

- (i) Describe how the droplets could be tested to show that they contain water.

Blue cobalt chloride paper  
turns pink.

- (ii) Explain why the plastic bag is tied around the stem of the plant, rather than placed over both the plant and the pot.

So water doesn't just evaporate from  
pot into bag.

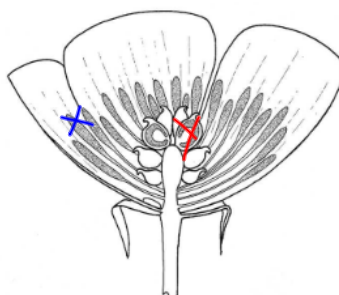
- (iii) What name is given to the movement of water through a plant and the evaporation of water from its leaves? Transpiration

- (iv) What type of tissue does the plant use for the transport of water?

Xylem

- (b) Sexual reproduction in a flowering plant, such as the buttercup, involves pollination, fertilisation, seed formation, seed dispersal and seed germination.

- (i) The diagram below is of the flower of the buttercup plant.



Mark with the letter X the part of the flower where pollen is produced.  
Mark with the letter Y the part of the flower where fertilisation occurs.

(6)

- (ii) The petals of the buttercup flower are usually coloured bright yellow.

Explain why having brightly coloured petals can assist sexual reproduction in some plants. (6)

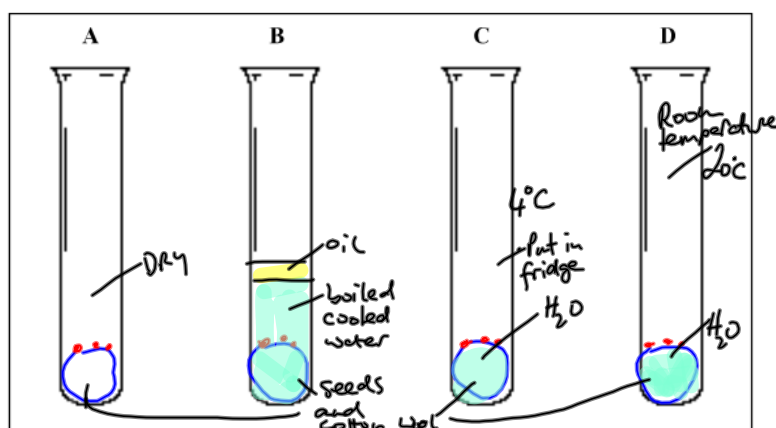
to attract insects & bees for pollination

- (iii) In an experiment to investigate the conditions necessary for germination, a student placed some seeds on cotton wool in each of four test tubes, labelled A, B, C and D.

The student set up the test tubes so that in each test tube the seeds were exposed to different conditions.

After a period of time, the student noticed that only the seeds in test tube D had germinated.

Describe, with the aid of labelled diagrams, how the student might have set up each of the four test tubes. (12)



A: Has no water

B: Has no O<sub>2</sub>

C: Has no suitable temperature

D: Has O<sub>2</sub>, H<sub>2</sub>O and suitable heat.

## Physics

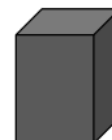
## Question 7

(52)

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(1) (2)

- (a) A block of metal of weight 240 000 N has sides of length 2 m, 3 m and 5 m. Calculate the maximum pressure the block can exert when it is resting on a level surface.



$$\text{Smallest Area} = (2)(3) = 6 \text{ m}^2$$

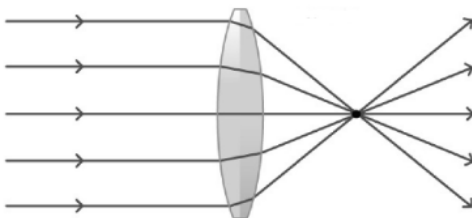
$$P = F/A = 240\,000 / 6 = 40\,000 \text{ N/m}^2 \text{ (Pa)}$$

- (b) A standard laboratory thermometer contains liquid alcohol which has been dyed red so as to make it easier to see. Describe what would be observed if the thermometer were moved from a warm region to a colder region. Explain this observation.

Observation level falls

Explanation liquid contracts when cooled

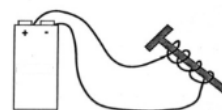


- (c)  The picture shows a converging lens with rays of light passing through it.
- What two properties of light are illustrated in this picture?

Property 1 light travels in straight lines

Property 2 refraction

- (d) A wire, which is wrapped around an iron nail, is attached to a battery, as shown in the diagram.



- (i) What happens to the nail when an electric current flows through the wire?

becomes magnetic

- (ii) How could this effect be demonstrated? use it to

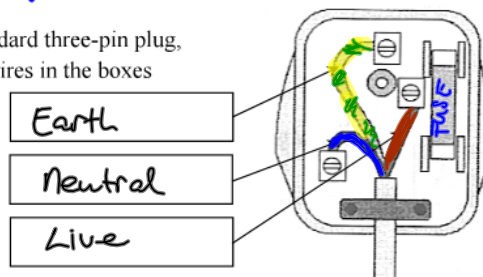
pick up paper clips.

