NAME…….. INDEX NO…….....

232/1 CANDIDATE'S SIGN……..……
PHYSICS
PAPER 1 DATE…….……...
(THEORY)
JULY/AUGUST, 2016
TIME: 2 HOURS

# KIRINYAGA CENTRAL SUB-COUNTY EFFECTIVE FORTY JOINT EXAMINATION – 2016

**Kenya Certificate of Secondary Education**
**PHYSICS**
**PAPER 1**
**(THEORY)**
**TIME: 2 HOURS**

**INSTRUCTIONS TO THE CANDIDATE:**

(a) Write your **name** and **index number** in the spaces provided above.
(b) **Sign** and write the **date** of examination in the spaces provided above.
(c) This paper consists of **two** Sections **A** and **B**.
(d) Answer **all** the questions in sections **A** and **B** in the spaces provided.
(e) All working **must** be clearly shown in the spaces provided.
(f) Non-programmable silent electronic calculators and KNEC Mathematical tables **may be** used.

**FOR EXAMINER'S USE ONLY:**

| Section | Question | Maximum Score | Candidate's Score |
|---|---|---|---|
| A | 1 – 13 | 25 | |
| B | 14 | 12 | |
| | 15 | 10 | |
| | 16 | 11 | |
| | 17 | 09 | |
| | 18 | 13 | |
| Total Score | | 80 | |

**SECTION A: (25 MARKS)**

Answer all the questions in this section in the spaces provided.

1. Figure 1 shows a measuring cylinder, which contains water initially at level A. A solid of mass 0.32g is immersed in the water, the level rises to B.

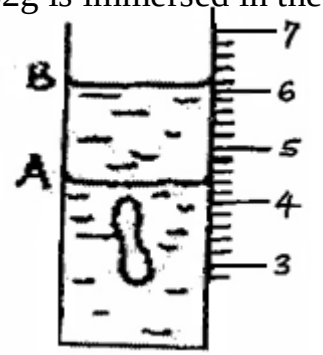


Figure 1

Determine the density of the solid. (Give your answer to 3 significant figures). (2mks)

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2. The figure 2 below shows part of micrometer screw gauge with 50 divisions on the thimble scale. Complete the diagram to show a reading of 5.73mm. (1mk)

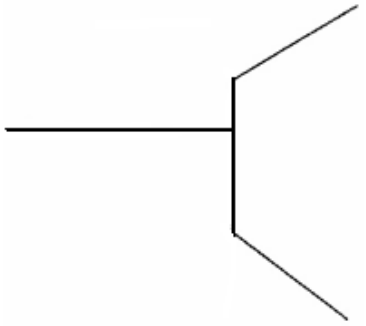
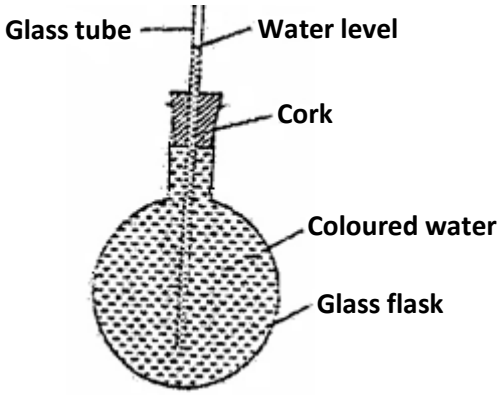


Figure 2

3. In the set up shown below, it is observed that the level of the water initially rises before starting to drop when the flask is dipped in ice cold water.




