Name: ………………………………………   Index No………………………………..

School: ……………………………………. Stram………………………….Adm No………..

232/1
PHYSICS
Paper 1
(Theory)
May/June 2014
Time: 2 Hours

BUNYORE-MARANDA PRE-MORK EXAMS 2014

Kenya Certificate of Secondary Education (K.C.S.E)

INSTRUCTIONS TO CANDIDATES
- ✓ The paper consists of TWO sections A and B.
- ✓ Answer all the questions in section A and B in the spaces provided
- ✓ All working MUST be clearly shown
- ✓ Non-programmable silent calculators and KNEC mathematical tables may be used.

FOR EXAMINER'S USE ONLY

Section	Question	Maximum Score	Candidate's Score
A	11-11	25	
B	12	11	
	13	10	
	14	10	
	15	13	
	16	11	
TOTAL SCORE		80	

This paper consists of 13 printed pages. Candidates should check to ascertain that all pages are printed as indicated and that no questions are missing.

SECTION A (25 Marks)

1.   The figure below shows a micrometer screw gauge being used to measure the diameter of a rod. The thimble scale has 50 divisions.
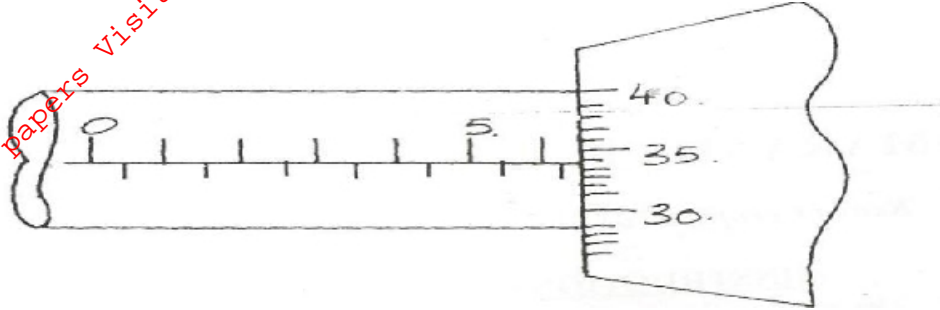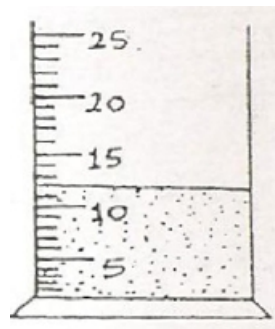

State the reading shown above.   (2 marks)

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2.   The figure below shows water placed in a measuring cylinder calibrated in cm^3

An object of mass 50.1g and density 16.7 g/cm^3 is lowered gently in the water. Indicate on the diagram the new level.   (1 mark)

3.   An object is attached to a spring balance and its weight determined in air. It is then gently lowered into a liquid in a beaker. State what will happen to the reading.   (1 mark)

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4. The figure below shows a uniform meter rule pivoted at the 23cm mark with a mass of 3.6kg hanging at 0cm mark the system is in equilibrium.
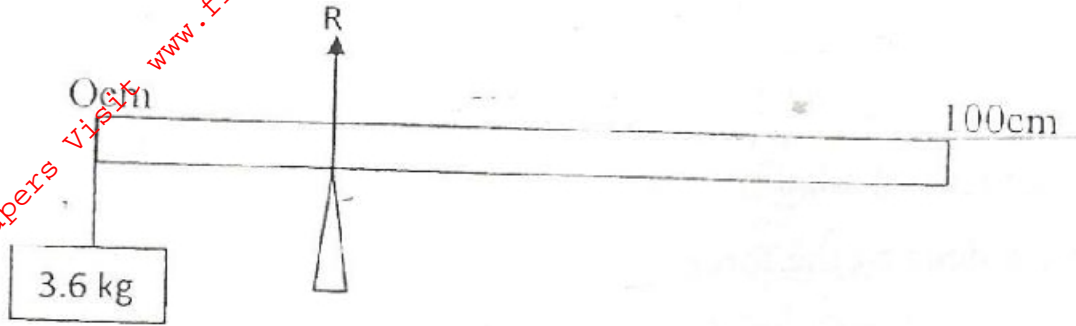
Determine,

    i)   The weight of the rule   (2 marks)

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    ii)   The normal reaction force R at the rule   (1 mark)

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5. When a mercury in a glass thermometer is used to measure the temperature of hot water, it is observed that the mercury level first drops before beginning to rise. Explain

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6. A trolley of mass 0.5kg moving with a velocity of 1.2m/s collides with a second trolley of mass 1.5kg moving in the direction with a velocity of 0.2m/s. If the Collins is inelastic, determine the velocity of the trolleys after collsion.   (3 marks)

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7. A block of copper of mass 2kg and specific heat capacity 400 J/kg K initially at 81^0C is immersed in water at 20^0C. If the final temperature is 21^0C, determine the mass of water.

