

NAME: ADM NO: CLASS:

CANDIDATE SIGNATURE: DATE:

1
PHYSICS
FORM 4 PAPER 1
MARCH 2019
DURATION
1 HOUR
TERM 1

KENYA CERTIFICATE OF SECONDARY EDUCATION EXAMINATION

INSTRUCTIONS TO CANDIDATES

- Write your name, admission number and class in the spaces provided above.
- Sign and write the date of examination in the spaces provided above.
- This paper consists of two sections A and B.
- Answer all questions in section A and B in the spaces provided.
- All working must be clearly shown in the spaces provided.
- Non-programmable silent electronic calculators may be used.

FOR EXAMINERS USE ONLY

Question	Maximum score	Candidate score
1-11	25	
12	9	
13	9	
14	9	
15	9	
16	9	
17	9	
TOTAL	80	

The paper consists of 14 printed pages, candidate should check the question paper to ensure that all pages are printed as indicated and no questions are missing.

SECTION A (25mks)

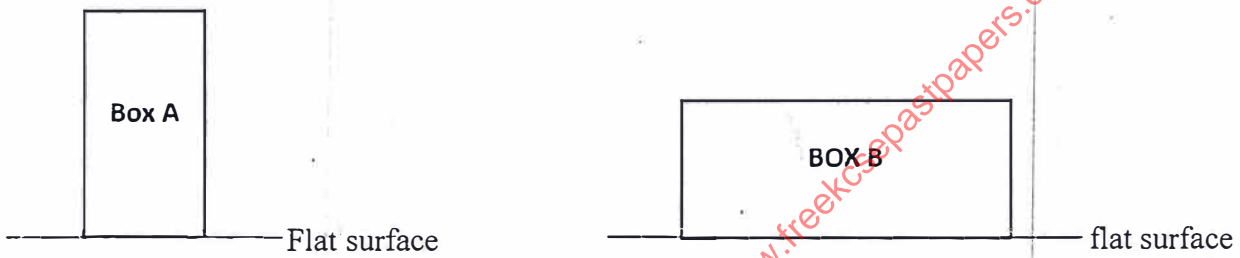
1. A drug manufacturer gives the mass of the active ingredient in a tablet as 15mg. Express this quantity in Kilogram and standard form (2mks)

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2.State **two** assumptions taken when deriving equation of continuity (2mks)

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3. State with a reason, which box will exert more pressure on the flat surface if they have equal weight (2mks)

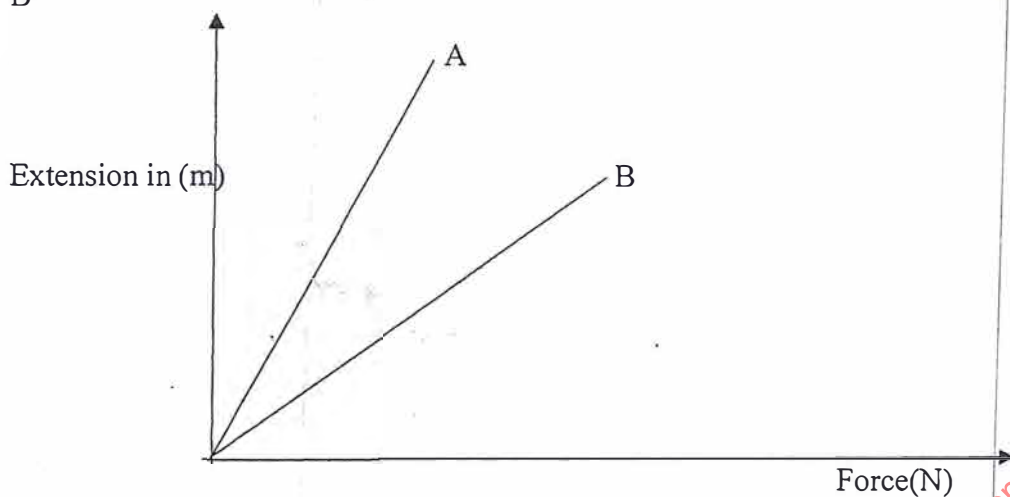


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4.State the conditions necessary for a body to attain the state of equilibrium (2mks)

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5 The sketches in the figure below shows the variation of extension with force for springs A and B



State with a reason which spring has a higher spring constant.