Explain this observation. (2mks)

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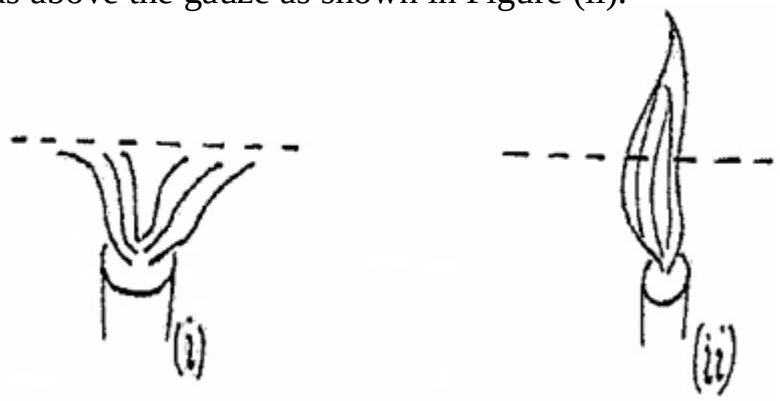
4. When a Bunsen burner is lit below wire gauze, it is noted that the flame initially burns below the gauze as shown in Figure (i). After sometime, the flame burns below as well as above the gauze as shown in Figure (ii).




Explain this observation. (2mks)

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5. The reading on a mercury barometer at a place in 690mm. The barometer contains some air which exerts a pressure of $15Nm^{-2}$. What is the pressure at the place $Nm^{-2}$. (Density of mercury is $1.36 \times 104kgm^{-3}$). (3mks)

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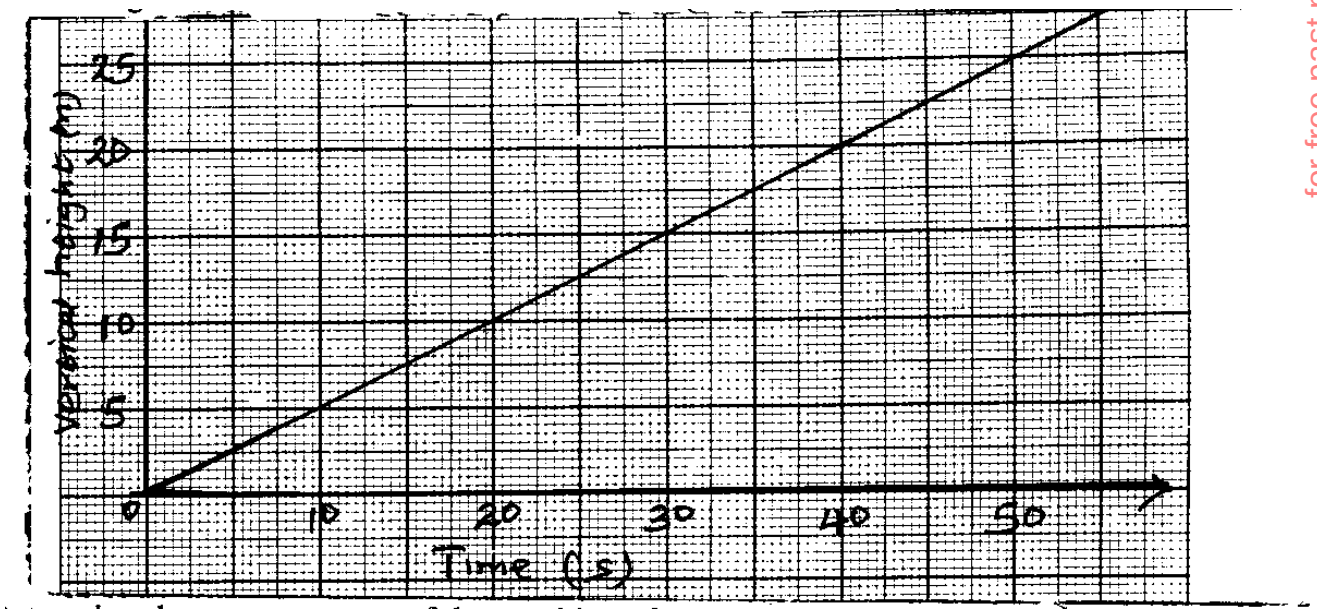
6. Figure below shows a graph of how the vertical height through which a machine raises a mass 30kg varies with time.



