Name:…… Index Number:..……/…… Adm No……

232/1
PHYSICS
Paper 1
2 Hours
June 2010

KASSU JOINT EVALUATION TEST (J.E.T)

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

PHYSICS
Paper 1
2 Hours

- This paper consists of Two sections: A and B.
- Answer ALL questions in section A and B in the spaces provided.
- All workings MUST be clearly shown.
- Mathematical tables and silent non programmable Electronic calculators may be used.

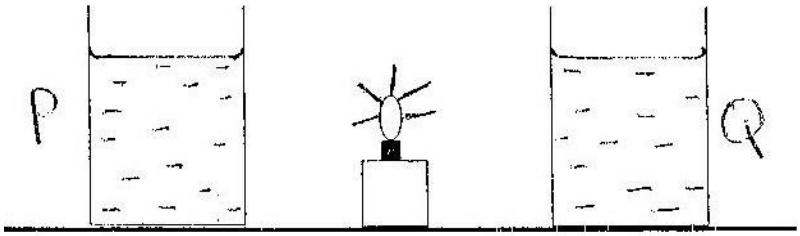
For Examiner's Use Only

Section	Question	Maximum score	Candidate's score
A	1-11	25	
B	12	14	
	13	7	
	14	12	
	15	11	
	16	11	
	Total Score	**80**	

This paper consists of 11 printed pages, candidates should check to ensure that all the pages are printed and no page is missing.

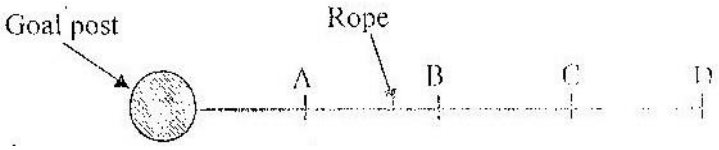
SECTION A (25 MARKS)

1. State two conditions necessary for a rigid body to be in equilibrium. (2mks)
2. An empty density bottle has a mass of 23.5g. When completely filled with water its mass is 39.0g. What will be its mass if it is completely filled with an acid of relative density 1.25? (Take the density of water to be $1.0gcm^{-3}$) (3mks)
3. (a) Define the term elastic limit of a material. (1mk)
   (b) Two springs of negligible weight and of spring constants $100Nm^{-1}$ respectively are connected end to end and suspended from a fixed point. Determine;
      (i) The total extension when a mass of 7.5 kg is hung from the lower end. (2mks)
      (ii) The force constant of the combination of springs. (2mks)
4. Equal amount of hot water at 78^0C is poured into vessels P and Q as shown below and left to cool up to room temperature. P is painted black and Q is polished.



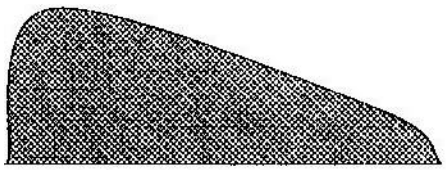
The readings of temperature are taken at intervals of five minutes. On the same axes sketch the graph of temperature against time. (2mks)

5. During a P.E lesson students loosely tied a rope to a goal post and arranged themselves at points A, B, C and D along the rope as shown below.



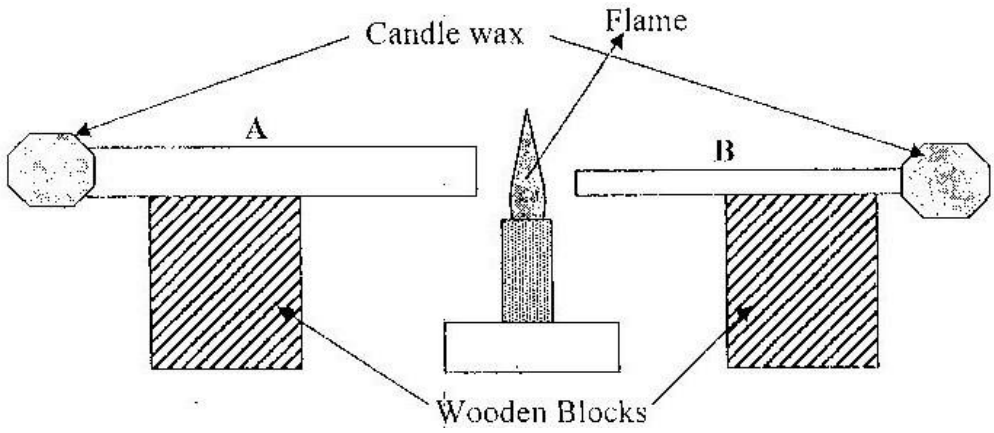
The students then went round the goal post holding the rope in their hands and ensuring that it remained tight and straight. State and explain the observations made by the students in respect to their relative speeds. (2mks)

6. The diagram below shows s section of the wing of a light aircraft taking off from Wilson airport Nairobi.



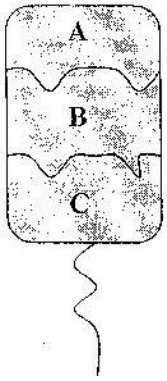
Briefly explain why the wing is of the shape shown. (2mks)

7. Two rods of copper A and B of the same length but different thickness with candle wax attached to either end are placed on wooden blocks and heated as shown below.



