Name:……..Index No:……

232/1
Physics
Paper 1
July / August – 2013
Time: 2 ½ Hours

SUPA JET
Kenya Certificate of Secondary Education
Physics
Paper 1
July / August – 2013
Time: 2 Hours

Instructions.

- Write you name and index number in the spaces provided
- This paper consists of two sections, **A** and **B**.
- Answer **all** the questions in the spaces provided.
- All working must be clearly shown in the spaces provided in this booklet.
- Mathematical tables and electronic calculators **may** be used.

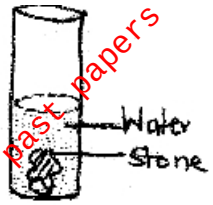
For Examiners Use Only

Section	Question	Maximum Score	Candidates' Score
A	1 – 13		
B	14 15 16 17 18		
	Total Score		

SECTION A – (25 Marks)

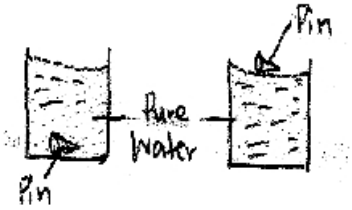
Answer all the questions in this section in the spaces provided.

1. The figure shows a glass container with a cross sectional area of $20cm^2$. A stone of mass 120g is completely immersed in the water and the level of water and the level of water rises by 2cm.



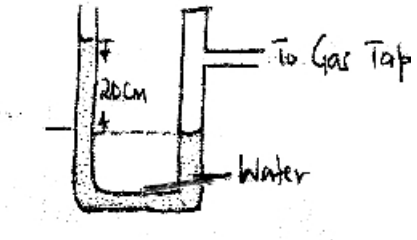
Determine the density of material which makes the stone. (2 mks)

2. A student placed two steel pins on the surface of water as shown in figure 2 (a) and 2 (b) below. He observed that the pin placed in (a) sunk while in (b) floated.



If the student never pierced the surface of water. Explain the observation. (2 mks)

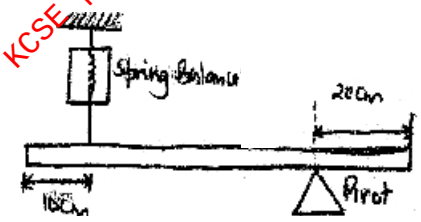
3. The figure below shows a U-tube manometer containing water. One arm is connected to gas supply. Given that the atmospheric pressure is $1.0x10^5N/m^2$ and density of water is $1000kg/m^3$. Determine the height which could be supported if water was replaced with glycerine of density $1.26g/cm^3$. (3 mks)



4. Explain using kinetic theory of gases why pressure of gases increase as temperature of the gas is increased. (2 mks)

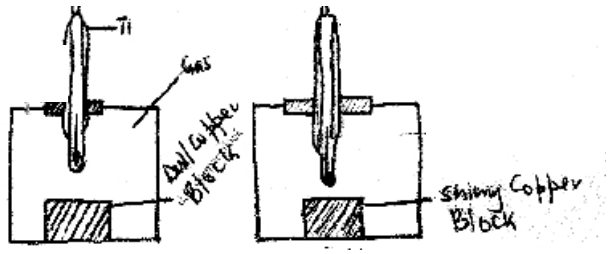
5. State the force which causes tides in the seas. (1 mk)

6. The figure below is a uniform metre rule pivoted near the end. It is kept in equilibrium by spring balance.



If the reading indicated by the spring balance is 1.2N, determine the weight of the metre rule. (3 mks)

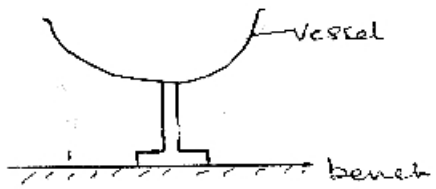
7. Two copper blocks of same mass and volume are heated upto 150^{o}c and then transferred into glass boxes as shown.



a) State the observation made on the reading of thermometer T_1 and T2 after 5 minutes. (1 mk)

b) Explain the observation stated in (a) above. (2 mks)

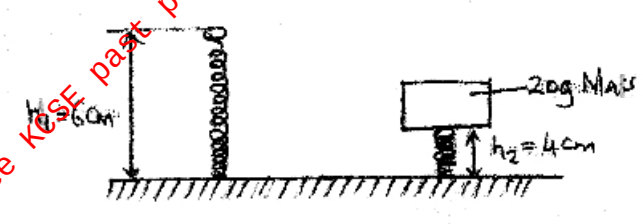
8. Figure 2 shows a vessel resting on a horizontal bench.