(3 marks)

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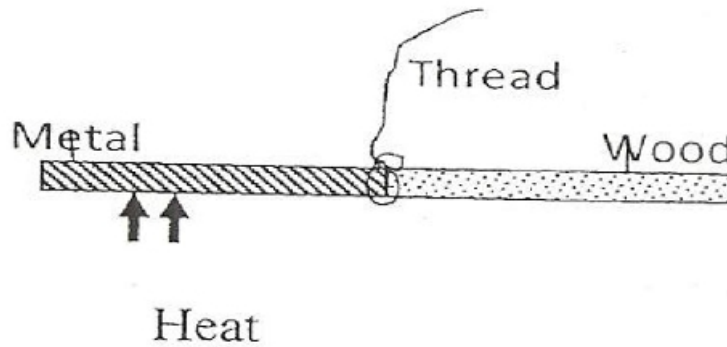
8. When a body of mass 0.25kg is acted on by a force, its velocity changes from 5m/s to 7.5m/s, determine the work done by the force. (3 marks)

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9. The following figure shows a rod made of wood on one end and metal on the other end suspended freely with a piece of thread so that it is in equilibrium.
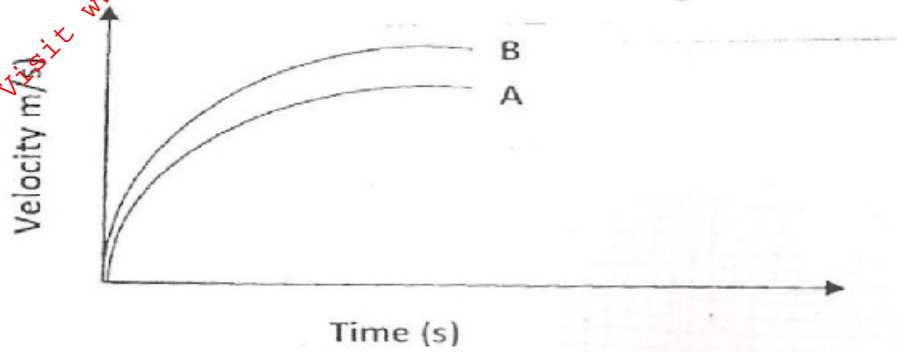

The side made of metal is now heated with a Bunsen flame. State with a reason, the side to which the rod is likely to tilt. (2 marks)

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10. The figure shows the velocity time graph of two identical spheres released from the surfaces of two liquids A and B.

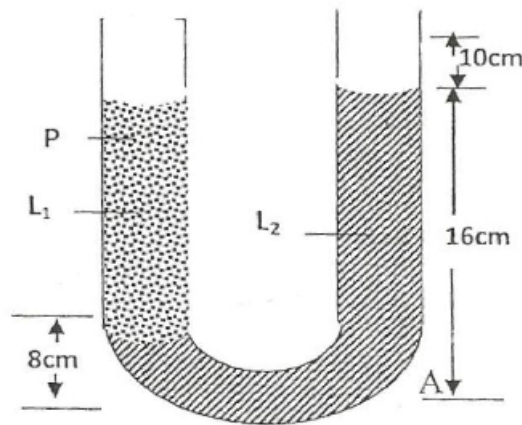Give a reason why the terminal velocity of the sphere In B is higher than in A.   (1 mark)

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11. A u-tube vertically holds two liquids L_1 and L_2 as shown in the figure below.