- (e) The 1979 science-fiction film *Alien* was promoted by use of the slogan: "In space no one can hear you scream." With reference to the properties of sound, explain the physics of this slogan.

Sound needs a medium to travel through.

- (f) On the diagram of a standard three-pin plug, name each of the three wires in the boxes provided.

Brown  
Blue  
Yellow/Green



- (g) The diagram shows two aluminium cans, one painted white and the other painted black, which are otherwise identical.



Each can contains 100 cm<sup>3</sup> of water at 60 °C.

In which of these cans will the water remain warmer for longer? Explain your answer.

Which can? White

Explanation Black radiates more heat

- (h) The picture shows the *London Eye*, a giant Ferris wheel of radius 60 m.

Diameter = 120 m

$W = Fd$

- (i) Calculate the work done when the wheel carries a person of weight 800 N from its base to the top.

$$W = 800(120) = 96,000 \text{ Nm}$$

(J)



- (ii) A person moves with a speed of 0.25 m s<sup>-1</sup> while travelling on the *London Eye*. Calculate the time it takes for the person to travel one full circle.

$$T = D/s = 376.99 / 0.25 = 1507.96 \text{ s}$$



$$D = C = 2\pi r = 2\pi(60) = 120\pi \approx 376.99$$

(7 × 6 + 1 × 10)

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(1) (2)

## Question 8

(39)

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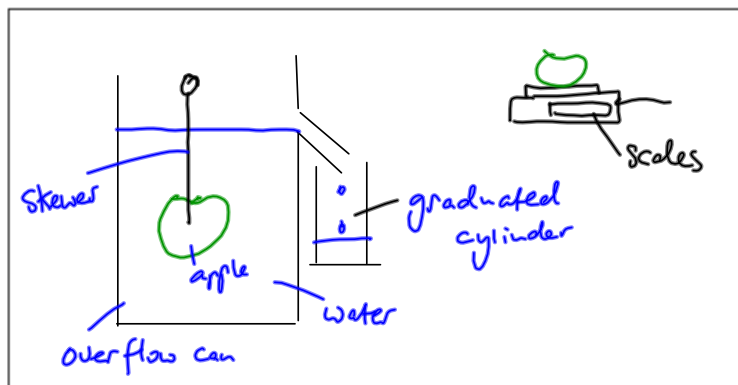
- (a) Bobbing for apples is a traditional Halloween game. A large basin is filled with water and apples are put into the water. Players try to catch the floating apples with their teeth. (18)



- (i) Why do the apples float in the water?

its less dense than water

- (ii) Describe, with the aid of a labelled diagram, an experiment to measure the density of an apple.



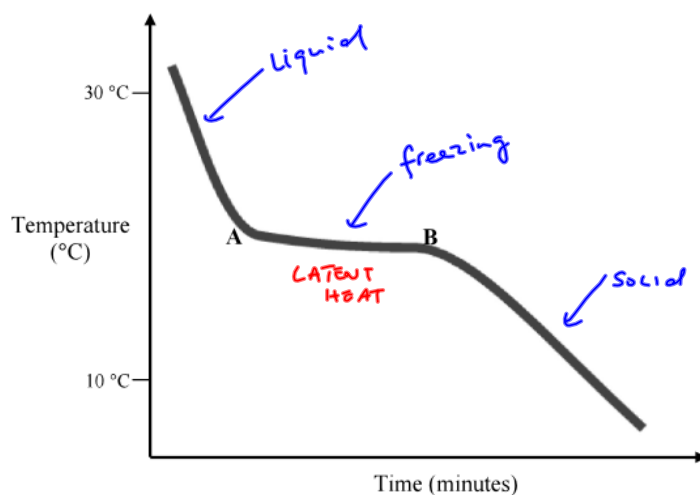
① get mass on scales

② get volume by submerging apple in overflow can.

Volume of apple = volume of displaced water in graduated cylinder

③ calculate density ( $D = m/v$ ).

- (b) The diagram below shows the cooling curve for chocolate. (12)



- (i) Which state of matter describes the chocolate when it is at 30 °C?

liquid

- (ii) Which state of matter describes the chocolate when it is at 10 °C?

Solid

- (iii) In terms of heat loss or heat gain, describe and explain what happens to the chocolate between position A and position B on the diagram.

Heat is lost as it changes state (latent heat) even though the temperature is unchanged.

- (c) Explain why the Sun is considered the primary source of energy for (i) biofuel and (ii) hydroelectricity. (9)

Biofuel photosynthesis is needed to grow crops.

Hydroelectricity Rain is needed for rivers to flow. Sun needed to evaporate

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(1) (2)