(i) State the effect on the stability of the vessel when it is filled with water. (1 mk)

(ii) Explain your answer in (i) above. (2 mks)

9. Figure 5 shows two springs placed on a flat surface.



Determine the elastic potential energy stored in the spring. ($g = 10Nkg^{-1}$) (3 mks)

10. State one way of increasing sensitivity of mercury in glass thermometer. (1 mk)

11. A bottle containing ammonia solution is placed at the back of the laboratory. **Give a reason** why its smell may not be detected in other parts of the laboratory if the temperature of the solution is kept very low. (2 mks)

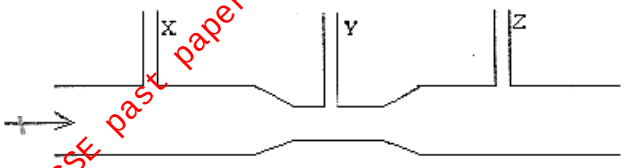
12. Define the term streamline flow. (1 mk)

13. Explain why a drop of methylated spirit placed at the back of hand feels colder than a drop of distilled water at the same temperature. (2 mks)

SECTION B – (55 Marks)

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

14. a) Figure 4 below represents a tube through which liquid is flowing in the direction shown by the arrow.



On the diagram show the relative position of the level of the liquid in sections marked x, y and z. (1 mk)

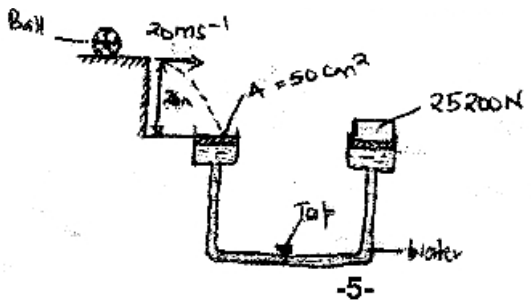
b) A lawn sprinkler has 20 holes each of cross-sectional area 2 x 10^{-2}cm^2 is connected to a hose pipe of cross-sectional area 2.4cm^2. If the speed of water in the hose pipe is 1.5m/s.

(i) Calculate the flow rate in the hose pipe. (3 mks)

(ii) The speed of water as it emerges from the holes. (3 mks)

(iii) The mass flux in the hose pipe. Take density of water 1000kg/m3. (3 mks)

15. The figure below shows a ball of mass 50kg being thrown from a top of wall 20m high with a horizontal velocity of 20m/s. It stuck the piston A of hydraulic lift and no water splashed out. The other piston B had a weight of 25200N placed on it. Assuming the tap was opened at the time the ball stuck the piston A.



Determine;

(i) The time taken by the ball to strike the surface of piston A. (3 mks)

(ii) The distance from the foot of the wall to where it hit piston A. (2 mks)

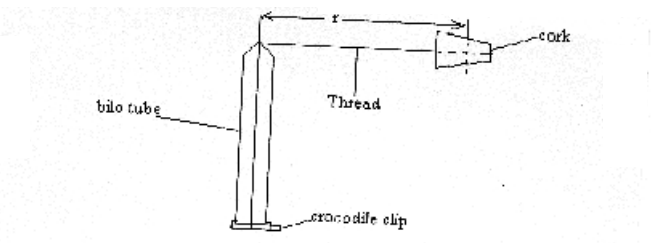
(iii) The vertical velocity with which the ball struck piston A. (2 mks)

(iv) The force with which the ball struck piston A. (2 mks)

(v) The area of piston B if the load on the piston B did not move and that the two pistons were initially at the same level. (3 mks)

16. a) Define the term angular displacement. (1 mk)

b) Figure 5 below shows a cork of mass m attached to a strong thread which passes through a biro tube. The lower end of the thread is held by a crocodile clip. The cork is swung in a horizontal plane.