(a) Mark accurately the point in liquid L_2 that is at the same pressure as point P

(1 mark)

(b) If the atmospheric pressure is 103000N/m^2 and the density of liquid L_2 is 103kg/m^3 determine the pressure acting at point A.   (3 marks)

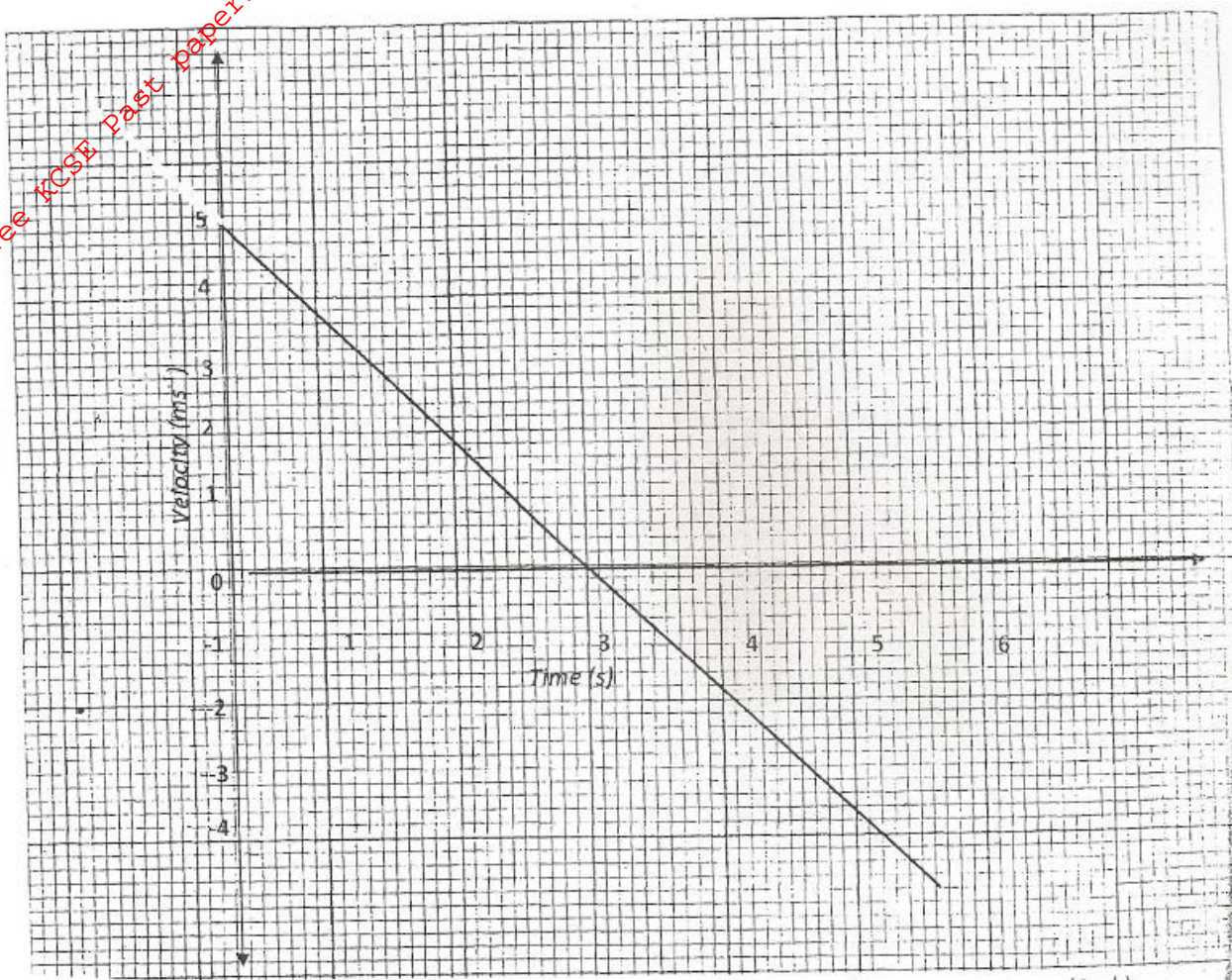………………………………………………………………………………………………………

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Answer all questions in this section

12 (a) The velocity-time graph in the figure below illustrates the motion of a ball which has been projected vertically upwards from the surface of the moon. The weight of the object on earth's surface is 20N, when the acceleration due to gravity is 10ms^{-2}.

(i)   State why the velocity becomes negative after 3 seconds.   (1 mark)

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(ii) Determine the acceleration of free fall on the moon showing clearly your work

(1 mark)

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(iii) Determine the total distance traveled by the ball in 1.0 sec   (2 marks)

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(iv) Find the weight of the ball on the moon   (2 marks)

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(v) If the ball was projected vertically upwards on the earth with the same velocity. What difference would you expect to observe in the velocity-time graph above? Illustrate with a sketch on the same axis.   (1 mark)

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(b) The figure below represents part of a tape pulled through the ticker-timer of frequency 50Hz moving down an inclined plane.

