**NAME……………………………………………………………………………… CLASS……………………ADM NO……………**

**SIGNATURE…………….. INDEX NO……………………… DATE………………**

**232/2**

**PHYSICS**

**PAPER 1**

**2022**

**TIME:2 Hours**

**FORM 4 END TERM 2 EXAMINATION**

***Kenya Certificate of Secondary Education***

***Physics Paper 1***

**INSTRUCTION TO CANDIDATES.**

. Write your ***name ,class*** and ***admission number*** in the spaces provided above

. This paper contain ***two sections***; Section A and Section B

. Answer all the questions in section A and B, In the spaces provided

. All workings and answers **must** be written on the question paper in the spaces provided below each question.

. Marks may be given for correct working even if the answer is wrong.

. Calculators and KNEC Mathematical tables may be used EXCEPT where stated otherwise.

. Show all the steps in your calculations, giving your answers at each stage in the spaces below each question.

***FOR EXAMINER’S USE ONLY***

|  |  |  |  |
| --- | --- | --- | --- |
| **SECTION** | **QUESTION** | **MAX MARKS** | **CANDIDATE’S SCORE** |
| **A** | **1-10** | **25** |  |
| **B** | **11** | **13** |  |
| **12** | **8** |  |
| **13** | **13** |  |
| **14** | **10** |  |
| **15** | **11** |  |
|  | **TOTAL** | **80** |  |

**SECTION A: (25 MARKS)**

1. Sketch a graph of volume of paraffin against temperature when heated from 00C to 100C (2 marks)
2. State two reasons why diffusion is more rapid in gases than in liquids. (2 marks)
3. A trolley of mass 20kg moving at 0.8m/s on frictionless horizontal surface was acted upon by a force of 2.5N. After impact the body moves at 4.8m/s. Determine the time of impact of the force. (3 marks)
4. The diagram below shows a metal tube made of iron and copper. The joint is tight at room temperature.

