NOVEMBER **2009** P2
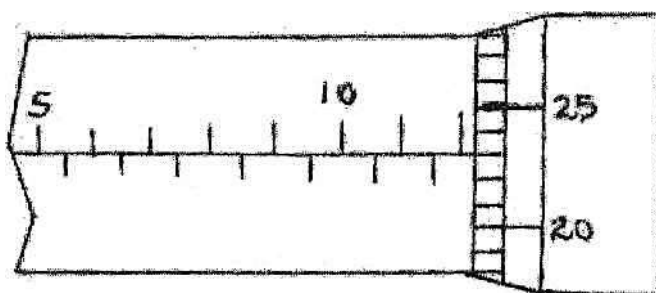
SECTION A

Answer all the questions.

Write your answers in the spaces provided on the question paper.

1. The diagram below shows the scales of an instrument used to measure length.

    a. Name the instrument that consists of the scale above. [1]

    b. State two precautions that should be taken before using the instrument named above.

    c. What is the reading shown? [**2**]

2. (a) What is meant by the term density? [1]

    (b) A tin containing 500 cm^3 of paint has a mass of 0.9 kg. Find the density of the paint. [2]

3. The diagram below shows how the speed of a 1200 kg car varied over 10 seconds.
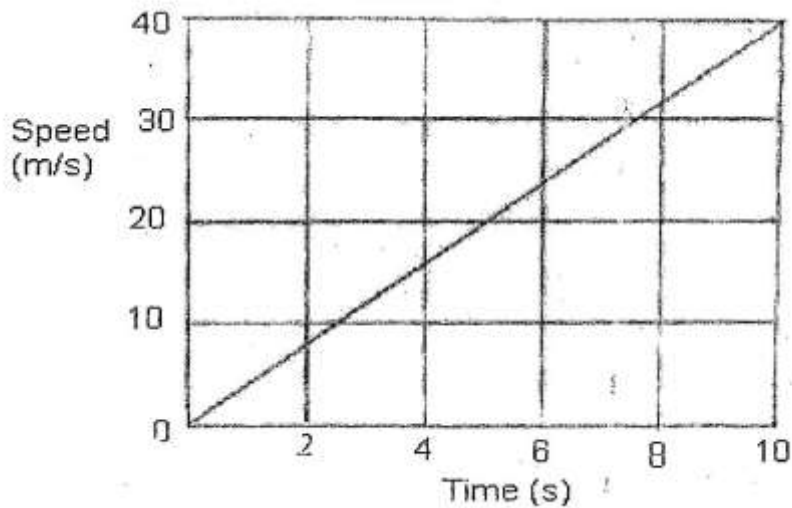
a. Define acceleration.   [1]

b. Find the acceleration of the car. [2]

c. Calculate:

   i.   the size of the force which produced the acceleration in (b).   [2]

   ii.   the distance moved by the car during the 10 seconds.   [2]

4. The figure below shows a bottle opener.
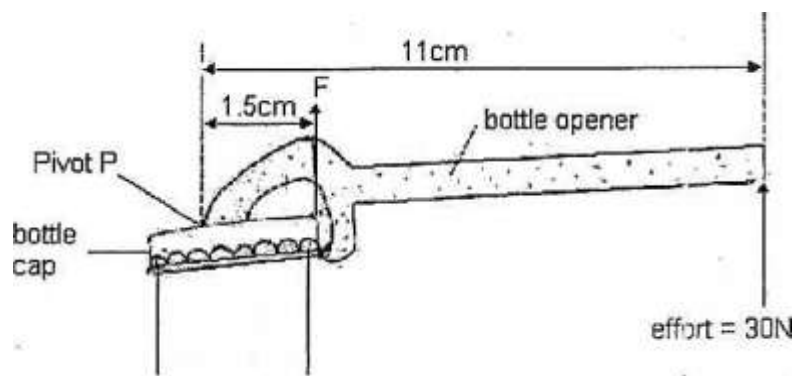
To open the bottle, a force of 30 N is applied at a distance of 11 cm from the pivot P.

a. State the principle of moments. [1]

b. Calculate the force F on the edge of the cap.   [2]

5. State why, for a liquid-in-glass thermometer,

a. the liquid should not be colourless,   [1]

b. the liquid should be a good conductor of heat.   [1]

c. the bore of the tube should be narrow.   [1]

6. The figure below shows waves passing from deep water to shallow water
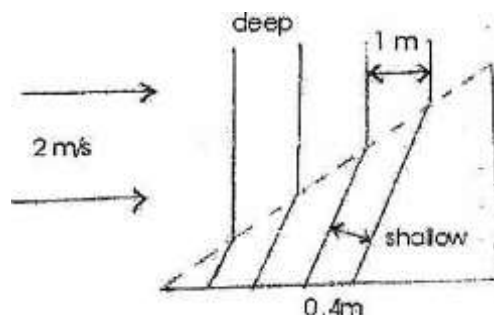
    a. What property of waves is being shown above? [1]

    b. Find the speed of the waves in the shallow water?   [2]

    c. Water waves are transverse waves. Explain the meaning of transverse.   [2]