Determine the power output of the machine after 40 seconds. (3mks)

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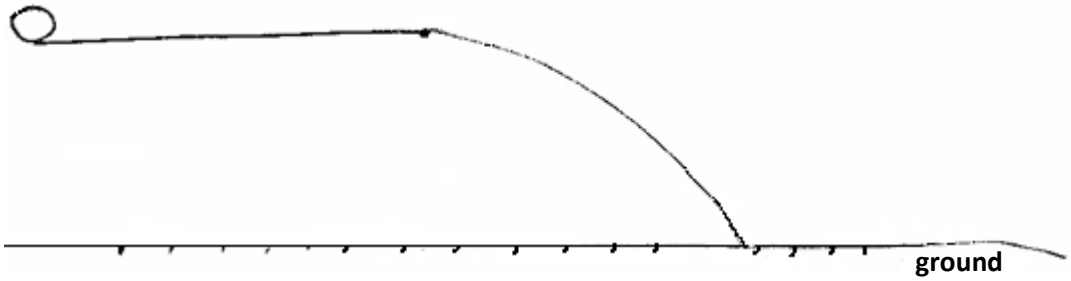
Figure below shows a ball projected horizontally. Use the diagram to answer question **7** and **8**.




A player taps the ball and makes it spin in anticlockwise direction as it moves.

7. Show the new path followed by the ball. (1mk)

8. Explain how the ball attains the new path above. (2mks)

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9. A constant force is applied to a body moving with a constant speed. State **one** observable change in the state of motion of the body likely to occur? (1mk)

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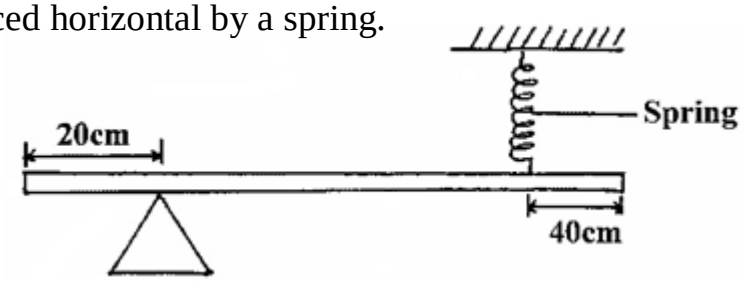
10. The figure below is a uniform bar of length 2.0m pivoted near one end. The bar is balanced horizontal by a spring.



Given that the tension on the spring is 1.2N, determine the weight of the bar. (3mks)

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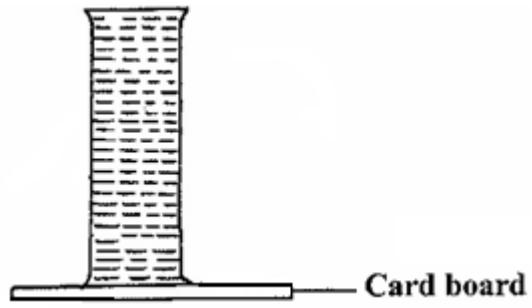
11. The figure below shows a long tube filled with water. The open end is then covered with a cardboard and tube is inverted. It is observed that the water in the tube does not spill out.




Explain the observation. (1mk)

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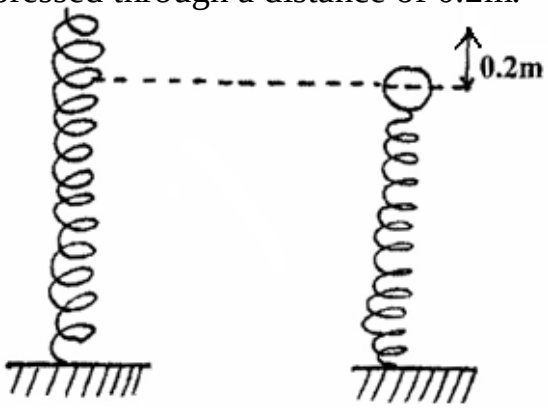
12. A steel ball of mass 0.05kg was placed on top of a spring on a level ground. The spring was then compressed through a distance of 0.2m.