On which of the copper rods will the candle wax melt first? Explain your answer. (2mks)

8. The diagram below shows a wire loop with two threads tied across it. The loop is dipped into a soap solution such that the soap film covers it as shown.

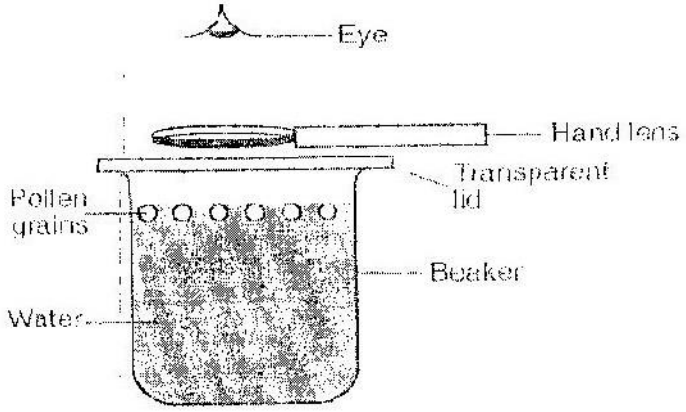


Region B is punctured such that the soap film in that section is broken. On the space alongside the diagram sketch the resulting shape of the wire loop. Give a reason for the shape. (2mks)

9. Give any two evidence of the unusual expansion of water. (1mk)

10. A trolley is moving at uniform speed along a straight horizontal path. A piece of plasticine is dropped on the trolley and sticks on it. State and explain the resultant motion of the trolley. (2mks)

11. A student observed some pollen grains on the surface of water in a beaker as shown below.

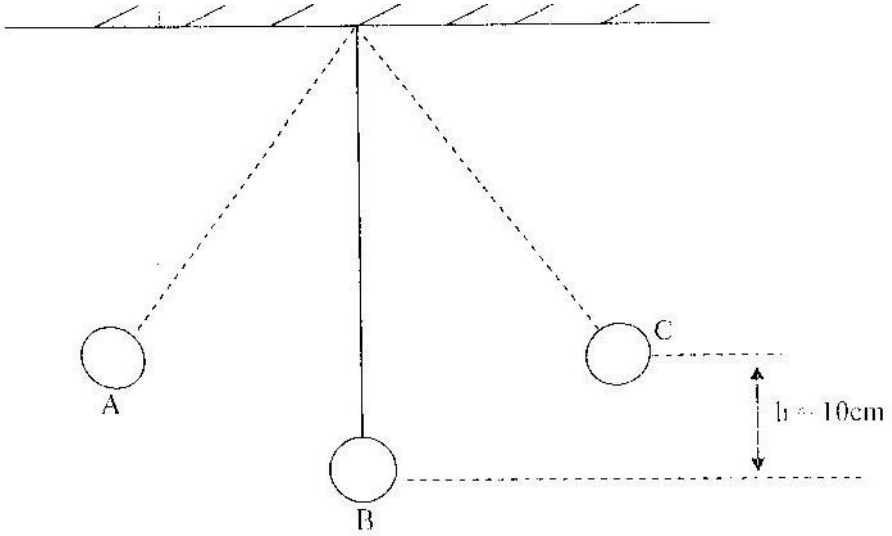


(i) State the observation made (1mk)

(ii) Explain the observation in (i) above (1mk)

SECTION B (55 MARKS)

12. (a) The diagram below shows a pendulum bob swinging freely to and fro.



(i) State the position where the pendulum bob has maximum kinetic energy (1mk)

(ii) Determine the velocity of the bob at position identified in a (i) above if the maximum vertical displacement of the bob is 10cm. (3mks)

(b) (i) What is meant by perfectly inelastic collision? (1mk)

(ii) A minibus of mass 1600kg traveling at a constant velocity of 20m/s collides with a stationery car of mass 800kg. The impact takes 2 seconds before the two moves together and come to rest after 15 seconds. Determine;

(I) The common velocity (3mks)

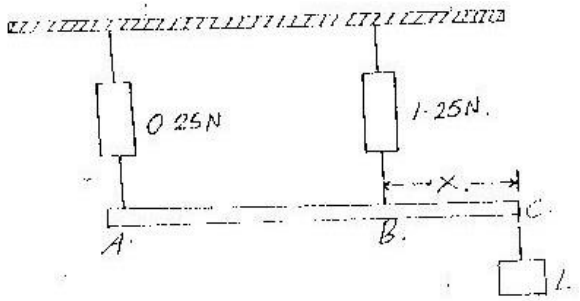
(II) The distance moved after the impact (3mks)

(III) The impulse force (3mks)

13. (a) State the principle of moments (1mk)

(b) Give one application of moments of force (1mk)

(c) The figure below shows a uniform metre rule of weight 1.0N suspended from spring balances. A load is attached to the extreme right hand end C. The spring balance attached to the extreme left hand end of the rule (A) reads 0.25N. The spring balance attached at B a distance X from the right hand end reads 1.25N.