7. The figure shows the I/V characteristic graphs for two resistors R and S.
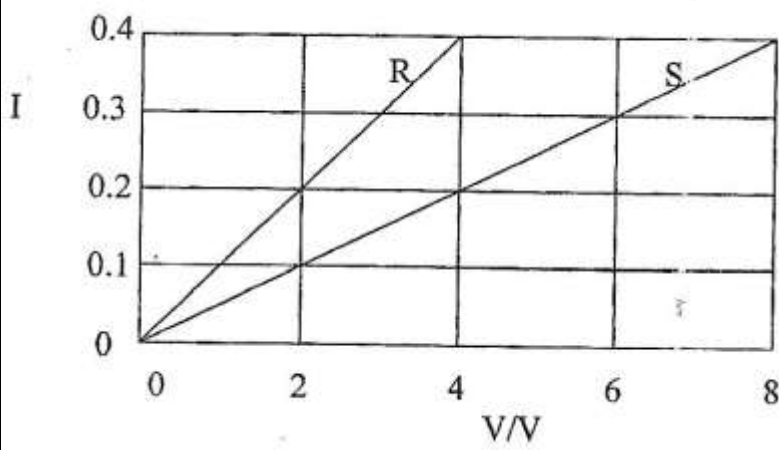
    a. Calculate the resistance of R.   [2]

    b. The parallel combination of R and S is connected to a battery, as shown below.
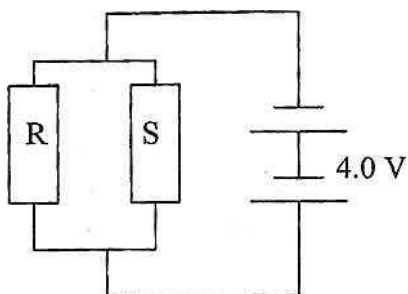

    i.   The battery has an e.m.f. of 4.0 V. Using the Figure above; calculate the current in the battery.
         [2]

    ii.   The battery of e.m.f. 4.0 V is replaced with a different battery. The current in this battery. The

current in this battery is -).3 A. Using the figure above (or otherwise), determine the e.m.p of the battery.   [3]

8.   (a) An atom of a radioactive element has 86 electrons. If its nucleon number is 222, what is the number of neutrons?   [2]

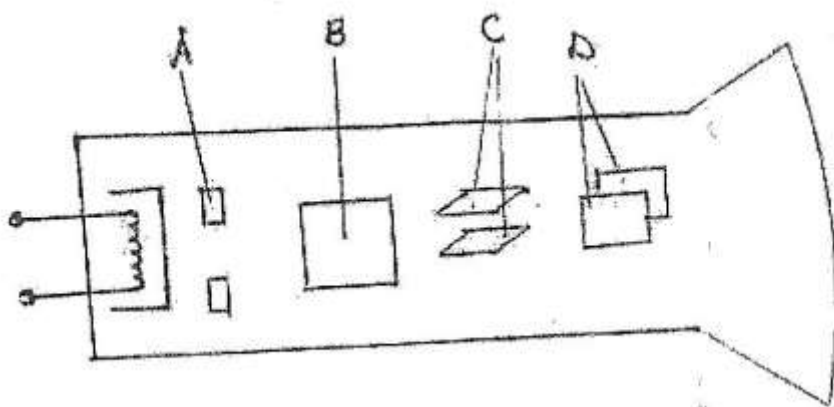   (b) (i) What is meant by the term half-life?

(ii) The nuclear equation below shows the alpha decay of Polonium.

$$^{218}_{84}Po \rightarrow ^{4}_{2}\alpha + x$$
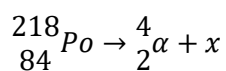
What is the nuclide composition of element α?

(iii) State the nature of an alpha particle.

9.   The figure represents a cathode ray Oscilloscope.

   a.   Name the parts labelled A and B.   [2]

b. What is the function of the part labelled D?   [2]

c. Explain how the electrons are produced.   , [1]

d. Give a reason why the tube is evacuated.   [1]

SECTION B

Answer any two questions.

Write your answers on the answer papers provided, if necessary, continue on separate answer paper.

10. (a) Describe the use of a plotting compass to plot: field lines near a bar magnet. [6]

   b. Describe induced magnetism by explaining what happens when a bar magnet picks up a chain of soft-iron nails.[4]

11. (a) By drawing a thin converging lens with parallel rays of light passing through it, show what is meant by the following:

    i. Principal axis

    ii. Focal length   [2]

    b.   A thin converging lens of focal length 2.5cm is used to produce an image of an object which is 2.0 cm tall and place 3.5 cm away from the optical centre of the lens.

    i.   Using the information above, draw a ray diagram to locate the image produced. [2]

    ii. Explain why this image is real.   [2]

    c.   A converging lens can be used as a magnify hg glass.

    i.   Under what condition is this possible?   [2]

    ii.   Describe the image produced by a magnifying glass.   [2]

12. The following results were obtained in an experiment when investigating the performance of a machine.

Load (N))\.	50	100	200	300	400	500	600
Effort (N) t)	30	45	65	85	105	125	145

    a.   Plot a graph of load against effort.   [5]

    b.   Determine the slop of the graph. [3]

    c.   Determine the efficiency of the machine if it has a velocity ratio of 6. [2]

13. (a) define the following

    i.   Energy {1}

    ii.   Work   {1}

    iii.   Kinetic Energy {1}

    iv.   Gravitational Potential Energy {1}

    (b) A body of mass 50g is thrown vertically upwards with an initial velocity of 50m/s Find

    i.   Its initial kinetic energy {2}

    ii.   The loss in kinetic energy When it reaches its maximum height {2}

    iii.   The highest height reached by the body.(take g to be 10 N/kg) {2}