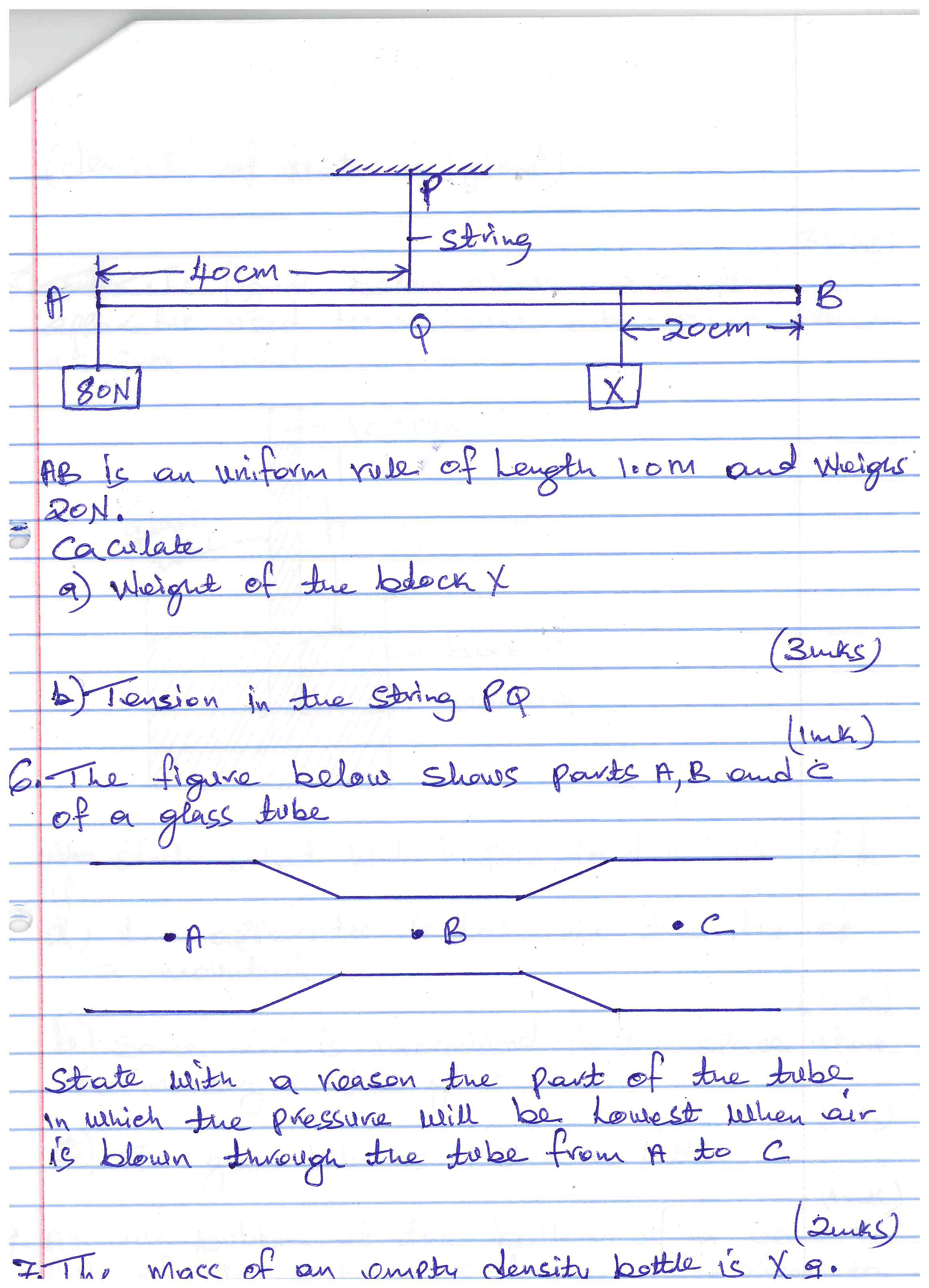
Copper

Iron

Joint

Explain how you would separate the two by changing the temperature given that copper expands more than iron for same change in temperature. (2 marks)

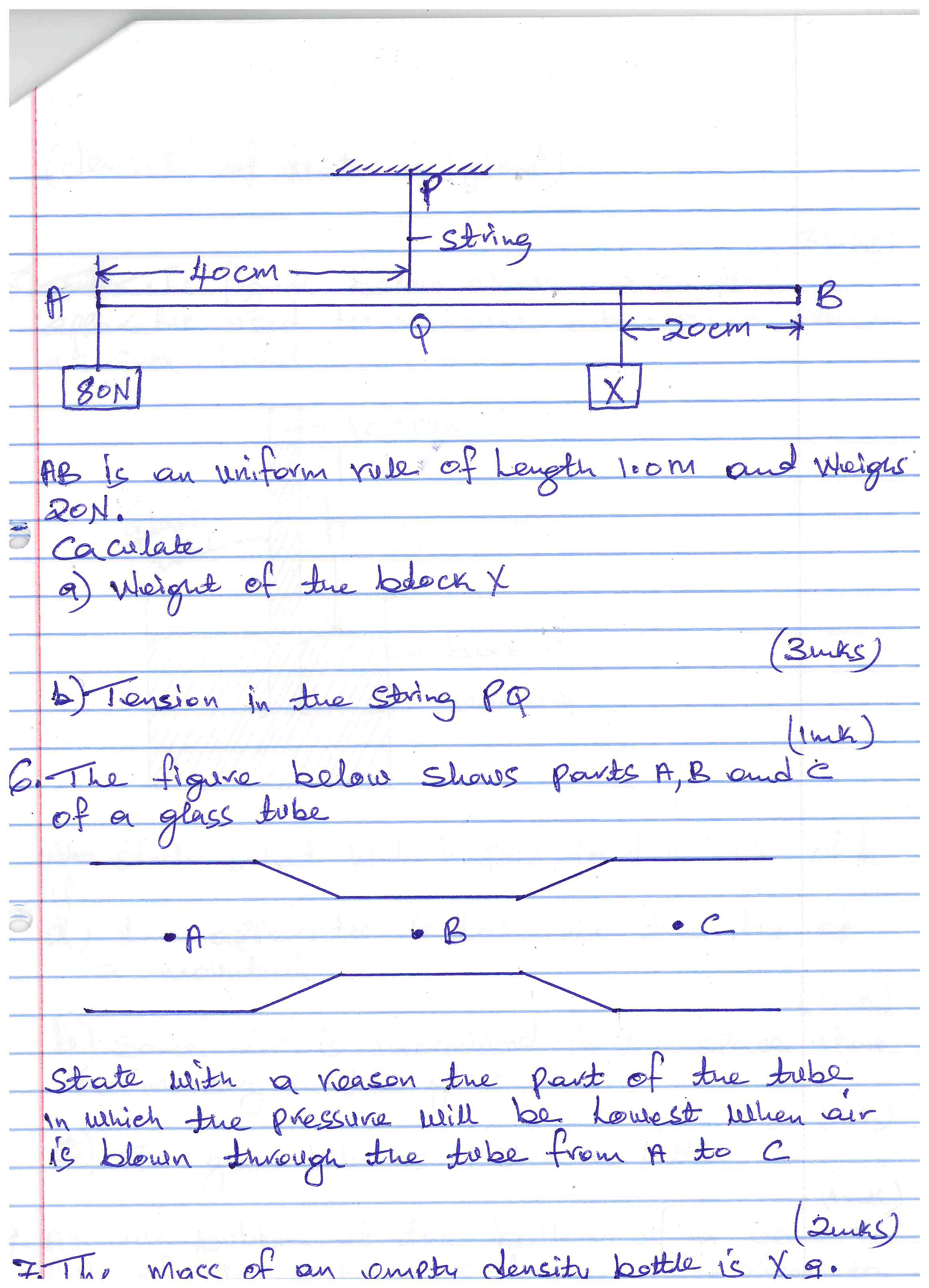
1. The figure below shows a system in equilibrium with the horizontal level.