(i) Calculate the weight of load L (2mks)

(ii) Determine the value of distance X by taking moments about A (3nks)

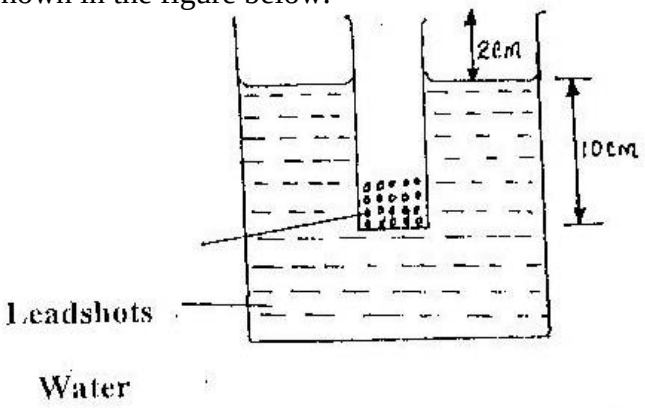
14. (a) State Archimedes' principle. (1mk)

(b) A solid Y weighs 40N in air, 30N when in water and 35N in liquid X. Find the density of;

(i) Solid Y (2mks)

(ii) Liquid X (3mks)

(c) A simple hydrometer is set up with a test – tube of mass 10g and length 12cm with a flat base and partly filled with lead shots. The test tube has a uniform cross-sectional area 2.0cm^3 and 10cm of its length is under water as shown in the figure below.



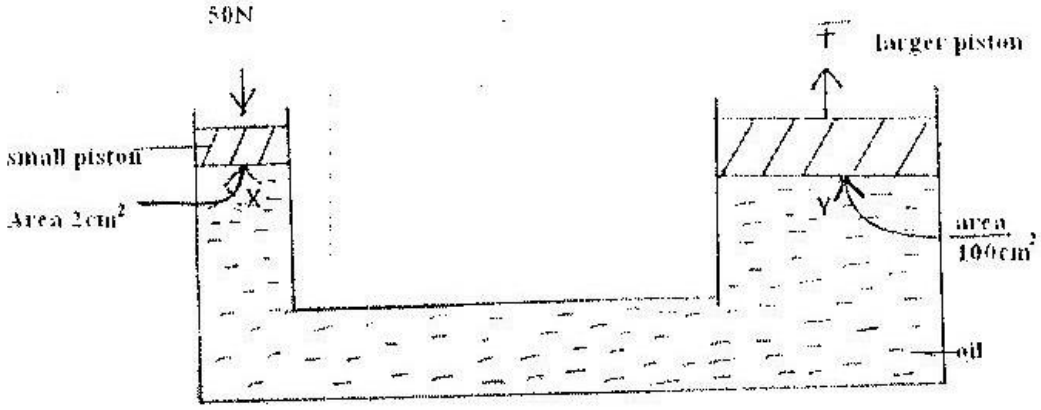
(i) Taking the density of water as 1000Kg/m^3. Calculate the mass of the lead shots in the test tube. (3mks)

(ii) The mass of the lead shots to be added if it has to displace an equal volume of a liquid of density 1.25g/cm^3. (3mks)

15. (a) (i) Explain why a liquid and not a gas must be used as the 'fluid' in a hydraulic machine. (1mk)

(ii) State one other important property of a liquid to hydraulic machine depends on (1mk)

(b) The diagram below shows the principle of the hydraulic car jack.



(i) If a force of 50N is applied to the smaller piston; calculate the pressure produced in the oil at X. (2mks)

(ii) What is the pressure of the oil at Y? (1mk)

(iii) Determine the velocity ration of the hydraulic jack (2mks)

(iv) Using the information the figures determine;

(I) The M.A (2mks)

(II) The efficiency (2mks)

16. (a) State one reason why diffusion in gases is faster than diffusion in liquids. (1mk)

(b) In an experiment to estimate the diameter of an oil molecule, an oil drop of radius $2.5x10^{-4}$m spreads over a circular patch whose diameter is 20cm. Determine:

(i) The volume of the oil drop. (3mks)

(ii) The area of the patch covered by the oil (3mks)

(iii) The thickness of the oil molecule (3mks)

(c) State one assumption made in (b) (iii) above (1mk)