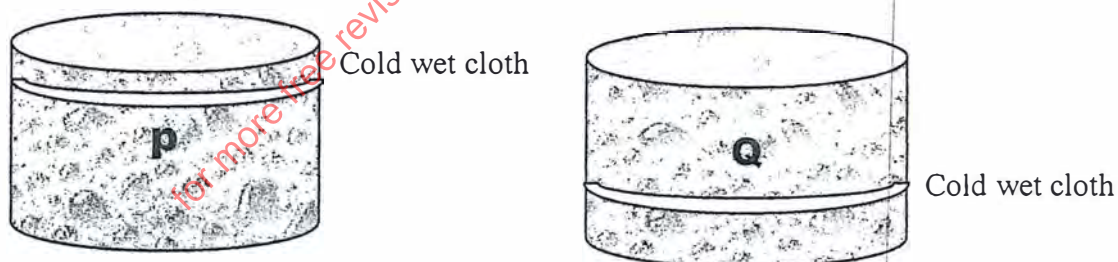
(2mks)

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6. The figure below shows two identical beakers P and Q full of waters at 90°C . Two similar wet clothes are wrapped, One around the top of P and the other around the bottom of Q



State with a reason, the beaker in which the water cools faster.

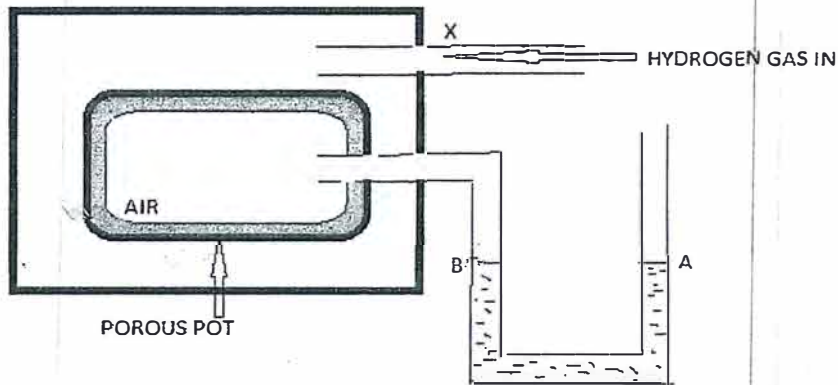
(2mks)

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7. A porous pot containing air is connected to a water manometer. When hydrogen gas is fed into the pot through tube X, it is observed that water in tube B lowers while that in tube A rises up.



Explain this observation

(2mks)

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8 (a) Draw a diagram to represent a scale of a micrometer screw gage of thimble scale 50 divisions and reading **0.369cm**

(2mks)

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(b) Determine the actual reading if the micrometer screw gage has a zero error of **-0.06mm**

(1mk)

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9. Explain why furniture may make a creaking sound at night after a warm day

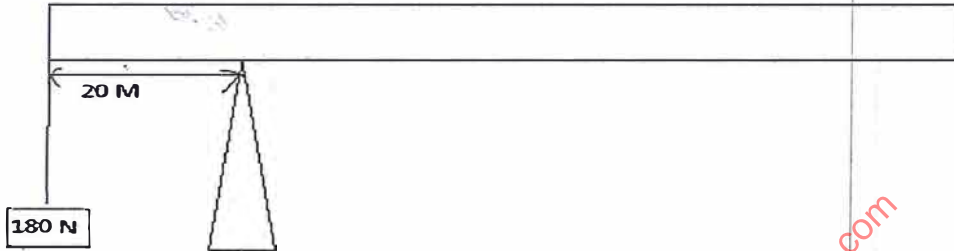
(2mks)

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10 The figure below shows a uniform wooden plank of weight 60N with a weight of 180N suspended from one of its ends. The plank is 80m long and the pivot is placed at the 20m mark.



Determine the weight that should be placed on the other end in order to balance the wooden plank.

(3mks)

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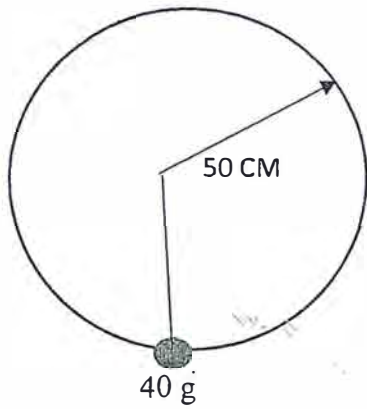
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11. A stone of mass 40g is tied to the end of a string 50cm long. It is whirled in a vertical circle at 2rev/s. The string breaks at its low of level as shown,



what is the linear speed with which it travels.