If the spring constant is 15N/m. Calculate the maximum height reached when the spring is released. (3mks)

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13. The volume of inflated balloon is observed to reduce when the balloon is placed inside a refrigerator. Use the kinetic theory of gases to explain this observation. (1mk)

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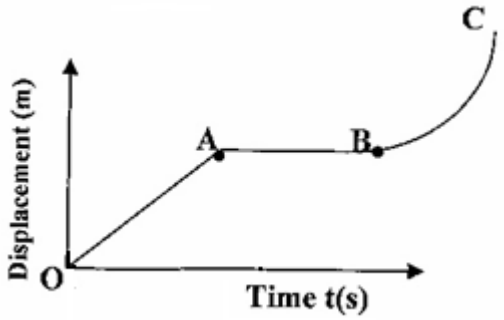
**SECTION B: (55 MARKS)**

14. (a) The figure below shows a displacement-time graph of the motion of a particle.




Describe the motion of the particle in the region. (3mks)

(i) **OA**……

(ii) **AB**……

(iii) **BC**……

(b) A hot air balloon falling through the air attains terminal velocity after a short-time. State the reason why it attains terminal velocity. (1mk)

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(c) State Newton's second law of motion. (1mk)

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(d) A ball of mass 0.2kg is thrown vertically upwards with velocity of $8ms^{-1}$. The air resistance is 0.5N. Determine:

(i) the resultant force on the ball as it moves up;
(Take acceleration due to gravity g = $10ms^{-2}$). (2mks)

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(ii) the acceleration of the ball. (3mks)

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(iii) the maximum height reached by the ball. (2mks)

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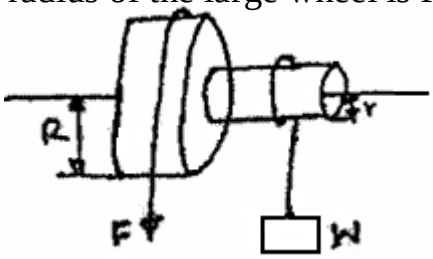
15. (a) Draw a single pulley arrangement with a velocity ratio of 2. (2mks)

(b) Figure shows a wheel and axle being used to raise a load W by applying an effort F. the radius of the large wheel is R and of the small wheel r as shown.




(i) Shows that the velocity ratio (V.R) of this machine is given by R/r. (3mks)

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(ii) Given that r = 5cm, R = 8cm, determine effort required to raise a load of 20N if the efficiency of the machine is 80%. (4mks)

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(iii) It is observed that the efficiency of the machines increases when it is used to lift large loads. Give a reason for this. (1mk)

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16. (a) (i) Define the term latent heat of fusion. (1mk)

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(ii) 9816J of heat energy is required to completely convert m kg of ice at 0°C to steam. Determine the value of m. (Take latent heat of fusion of ice = $2.34 \times 10^{5}Jkg^{-1}$; specific heat capacity of water = $4200Jkg^{-1}k^{-1}$, latent heat of vaporization of steam = $22.26 \times 106Jkg^{-1}$). (4 marks)

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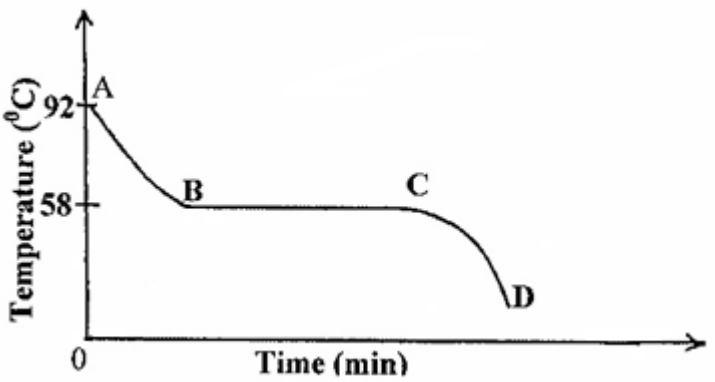
(b) The cooling curve shown in figure below is for a pure substance.