If the trolley was allowed to move down the inclined plane for 4 seconds. Calculate the distance it covers. (3 marks)

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13 a)   State two differences between boiling and evaporation.   (2 marks)

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(b) 200g of a solid was uniformly heated by a 0.2kw heater for sometime. The graph in the figure below shows how the temperature of the solid changed with time.

Figure 8
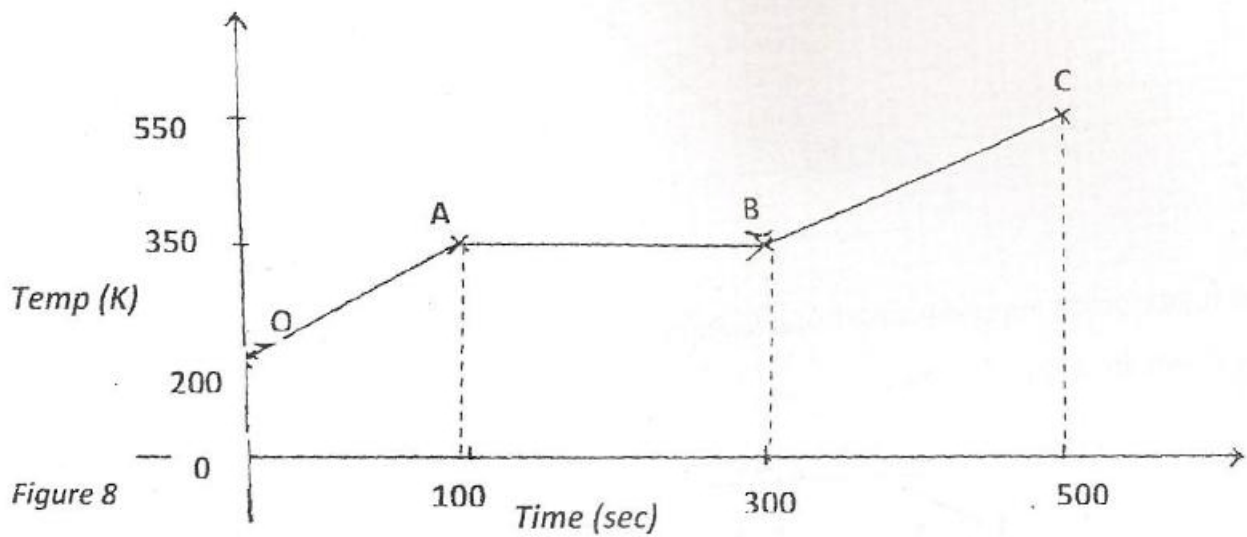
(i) Explain what is happening between OA and AB. (2 marks)

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(ii) Calculate the specific heat capacity of the solid. (3 marks)

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(iii) Calculate the specific latent heat of fusion **k** of the solid. (3 marks)

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14 (a) (i) Define the term velocity ratio (V.R) (1 mark)