AB is an uniform rule of length 1.0m and weighs 20N.

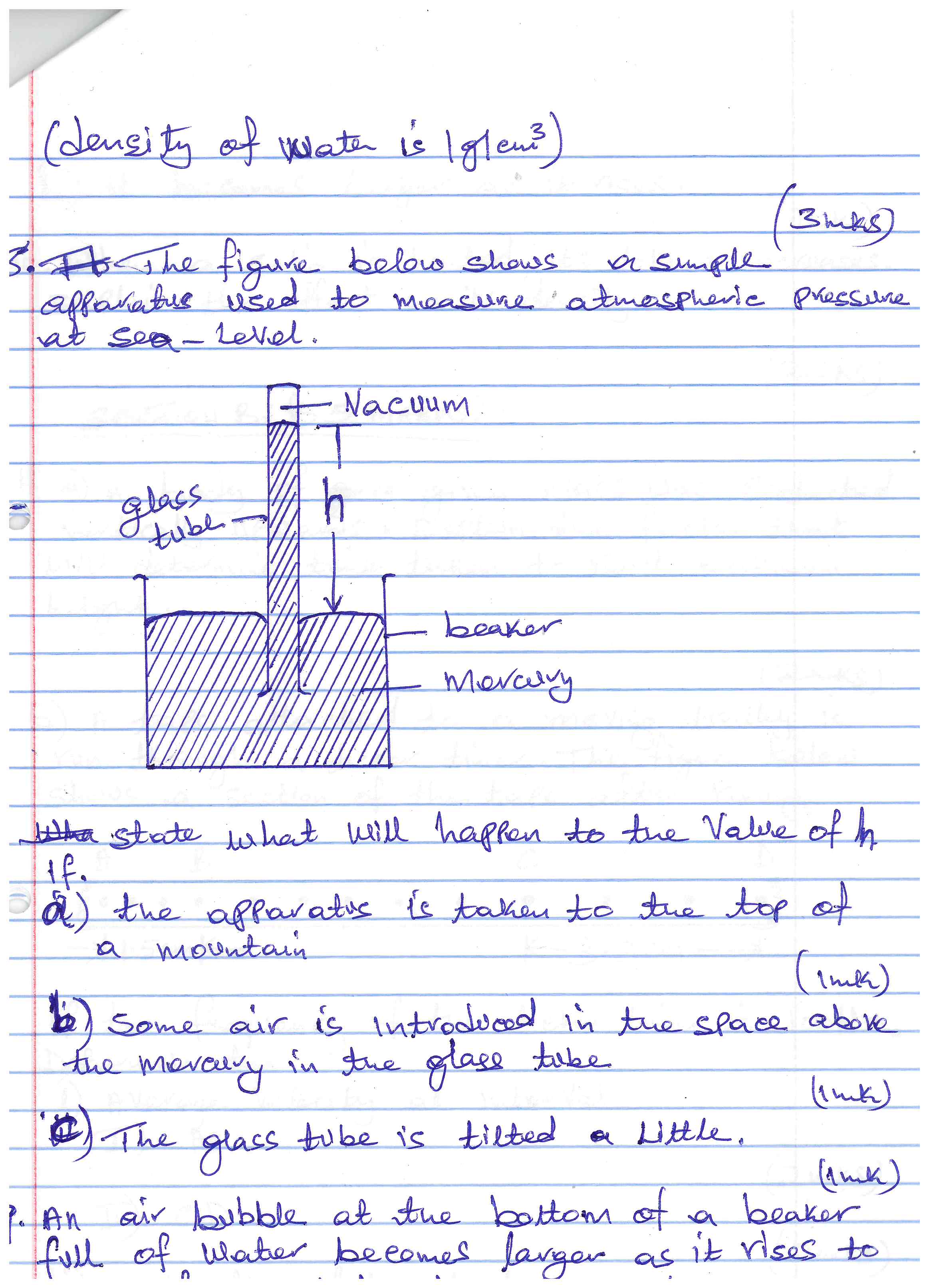
Calculate

1. Weight of the block X (3 marks)
2. Tension in the string PQ (1 mark)
3. The figure below shows parts A, B and C of a glass tube

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State with a reason the part of the tube in which the pressure will be lowest when air is blown through the tube from A to C. (2 marks)

1. The mass of an empty density bottle is X g. When full of water its mass is 70g and 68.4g when full of another liquid L whose density is 0.96g/cm3. Determine the value of X.(Density of water is 1g/cm3) (3 marks)
2. The figure below shows a simple apparatus used to measure atmospheric pressure at sea-level.

