NAME..... INDEX NO.....

GATUNDU SOUTH FORM FOUR JOINED EVALUATION EXAM

232/1
PHYSICS
PAPER 1
JULY/AUGUST 2016
TIME: 2 HOURS

KENYA CERTIFICATE OF SECONDARY EDUCATION
GATUNDU SOUTH JOINED EVALUATION EXAM

INSTRUCTIONS TO CANDIDATES

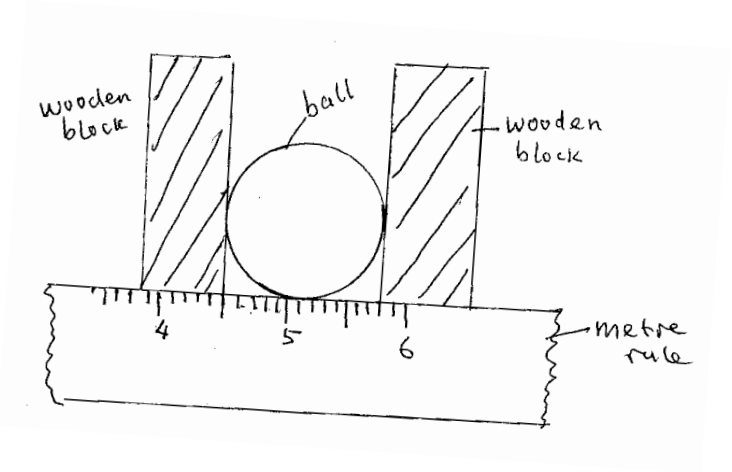
- Write your name and index number in the spaces provided above.
- This paper consists of two sections A & B.
- Answer ALL questions in section A and section B in the spaces provided.
- All working must be clearly shown in the spaces provided.
- None programmable silent electronic calculators and KNEC Mathematical tables may be used.
- Take:
  - g = 10m 5^{-2}
  - Specific heat capacity of copper = 400 J/kgk^{-1}
  - Specific heat capacity of oil = 2400 J/kgk^{-1}
  - Specific latent heat of fusion of ice = 336000 J/kg

FOR EXAMINERS USE ONLY

Section	Question	Maximum score	Candidates score
A	1 – 10	25	
B	11	8	
	12	6	
	13	11	
	14	10	
	15	11	
	16	9	
TOTAL		80	

SECTION A (25 MARKS)

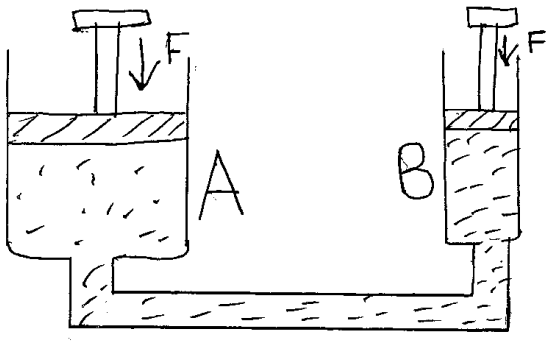
1. The figure below shows a spherical ball placed between 2 wooden blocks and a metre rule.



What is the volume of the ball? (3 Mks)

2. A solid weighs 16.5N on the surface of the moon. The force of gravity on the moon is 1.7N/kg. Determine the mass of the solid. (2 Mks)

3. The figure below shows two cylinders containing a liquid and connected with a tight – fitting flexible tube. The cylinders are fitted with air – tight pistons A and B as shown.



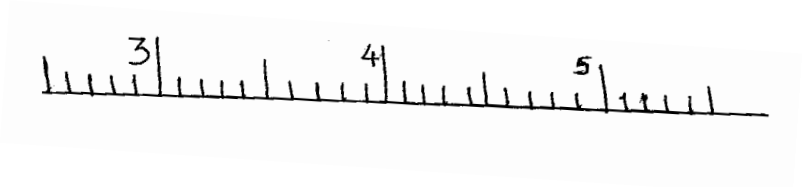
When equal forces, F are on the pistons as shown, what is observed. Explain the observation. (3 Mks)

4. A bottle of soda stands on a bench. As the temperature of the surrounding rises the temperature of the bottle also rises. State and explain the effect of this on the stability of the bottle. (3 Mks)

5. Explain how heat loss by ;
   (i) Radiation is minimized in a vacuum flask. (1 Mk

(ii) Conduction is minimized in a vacuum flask. (1 Mk)

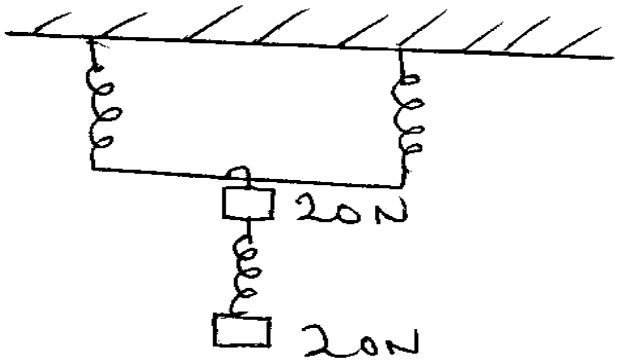
6. The figure below shows part of the main scale of vernier valipers.