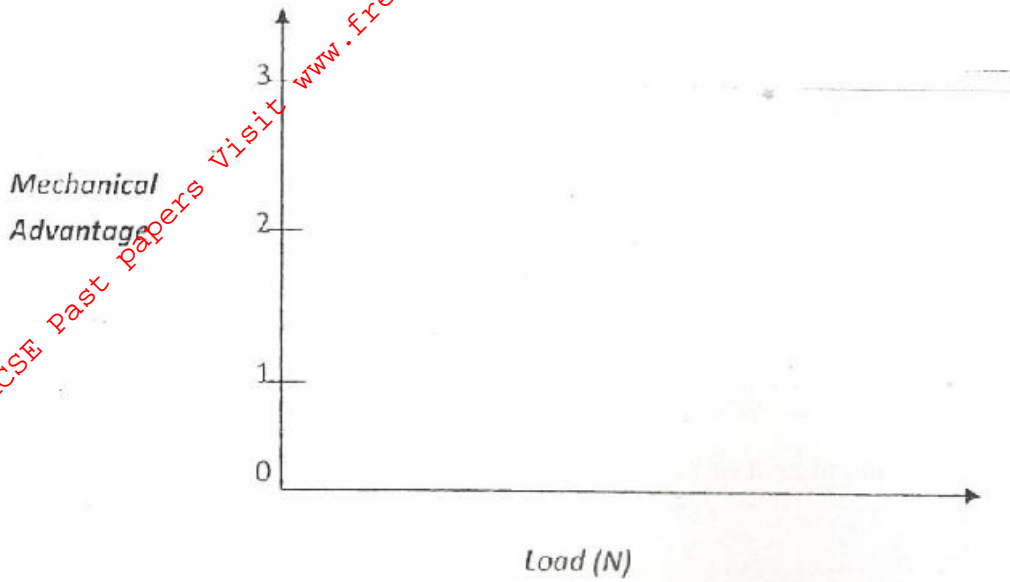…………………………………………………………………………………………………

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(ii) Name one machine that has a velocity ratio of less than one   (V.R < 1)   (1 mark)

(b) The figure below shows a set-up used to find the mechanical advantage of a pulley system\
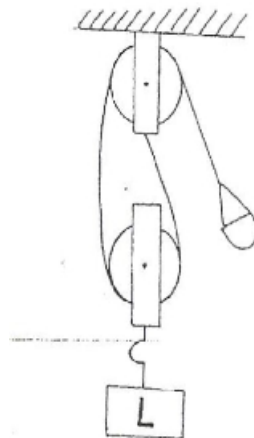
On the axes provided sketch a graph of mechanical advantage (M.A) against load (L)

(2 marks)

Mechanical
Advantage

3 ⊢

2 ⊢

1 ⊢

0 ⊢

Load (N)

(c) A hydraulic machine is used to raise a load of 100kg at a constant velocity through a light of 2.5m. The radius of the effort piston is 1.4cm while that of the load piston is 7.0cm. given that the machine is 80% efficient, calculate: -

(i) The effort needed (3 marks)

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(ii) The energy wasted in using the machine (3 marks)

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15. a) Define pressure and state its SI Units. (2 marks)

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b) State Pascal's principal. (1 mark)

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c) In construction of a mercury barometer care is taken to make sure it has no gas in the space above mercury.

i) How would you test whether there is gas above? (1 mark)

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iii) State the problem caused by the presence of gas in the barometer. (1 mark)

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d) Find the total pressure experienced by a diver 8 meters below the sea surface.

Take; Atmospheric pressure = 103 360N/m^2. Density of sea water 1030kg/m^3

(3 marks)

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e) i) The air pressure at the base of a mountain is 75.0cm of mercury while at the top it is 60.0cm of mercury. Given that the average density of air is 1.25kgm^{-3} and the density of mercury is 13600 km^{-3} calculate the height of the mountain.
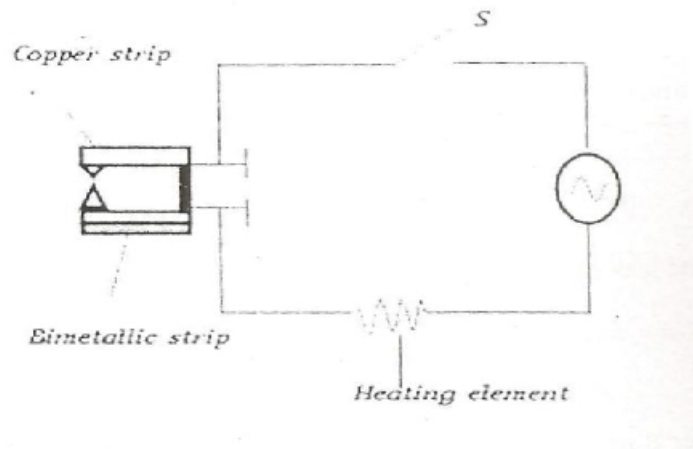
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ii) State factors that affects pressure due to liquid column. (2 marks)

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16 a) The figure below shows a circuit diagram for a device for controlling the temperature in a room.

i) Explain the purpose of the bimetallic strip. (2 marks)

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ii)   Describe how the circuit controls the temperature when the switch is closed.

(2 marks)

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b)   (i) Explain why bodies in circuit motion undergo acceleration even when their speed is
       constant.   (1 mark)

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(iii)   A particle moving along a circular path of radius 5cm describes an arc of
        length 2cm every second. Determine:
        I)   Its angular velocity   (2 marks)

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        II)   Its periodic time.   (2 marks)

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(iv)   A stone of mass 40g is tied to the end of a string 50cm long and whirled in a
        vertical circle at 2rev/s. Calculate the maximum tension in the string.

(3 marks)

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