MUTOMO SUB-COUNTY KCSE REVISION MOCK EXAMS 2015

232/1
PHYSICS
PAPER 1
(THEORY)
TIME: 2 HOURS

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MUTOMO SUB-COUNTY KCSE PACESETTER, 2015
Kenya Certificate of Secondary Education (K.C.S.E)

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INSTRUCTIONS TO CANDIDATES
1. Write your name, school and index number in the spaces provided above.
2. Sign and write the date of examination in the space provided above.
3. This paper consists of two sections, Section **A** and **B**.
4. Answer **ALL** the questions in section **A** and **B** in the spaces provided.
5. **ALL** answers and working **MUST** be clearly shown.
6. 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	1–12	25	
B	13	12	
	14	10	
	15	11	
	16	12	
	17	10	
	TOTAL	80	

This paper consists of 10 printed pages
Candidates should check to ensure that all pages are printed as indicated and no questions are missing

SECTION A (25 MARKS)

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

1. The figure 1 below shows a measuring cylinder which contains water initially at a level A.
   A spherical solid is immersed in the water and the level rises to B.
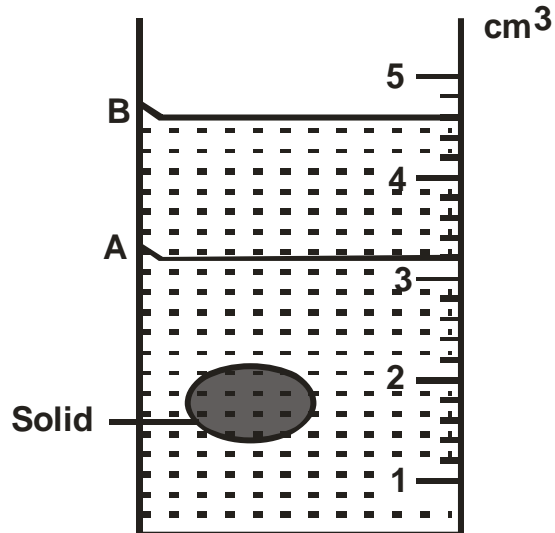
Figure 1

Determine the diameter of the spherical ball. (3 marks)

2. Give a reason why water is not suitable as a barometric liquid. (1 mark)

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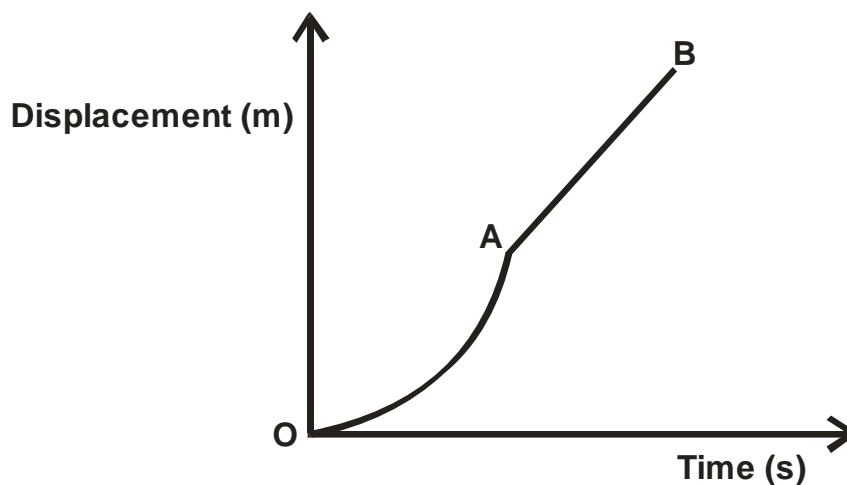3. The figure 2 below shows a displacement time graph.