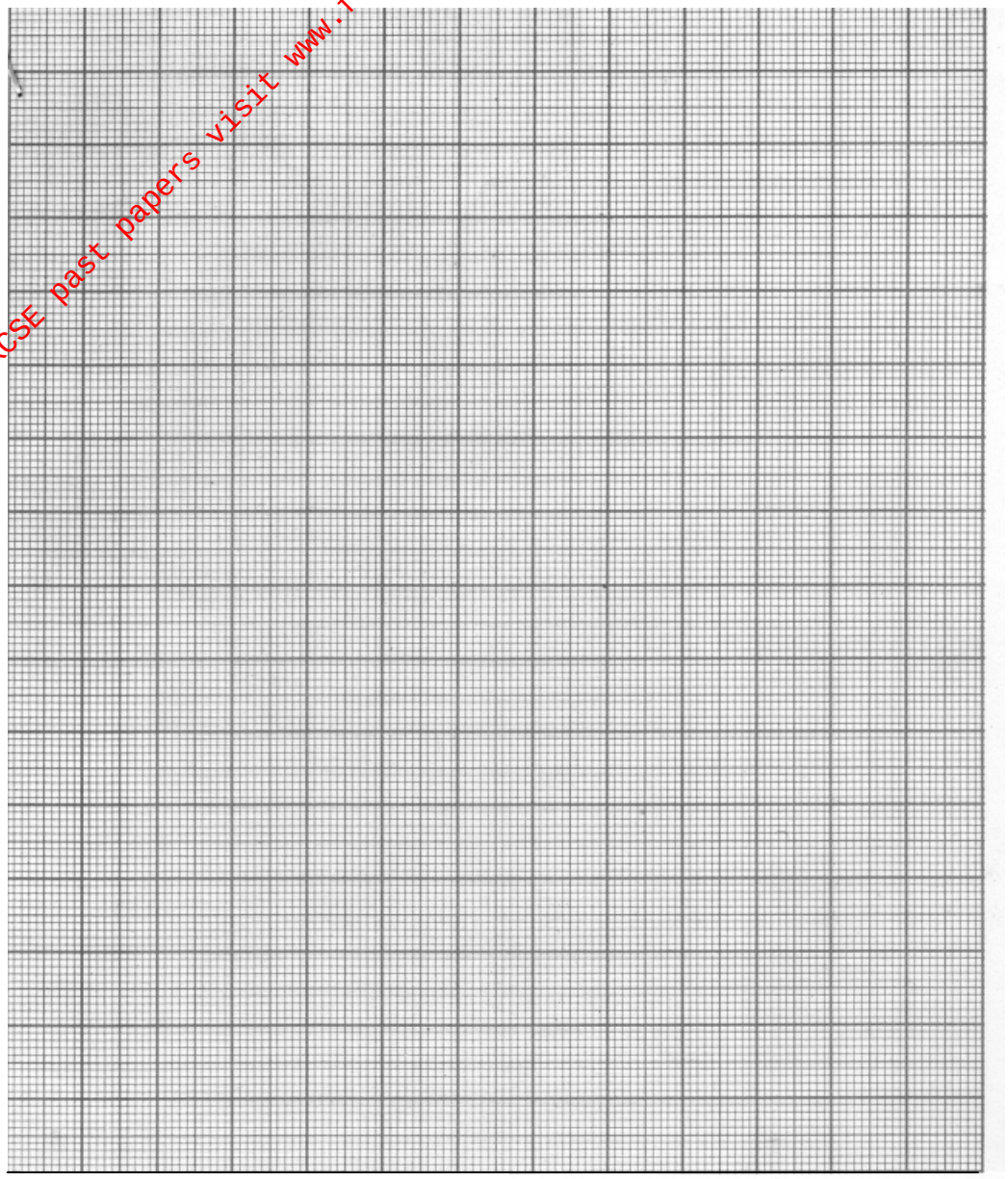


The radius r was varied with the help of the crocodile clip and the periodic time $T_{(s)}$ was determined. The table below shows the results obtained.

Periodic time $T_{(s)}$	0.49	0.56	0.63	0.69	0.74
Radius r (cm)	0.3	0.4	0.5	0.6	0.7
T^2 (s^2)					

(i) In the spaces provided fill in the values of T^2 to 2 decimal places. (1 mk)

(ii) Plot a graph of T^2 against r(m). (5 mks)



(iii) Determine the slope s of the graph. (3 mks)

(iv) Determine the constant F given that $T^2 = \frac{4m\pi^2 . r}{F}$ where mass (m) = 0.1kg. (2 mks)

17. a) State the law of floatation. (1 mk)

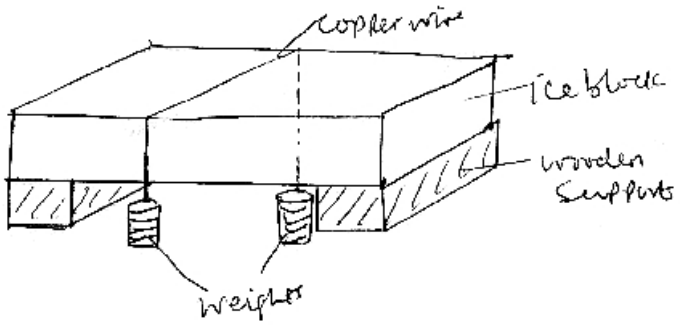
b) Explain why hydrometer has wide bulb with air in it. (2 mks)

c) A log of wood of mass 300kg floats on water, the density of wood is 750kg/m3. What is the maximum number of pupils of average weight 400N that can sit on this log without making it wholly submerge? (3 mks)

d) A wooden block of mass 375g and density 750kg/m^3 is held under water by tying it to the bottom of the container with a light thread. Determine the tension in the thread. (Density of water; e = 1000kgm^{-3}) (3 mks)

18. a) Define the term latent heat. (1 mk)

b) The figure below shows a block of ice with two heavy weights lying such that the copper wire / string connecting them pass over the block of ice.



(i) It is observed that the wire gradually cuts its way through the ice block but leaves it as one piece. Explain. (3 mks)

(ii) What change would be observed if the copper wire used in the experiment was replaced by a cotton thread? Explain your answer. (2 mks)

c) 3kg of hot water was added to 9kg of cold water at 10^{o}c and the resulting temperature was 20^{o}c. Ignoring heat gained by the container. Determine the initial temperature of the hot water. (Specific heat capacity of water – 4200J/kg/k) (3 mks)

d) State two differences between boiling and evaporation. (1 mk)