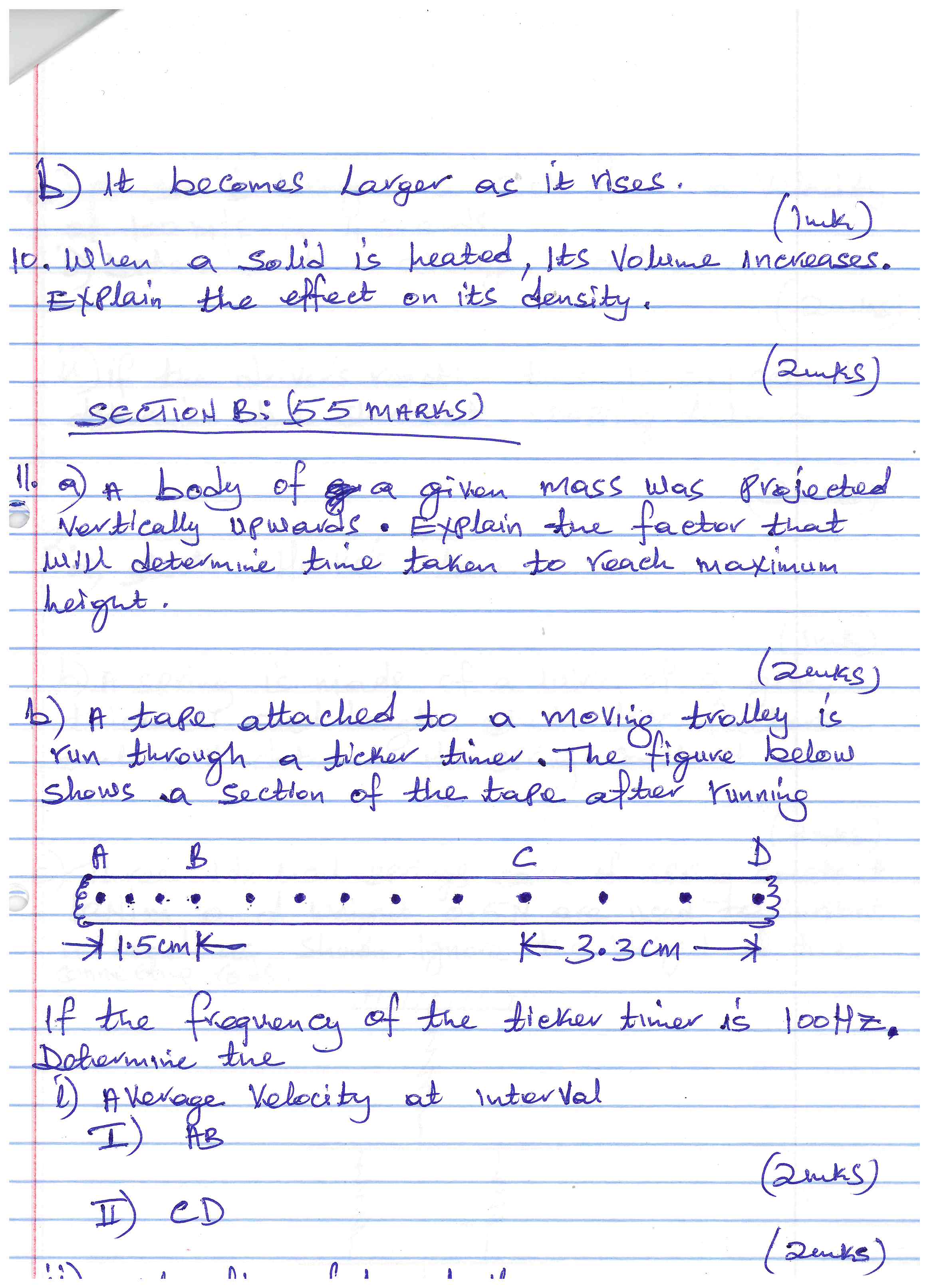


State what will happen to the value of h if;

1. The apparatus is taken to the top of a mountain (1 mark)
2. Some air is introduced in the space above the mercury in the glass tube. (1 mark)
3. The glass tube is tilted a little. (1 mark)
4. An air bubble at the bottom of a beaker full of water becomes larger as it rises to the surface. State the reasons why.
5. The bubble rises to the surface (1 mark)
6. It becomes larger as it rises (1 mark)
7. When a solid is heated, its volume increases. Explain the effect on its density. (2 marks)

**SECTION B: (55 MARKS)**

1. A body of a given mass was projected vertically upwards. Explain the factor that will determine time taken to reach maximum height. (2 marks)
2. A tape attached to a moving trolley is run through a ticker timer. The figure below shows a section of the tape after running.