Insert the vernier scale to the main scale, to show a reading of 3.62 C.M (1 Mk)

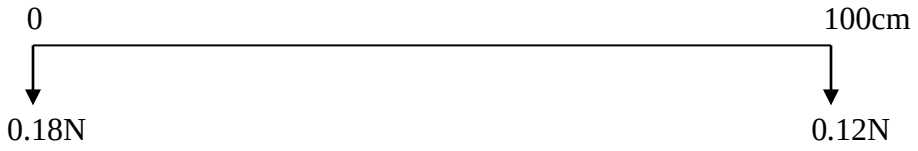
7. A liquid flows into a pipe of varying cross sectional area. The inlet cross section is 10cm in diameter. If the liquid leaves the pipe at $0.5m^3/_s$ find the inlet velocity of the liquid. (3 Mks)

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



Determine the constant of each spring. (2 Mks)

9. The figure below shows a uniform metre rule of weight 1N with two weights 0.18N and 0.12N suspended from its ends.



Determine how far from the 0.18N weight a pivot should be placed in order to balance the metre rule. (3 Mks)

10. An athlete runs at 4m/s from point A to point B and immediately turns and runs back from B to A with a speed of 8m/s. Calculate the average speed of the athlete. (3 Mks)

SECTION B: 55 MARKS.

11. (a) In a car, the engine drives an alternator which produces electricity that lights the headlights. List the energy changes involved. (3 Mks)

(b) What is the power output of a pump which can raise 60kg of water to a height of 10m every minute. (3 Mks)

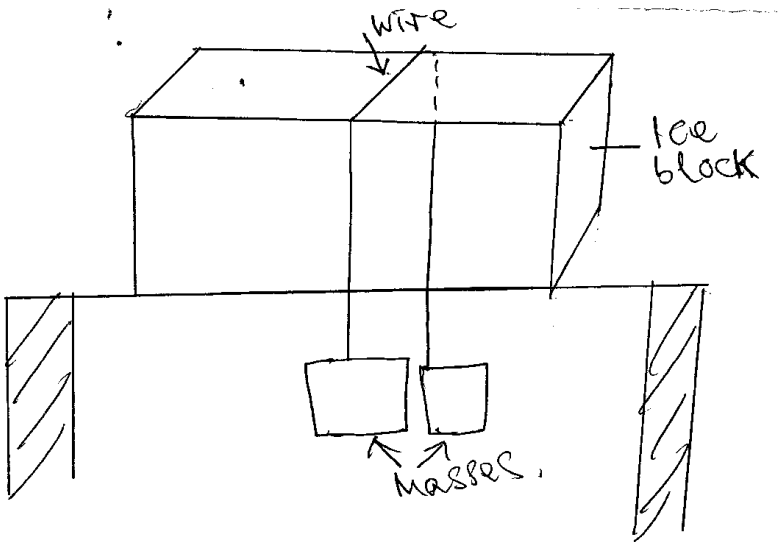
(c) If the efficiency of the pump in 11(b) is 80%, how much power must be supplied (2 Mks)

12. (a) A mass, 5kg moving with a velocity of 10m/s collides with a 10kg mass moving with a velocity of 4m/s in the same direction along the same line. After collision, the 5kg mass moves with a velocity of 7.0m/s. Calculate the velocity of the 10kg mass. (3 Mks)

(b) Explain why a steel ball falling through oil, will first accelerate after which the acceleration falls to zero. (3 Mks)

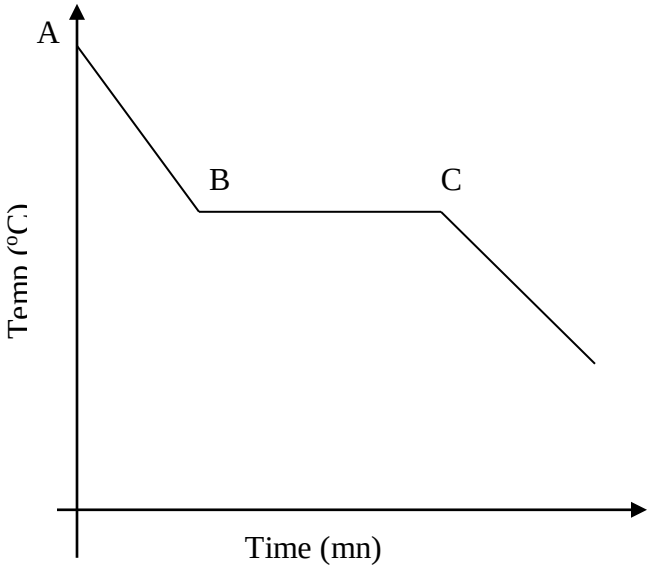
13. (a) State one factor that affects the rate of evaporation. (1 Mk)

(b) A thin wire is passed round a large block of ice and two heavy weights are attached to the ends. It is observed that the wire passes through and the ice remains as a single block.