(i) What is the melting point of the substance? (1mk)

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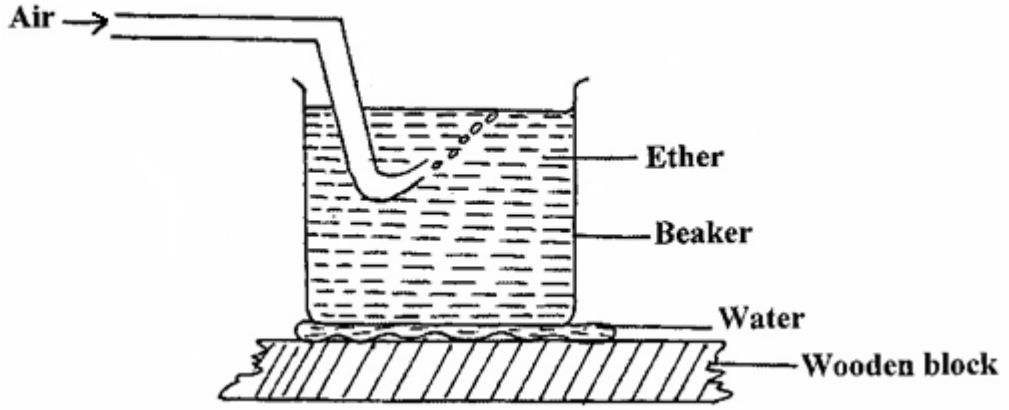
(ii) Explain what happens in the region. (3mks)

I **CD**……

II **AB**……

III **BC**……

(c) A beaker containing ether was placed on some water on a wooden block. Air was then blown through the ether using a pump as shown in figure below.




State and explain what observation is made after sometime. (2mks)

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17. (a) When the temperature of water reaches the boiling point, bubbles rise to the surface.

(i) State what is contained in the bubbles. (1mk)

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(ii) State the reason why bubbles rise to the surface only at the boiling point. (1mk)