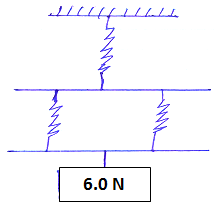
If the frequency of the ticker timer is 100Hz.

Determine the

1. Average velocity at interval
2. AB (2 marks)
3. CD (2 marks)
4. Acceleration of the trolley. (2 marks)
5. A car is brought to rest from a velocity of 100m/s in 4 seconds.
6. Determine the average acceleration (2 marks)
7. If the driver’s reaction time is 0.1 seconds, determine the shortest stopping distance.

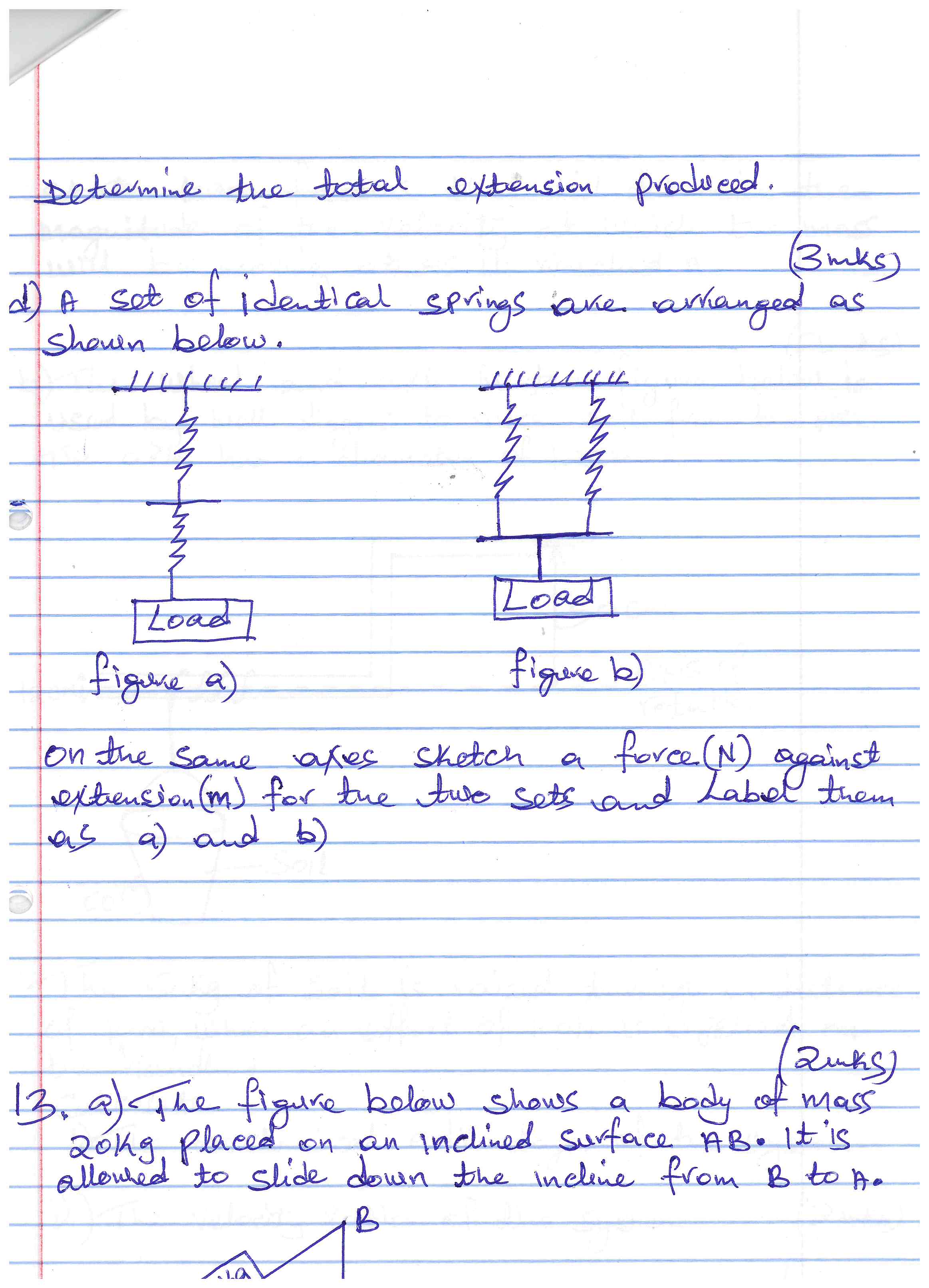
(3 mks)

1. State Hooke’s Law. (1 mark)
2. A spring is made of a steel wire of a given thickness and length. State two factors that will determine its spring constant. (2 marks)
3. Three identical springs each of spring constant 10N/m and weight 0.5N are used to support a load as shown. Ignore the weight of the connecting rods.