(3mks)

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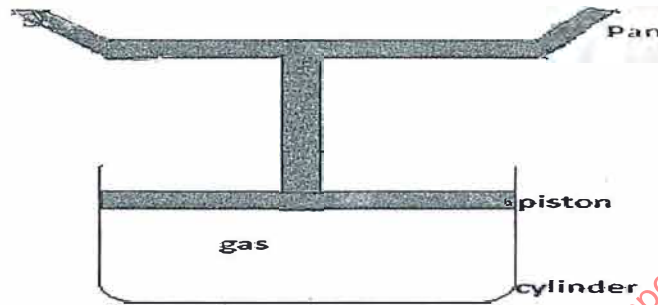
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SECTION B (55mks

12. (a) state Boyle's law

(1mk)

(b) You are provided with a large cylinder of uniform cross-section in which a gas is enclosed by a movable frictionless piston. At the end of the piston is attached a pan as shown in figure below.



You are also provided with various masses and a metre rule. Describe how the set up may be used to demonstrate the variation of the volume of the gas with pressure at constant temperature

(5mks)

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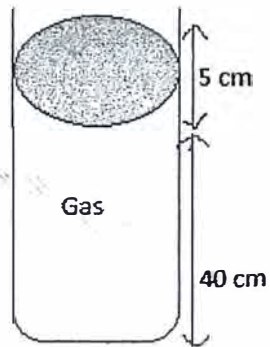
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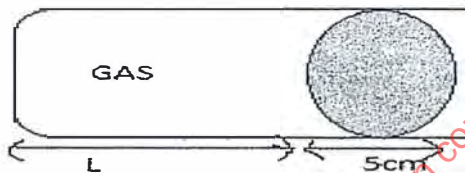
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(e) A column of air 40cm long is trapped in a tube of uniform cross-section area by a column of mercury of length 5cm as shown below.



If the atmospheric pressure is 750mm of mercury determine the length of air column when the tube is horizontal as shown below. (3mks)



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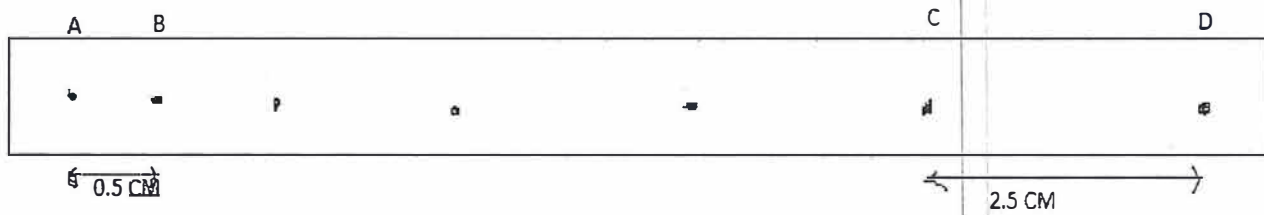
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13 The figure below shows the motion of trolley on a ticker timer. The ticker timer has a frequency for 50Hz.



(a) (i) Calculate the initial velocity between A and B (2mks)

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(ii) Calculate the final velocity between C and D (2mks)

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(iii) Calculate the acceleration of the trolley during the motion (2mks)

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(b) A ball is dropped from the top of a vertical cliff 45m high. Given that the velocity just before striking the sandy beach is 30m/s and the ball penetrates the sand to a depth of 10cm. Determine its average retardation. (3mks)