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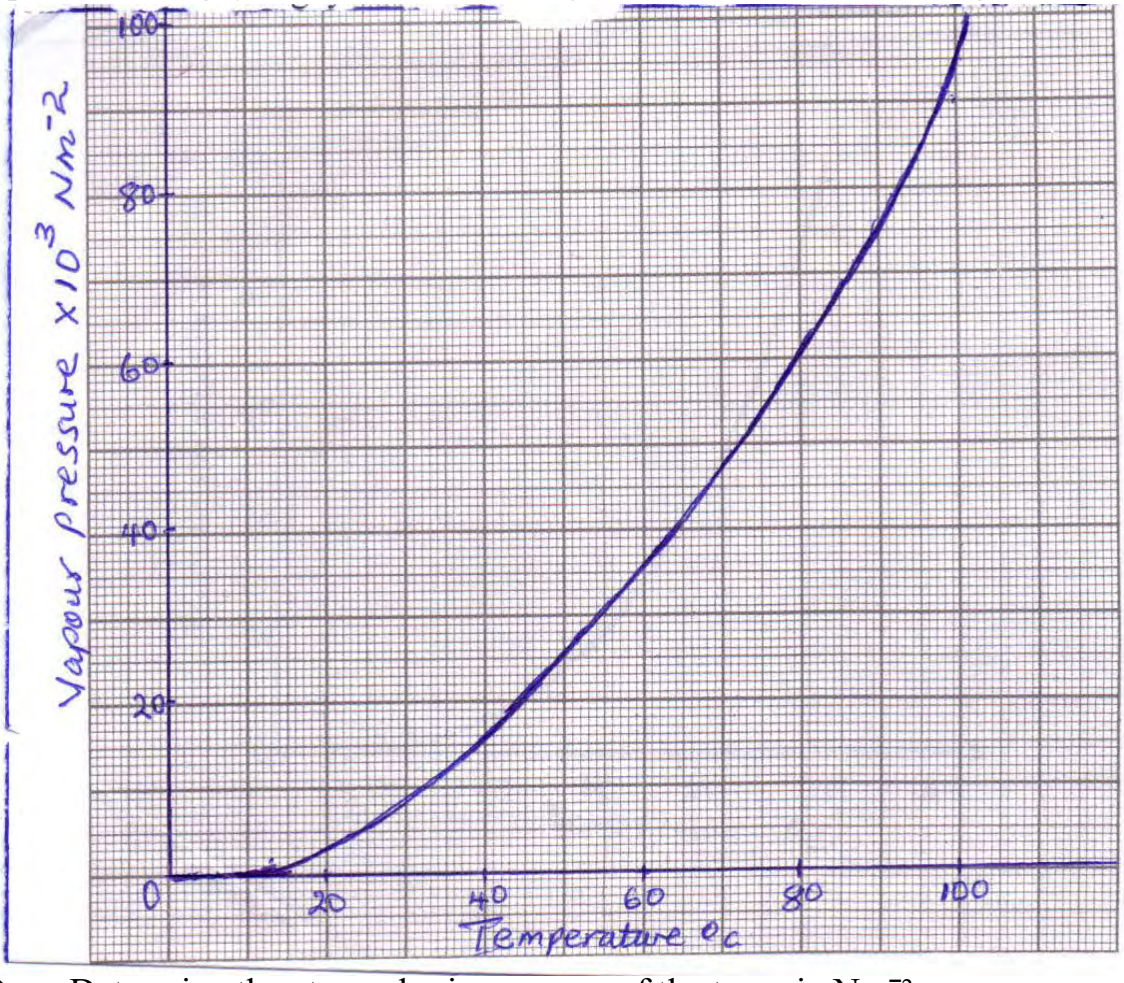
(b) Figure below shows a graph of vapour pressure against the temperature of water vapour at Kerugoya town where mercury barometer indicates a height of 650mm.




(i) Determine the atmospheric pressure of the town in $Nm^{-2}$.
(Take g = 10m/s² and density of mercury = 13600kg/m³). (3mks)

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(ii) Use the graph to determine the boiling point of water in the town. (1mk)

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(c) The pressure of helium gas of volume 10cm³ decreases to one third of its original value at constant temperature. Determine the final volume of the gas. (3mks)

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18. (a) One of the factors that affect the centripetal force is the mass of the body. State **two** other factors. (2mks)

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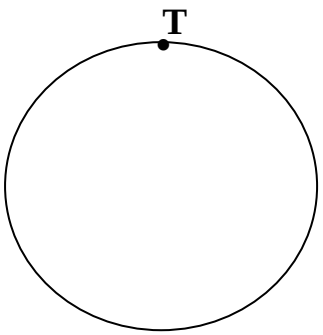
(b) A mass of 400g is rotated by a string at a constant speed V in a vertical circle of radius 100cm. The minimum tension in the string is 7.2N which is experienced at point T.




(i) Determine the velocity V of the mass at point T. (3mks)

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(ii) Determine the maximum tension in the string. (2mks)

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(c) The anchor of a ship is made of steel and has a weight of 3200N in air. A ship floating in water is held by the anchor submerged in water. (Density of steel is $8000kgm^{-3}$).
Calculate.

(i) The volume of the anchor. (2mks)

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(ii) The up thrust on the anchor. (2mks)

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(iii) The apparent weight of the anchor. (2mks)

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