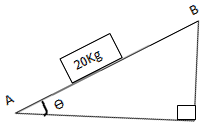
Determine the total extension produced. (3 marks)

1. A set of identical springs are arranged as shown below.



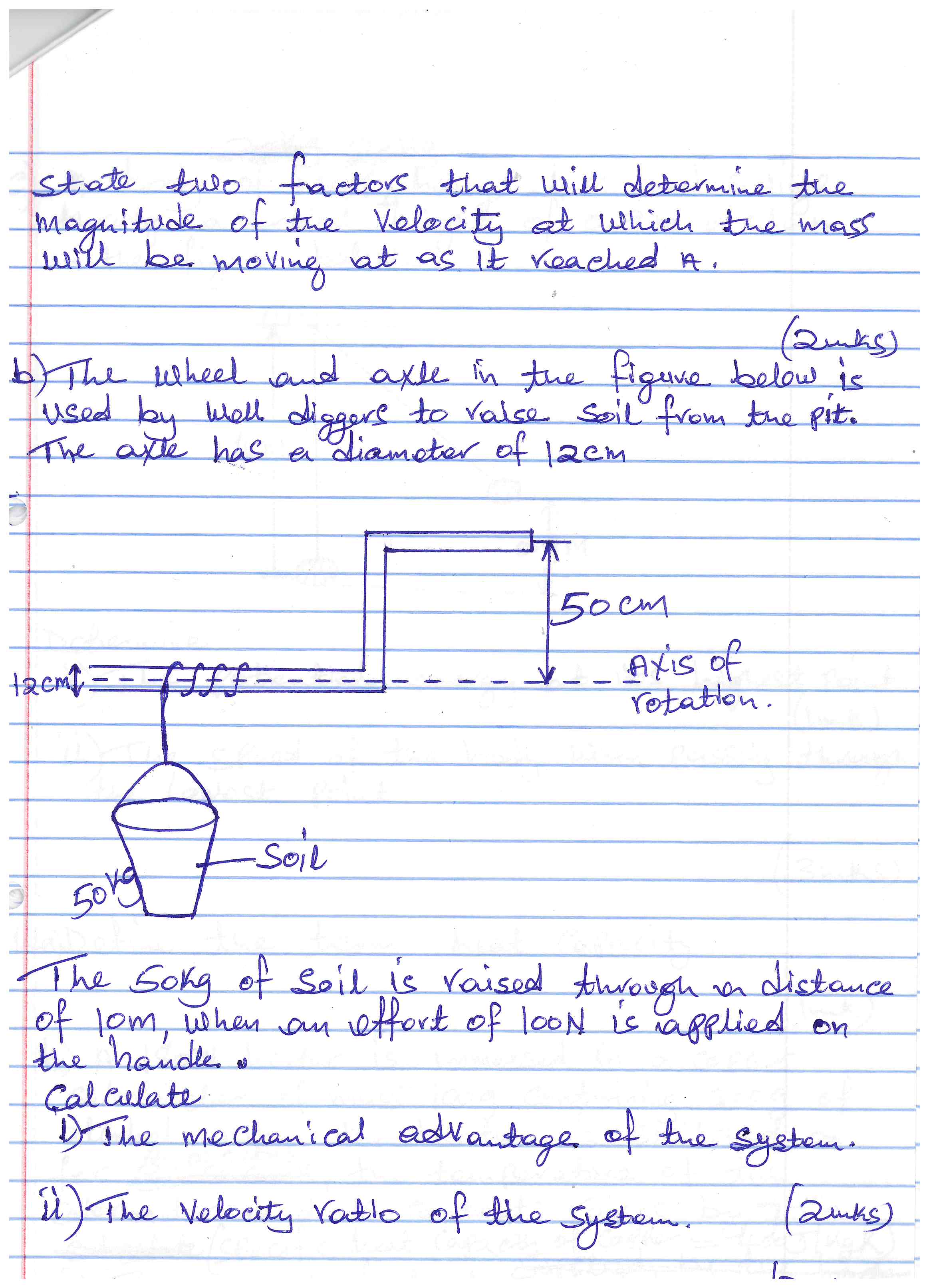
On the same axes sketch a force (N) against extension (m) for the two sets and label them as (a) and (b). (2 marks)

1. The figure below shows a body of mass 20kg placed on an inclined surface AB. It is allowed to slide down the incline from B to A.