Figure 2

Describe the motion of the body between points:

OA   (1 mark)

_____

AB   (1 mark)

_____

4. State **one** factor that affects turning effect of a force on a body.   (1 mark)

_____

5. A person of mass 70kg stands on a scale balance in a lift. At a particular instant the lift is moving downward uniformly at 2.8m/s^2. Calculate the reading on the scale in Newtons.   (2 marks)

6. The three springs shown below are identical and of negligible weight. The extension produced on the system of springs is 20cm.
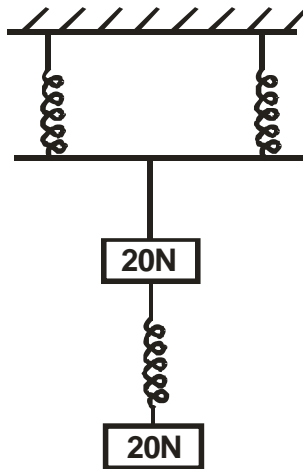
Figure 3

Determine the constant of each spring.   (3 marks)

7. A stone and a feather are dropped from rest from a building 20m tall. If they reach the ground at the same time, find:

a) The velocity with which they reach the ground (take g = 10m/s)   (2 marks)

b)   The condition under which they fall.   (1 mark)

_____

8.   Figure 4 below shows a uniform metre rule balancing when a mass of 200g is hung at one end.

Determine the tension T in the string.   (2 marks)
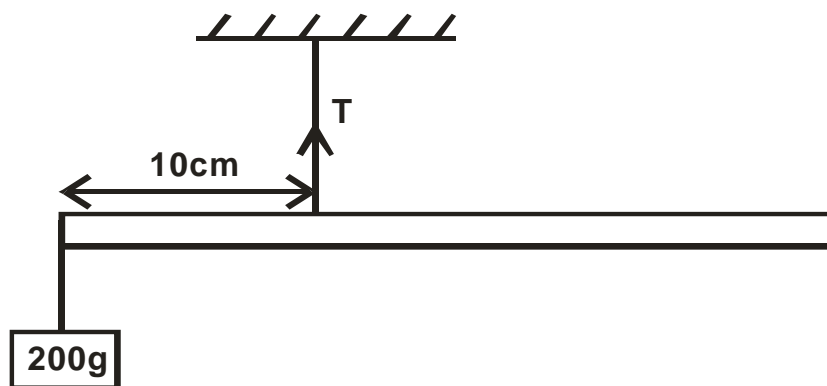

Figure 4

9.   An immersion heater rated at 180W is placed in a liquid of mass 2kg. When the heater is switched

on for 7.5 minutes the temperature of the liquid raises by 40^0C. Determine the specific heat capacity

of the liquid.   (2 marks)

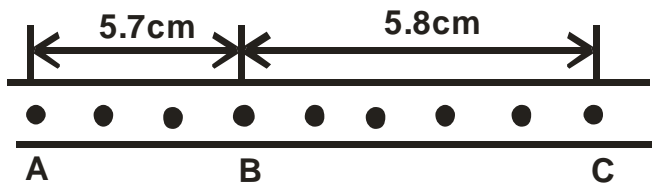10. A body in a uniform circular motion experiences acceleration despite moving at constant speed. Explain. (1 mark)

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11. Figure 6 shows dots which were made by a ticker timer tape attached to a trolley.

Figure 6

If the frequency used was 50Hz, determine;

a) The velocities between AB and BC.   (2 marks)

b) The deceleration of the trolley.   (2 marks)

12. State **one** reason why the efficiency of a machine is never 100%.   (1 mark)

_____

_____

SECTION B (55 MARKS)

Answer ALL the questions in this section in the spaces provided

13. a) An object is released to fall vertically from a height of 100m. At the same time another object is projected vertically upward with a velocity of 40m/s.

i) Calculate the time taken before the objects meet. (3 marks)

ii) At what height do the objects meet? (2 marks)

b) A string of negligible mass has a bucket tied at one end. The string is 60cm long and the bucket has a mass of 45g. The bucket is swung horizontally making 6 revolutions per second. Calculate:

i) The angular velocity. (2 marks)

ii) The angular acceleration. (2 marks)

iii) The tension on the string. (2 marks)
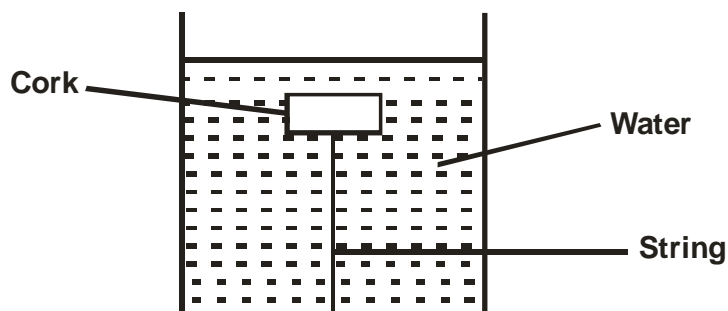
iv) The linear velocity. (1 mark)

14. a) State the law of floatation. (1 mark)

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_____

b) Figure 7 shows a piece of cork held with a light thread attached to the bottom of a beaker. The beaker is filled with water.