Explain the observation. (2 Mks)

(c) The graph below shows the cooling curve of naphthalene.



State what is happening at points;

(i) A – B. (1 Mk)

(ii) B –C. (1 Mk)

(d) A copper calorimeter of mass 50g contains 80g of oil at 25°C.
A piece of ice of mass 25g at 10°C is added to the oil. What mass of ice will be left when the temperature of the calorimeter and its contents will be 0°C. (6 Mks)

14. (a) An air bubble of volume 0.5cm^3 when released from the bottom of a lake rises to the surface of the lake.

(i) Explain why the bubble rises up. (2 Mks)

(ii) Calculate the volume of the bubble at the surface of the lake given that the lake is 92.7m deep and the atmospheric pressure is equivalent to 10.3m of water pressure. (4 Mks)

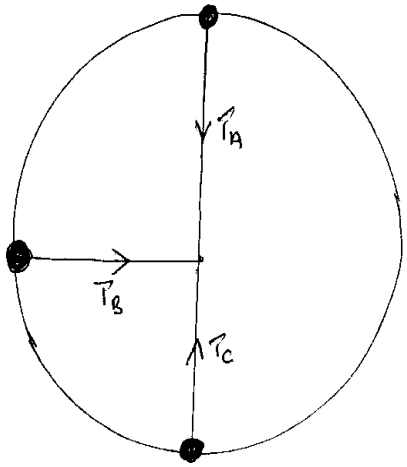
(iii) What assumption have you made in arriving at your answer? (1 Mk)

(b) A fixed mass of gas at constant pressure has a volume of 600cm^3 at 0^{o}C. At what temperature will its volume be 1099 cm^3. (3 Mks)

15. (a) (i) Define centripetal force. (1 Mk)

(ii) Explain why no work is done by a centripetal force acting on a body moving in a horizontal plane. (1 Mk)

(iii) A body of mass m is tied to a string in a vertical plane with a constant speed V. Tensions in the string at positions A, B and C marked T_A, T_B and T_C respectively. Arrange the tensions T_A, T_B and T_C in ascending order. (1 Mk)



(iv) Explain why wet clothes put in a spin dryer, drys faster when the spin drum is rotated at a higher speed. (2 Mks)

(b) A particle revolves at a frequency of 5 H3 in a horizontal circle of radius 2m.

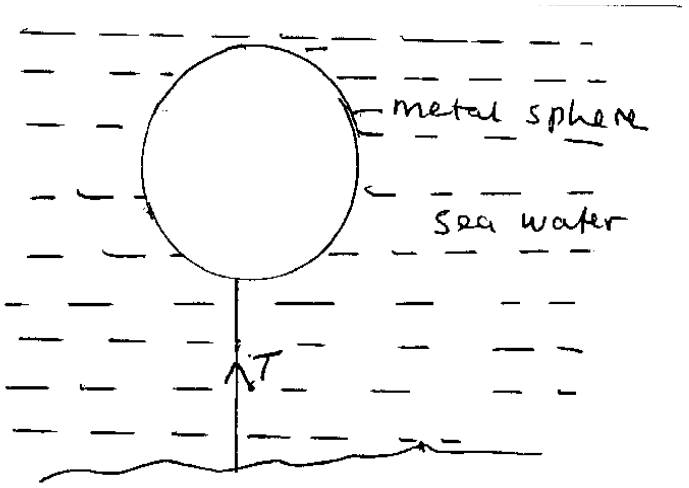
Determine its;

(i) angular velocity. (2 Mks)

(ii) Linear velocity. (2 Mks)

(iii) Centripetal acceleration. (2 Mks)

16. The figure below shows a metal sphere of mass 400kg and volume $0.6m^3$ fully submerged in sea water of density $1030kg/m^3$



Determine;

(a) The tension in the cable holding the sphere. (4 Mks)

(b) The radius of the sphere. (2 Mks)

(c) The weight of a solid in air is 5N. When it is fully immersed in a liquid of density $800kg/m^3$ its weight is 4.04N.

Determine;

(i) The upthrust of the liquid. (1 Mk)

(ii) The volume of the solid. (2 Mks)