State two factors that will determine the magnitude of the velocity at which the mass will be moving at as it reached A. (2 marks)

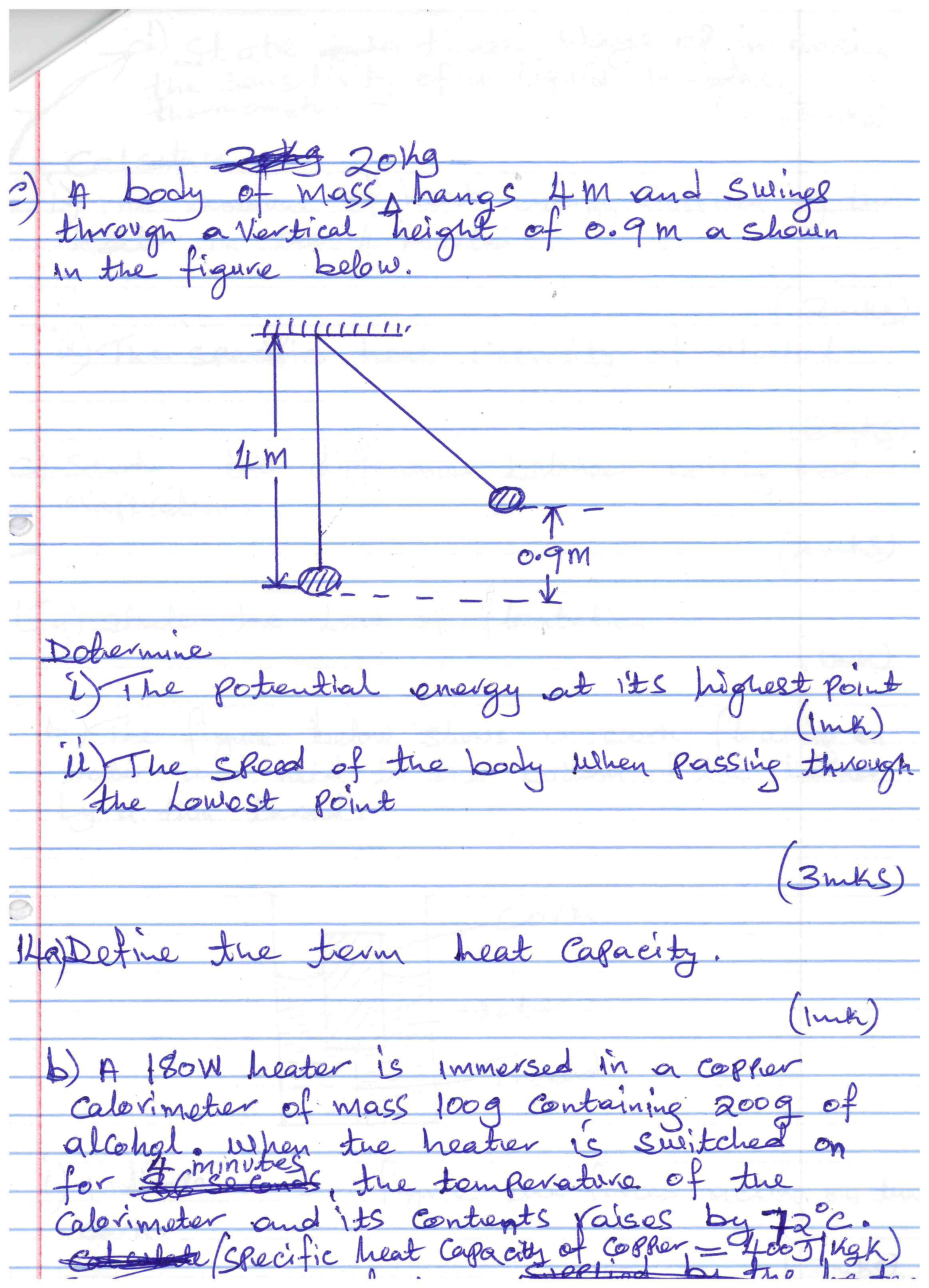
1. The wheel and axle in the figure below is used by well diggers to raise soil from the pit. The axle has a diameter of 12cm.



The 50kg of soil is raised through a distance of 10m, when an effort of 100N is applied on the handle.

Calculate

1. The mechanical advantage of the system (2 marks)
2. The velocity ratio of the system (2 marks)
3. The efficiency of the wheel and axle system (3 marks)
4. A body of mass 20kg hangs 4m and swings through a vertical height of 0.9m as shown in the figure below.