Figure 7

i) Indicate and label on the diagram the forces acting on the cork. (3 marks)

ii) Write an expression showing the relationship between the forces. (1 mark)

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c) A solid displaces 8.5cm^3 of liquid when floating on a certain liquid and 11.5cm^3 when fully submerged in the liquid. The density of the solid is 0.8g/cm^3, determine:
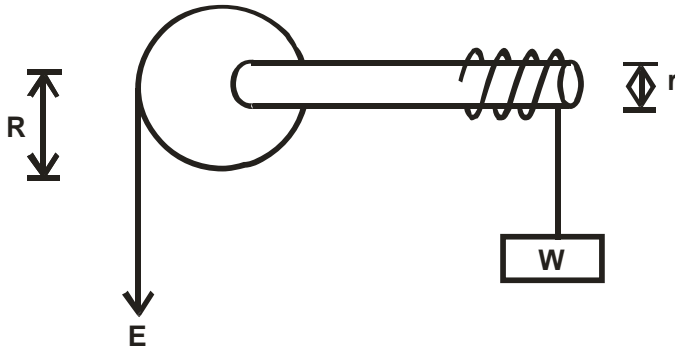
i) Upthrust on the solid when floating. (3 marks)

ii) Density of the liquid (2 marks)

15. a) A machine is a device that enables work to be done more easily and conveniently.

   State **two** ways in which a machine ensures this. (2 marks)

   _____

   _____

   b) The figure below shows a simple machine being used to raise a load W by applying an effort E.

   i) Name the machine. (1 mark)

   _____

   ii) Show that the velocity ratio (V.R) of the machine is given by $\dfrac{R}{r}$. (3 marks)

   iii) Given that r =11cm and R = 99cm, determine the effort E required to raise a load of 2800N
       if the efficiency (η) of the machine is 95%. (4 marks)

   c) Explain why as the load increases the value of mechanical advantage of a machine approaches

the value of the velocity of the machine. (1 mark)

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16. a) What is meant by specific latent heat of vaporization of a substance? (1 mark)

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b) In an experiment to determine the specific latent heat of vaporization of water, steam at 100^0C was passed into water contained in a well lagged copper calorimeter. The following measurements were made:
   - Mass of calorimeter = 55g
   - Initial mass of water = 75g
   - Final mass of calorimeter + water + condensed steam = 133g
   - Final temperature of the mixture = 30^0C.
   Specific heat capacity of water = 4200J/Kg/K.
   Specific heat capacity of copper = 390J/Kg/K.
   Determine the:

   i) Mass of condensed steam (1 mark)

   ii) Heat gained by the calorimeter and water if the initial temperature of the calorimeter + water = 20^0C (2 marks)

   iii) Given that L is the specific latent heat of vaporization of steam.
   (I) Write an expression for the heat given out by steam. (2 marks)

   (II) Determine the value of L. (2 marks)

c) (i) State the pressure law of an ideal gas. (1 mark)

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(ii) A gas container of volume $1.5\times10^{-5}m^3$ contains an ideal gas at a temperature of 27^0C and pressure 1.0×10^5 pa. Determine the volume of the gas when cooled to 17^0C and its pressure raised to 1.5×10^5 pa. (3 marks)

17. In an experiment to estimate the size of oil molecule an oil drop of diameter 0.05cm spreads over water to form a circular patch whose diameter is 15cm.

a) Explain why the oil spreads over water. (1 mark)

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b) Determine:

i) Volume of the drop. (2 marks)

ii) Area of the patch. (2 marks)

iii) Size of the oil molecule. (3 marks)

c) State **two** assumptions made in b)(iii) above. (2 marks)

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