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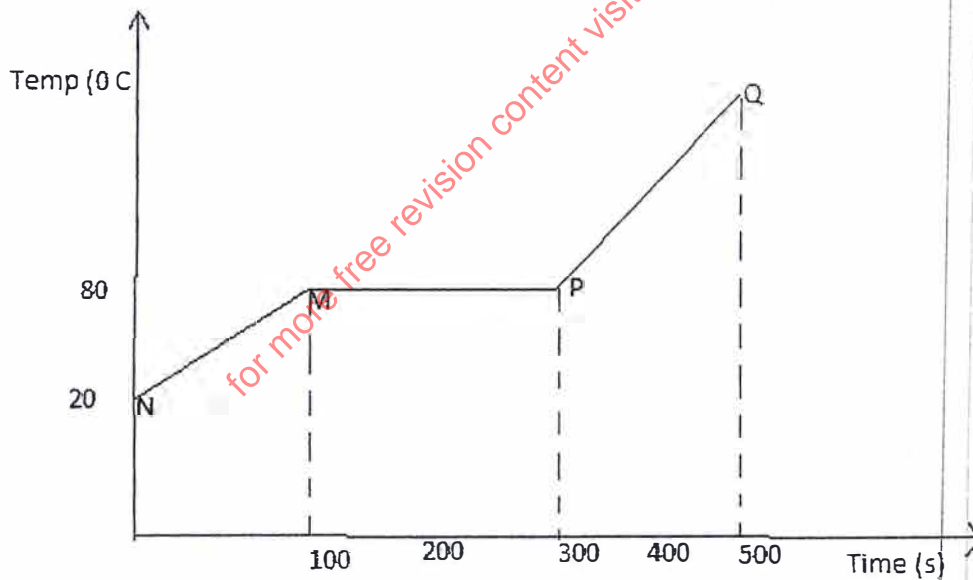
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14(a) Give a differences between boiling and evaporation (1mk)

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(b) A solid of mass 1kg was heated uniformly by a 100W heating element until it melts. The graph in the figure below shows variation of temperature with time.



(i) Explain what is happening in the regions

NM.....
.....(1mk)

MP

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..... (1mk)

(ii) Calculate the specific heat capacity of the solid

(2mks)

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(iii) Calculate the specific latent of heat of fusion of the solid

(2mks)

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(c) A substance of mass 2kg and specific heat capacity 400J/kgK initially at 80°C is immersed in water at 19°C. If the final temperature of the mixture is 20°C calculate the mass of water. (Specific heat capacity of water is 4200J/kgK) (3mks)

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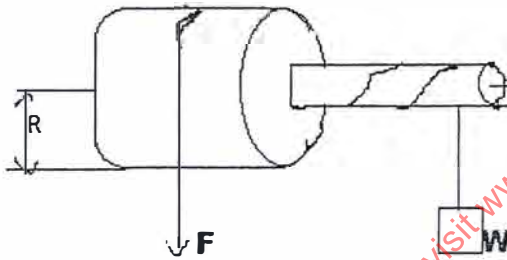
15(a) define the term velocity ratio of a machine

(1mk)

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(b) An electric motor raises a 60kg mass at a constant velocity. Calculate the power of the motor if it takes 4 seconds to raise the mass through a height of 20m (3mks)

(c) The figure below 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 below.



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

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

(d) In a car, the engine drives an alternator which produces electricity that lights the headlights.
List energy changes involved (1mk)

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16(a) State Newton's second Law of motion (1mk)

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(b) A trolley of mass 5kg travelling to the right at 2m/s collides heads on with another trolley of mass 3kg travelling at 4m/s to the left. Find their velocity after collision if the collision is perfectly in elastic (3mks)

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(c) A bullet of mass 2g is fired with a velocity of 300m/s into a wooden block of mass 5kg suspended from a long string. The bullet sticks into the wood and the two moves together.

(i) Find the velocity of the block and the bullet immediately after the collision took place. (2mks)

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(ii) Calculate the height to which both swings upwards

(3mks)

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17(a) State Archimedes principle

(1mk)

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(b) A solid displaces 7.0cm^3 when floating on a certain liquid and 10cm^3 when fully submerged in the same liquid. The density of the solid is 0.8g/cm^3 , determine;

(i) Up thrust on the solid when floating

(2mks)

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(ii) Density of the liquid

(2mks)

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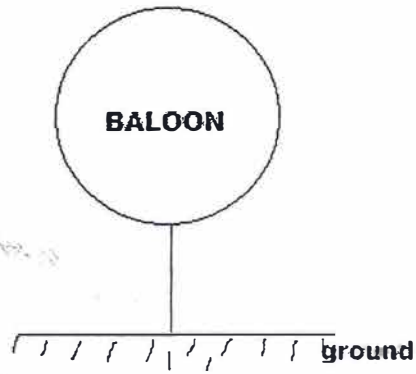
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(c) The figure below shows a balloon whose Fabric has a mass of 100kg. The balloon is inflated with 200cm^3 of helium. The balloon is attached to a string fixed to the ground as shown. (Density of air and helium are 1.25kg/m^3 and 0.2kg/m^3 respectively)



(i) Indicate all the forces acting on the balloon.

(1mk)

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(ii) Calculate the tension on the string

(3mks)

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END

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BLESS THE WORK OF YOUR HANDS**