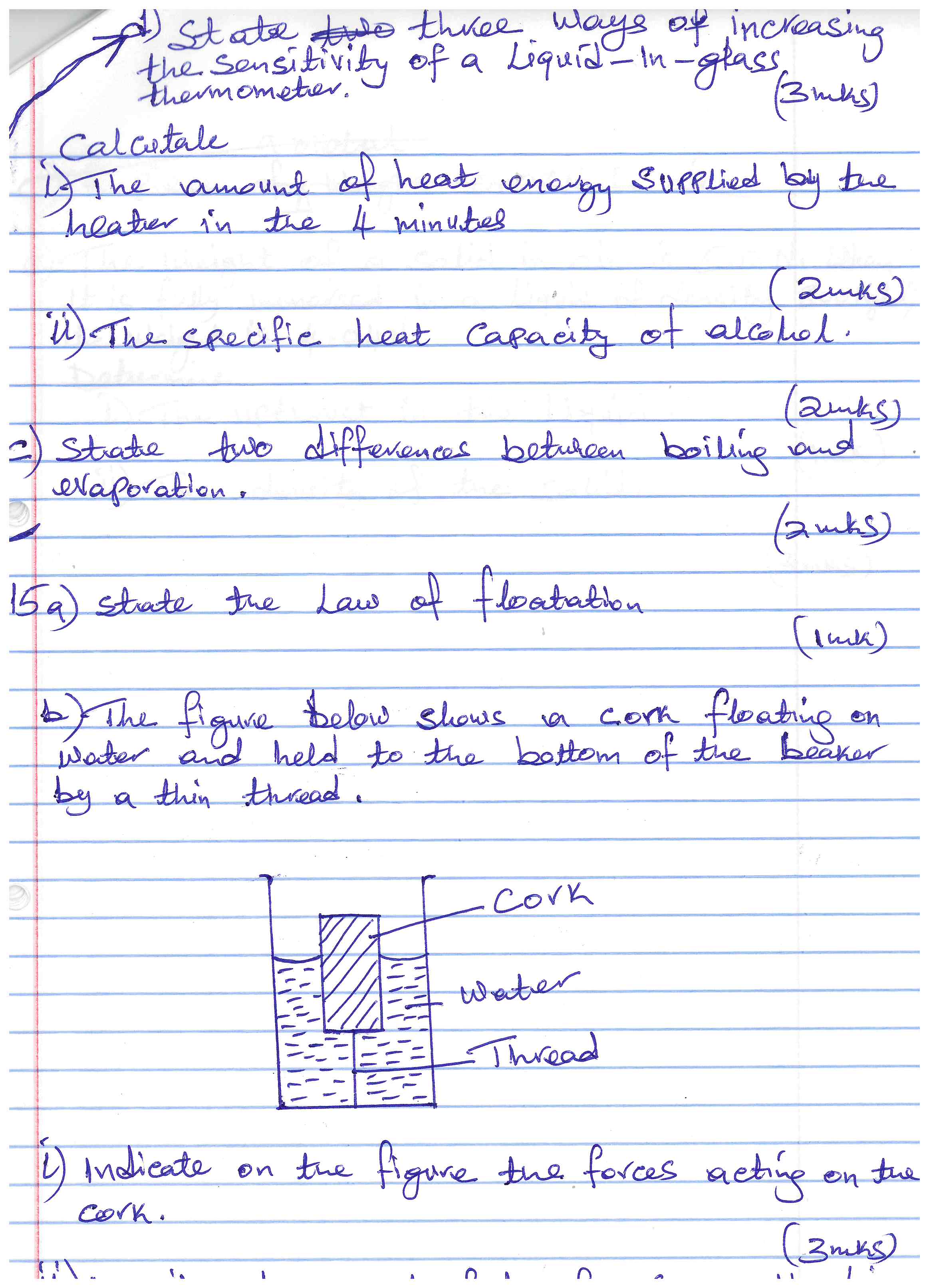


Determine

1. The potential energy at its highest point. (1 mark)
2. The speed of the body when passing through the lowest point. (3 marks)
3. Define the term heat capacity. (1 mark)
4. A 180W heater is immersed in a copper calorimeter of mass 100g containing 200g of alcohol. When the heater is switched on for 4 minutes the temperature of the calorimeter and its contents raises by 72oC. (Specific heat capacity of copper=400J/kgK)

Calculate

1. The amount of heat energy supplied by the heater in the 4 minutes (2 marks)
2. The specific heat capacity of alcohol (2 marks)
3. State two differences between boiling and evaporation. (2 marks)
4. State three ways of increasing the sensitivity of a liquid - in – glass thermometer. (3 marks)
5. State the Law of floatation (1 mark)
6. The figure below shows a cork floating on water and held to the bottom of the beaker by a thin thread.



1. Indicate on the figure the forces acting on the cork. (3 marks)
2. Describe how each of the forces mentioned in (i) above changes when water is added into the beaker untill it fills up. (3 marks)
3. The weight of a solid in air is 5.0N. When it is fully immersed in a Liquid of density 800kg/m3. Its weight is 4.04N. determine
4. The upthrust in the Liquid (1 mark)
5. The density of the solid (3 marks)