NYABURURU GIRLS' NATIONAL SCHOOL
OUR LADY OF LOURDES

Date done	
Invigilator	
Date returned	
Date revised	

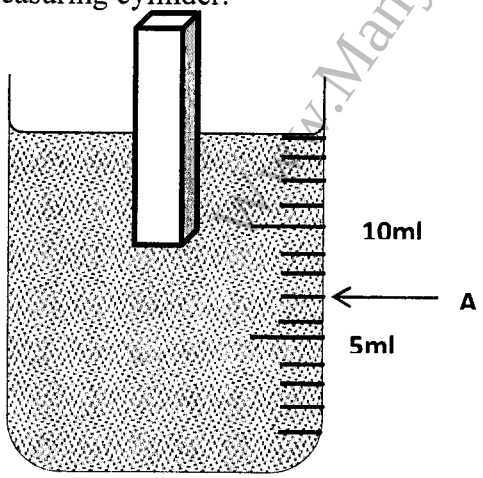
FORM ONE PHYSICS
CAT 3 TERM 2 2016
TIME: 2 HOURS

INSTRUCTIONS TO CANDIDATES

- Write your name, class and class number in the spaces provided above.
- This paper consists of two sections: Section A and B.
- Answer all questions in section A and B in the spaces provided.
- Take g = 10 Nkg^{-1}, density of mercury = 13,600Kg/m^3 and density of water = 1 g/cm^3.
- **This paper consists of 8 printed pages. Candidates should check the question paper to ensure that all the pages are printed as indicated and no questions are missing.**

SECTION A (25 MARKS)

1. The figure below shows wooden block with half of its volume immersed in water in a measuring cylinder.



Given that the mass of the wooden cylinder is 35.0g and the initial level of water was at point A. Use the diagram to answer the questions that follow.

(i) Calculate the volume of the wooden block. (2mks)

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(ii) Calculate the density of the wooden cylinder in SI units. (3mks)

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2. State any three professions which require sound knowledge of physics. (3mks)

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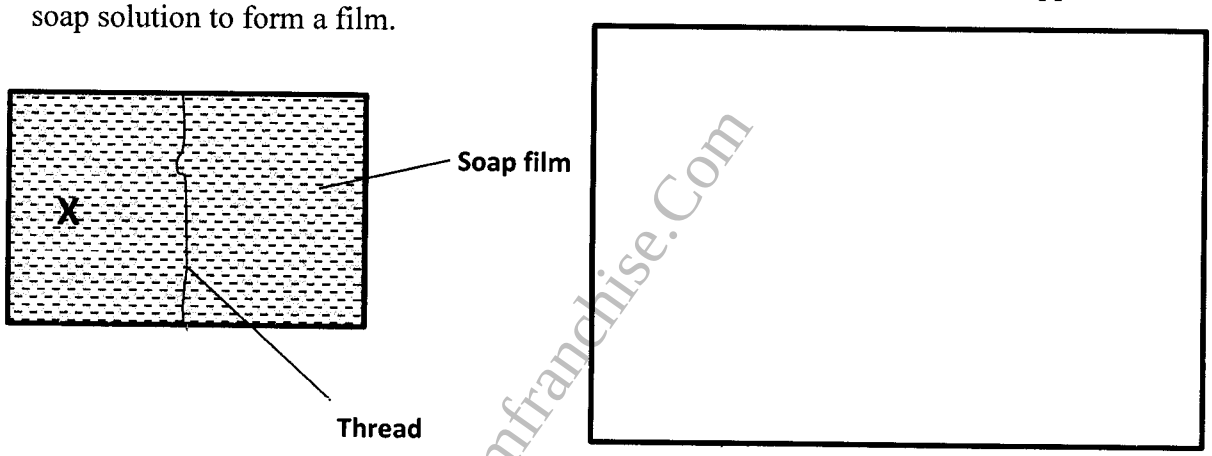
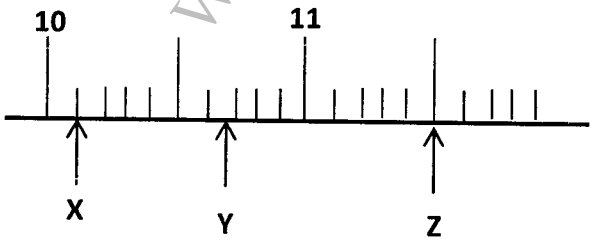
3. The diagram below shows a rectangular wire with loose thread tied in it and dipped on a soap solution to form a film.



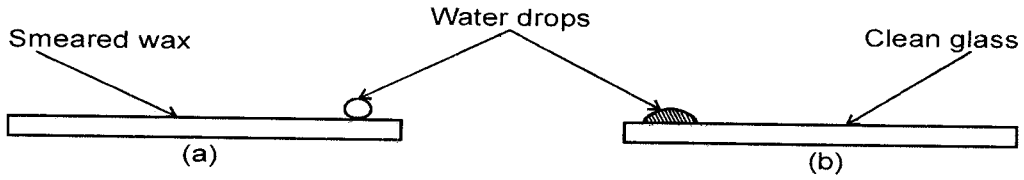
Draw a diagram on the space alongside what will be observed when the film is broken at point **X**. (2mks)

4. Indicate the reading in the following millimetre scale.



X = ... (1mk)
Y = ... (1mk)
Z = ... (1mk)

5. The figure below shows water drops on two surfaces. In figure (a) the surface is smeared with wax while in figure (b), the surface is clean.



Explain the difference in the shape of the drops. (2mks)

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6. Explain briefly the working of a drinking straw. (2mks)

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7. A thread was wound 10 times closely over a cylindrical tin. The length of the windings was found to be 280cm. Calculate the radius of the tin in metres. (3mks)

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8. A mercury barometer at the base of the building reads 76cmHg and 72cmHg at the top of the building. How tall is the building? (Take average density of air =1.25kg/m^3, density of mercury =13600kg/m^3 and g=10N/Kg) (3mks)

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9. Give a reason why water is not suitable as a barometric liquid. (1mk)

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10. State one evidence which demonstrates that matter is particulate (1mk)

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SECTION B (55 MARKS)

11. (a) For each of the following situations, name the force(s) acting.

(i) A stretched wire (1mk)

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(ii) A floating cork (1mk)

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(iii) The force between a magnet and non-magnetic material. (1mk)

.....

(iv) The force between two rubbed plastic ruler and small pieces of paper. (1mk)

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(b) An object weighs 980N on the earth's surface.

(i) What is the mass (g = 10N/kg) (2mks)

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(ii) If the same object weighs 360N on another planet, find the gravitational constant of that planet. (2mks)

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(c) Distinguish between a scalar and a vector quantity. (1mk)

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(d) Give a reason why weight varies from place to place. (1mk)

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(e) An athlete preparing for a competition started a lap when the reading on his digital stop watch was **6:21:82**. At the end of the lap the reading was **6:25:18.** Assuming his speed was constant; calculate how much time in seconds. (3mks)

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12. (a) State the SI unit of pressure. (1mk)

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(b) A metal block 10cm by 15cm by 20cm of weight 120N rests on a table. Calculate:-

(i) The minimum pressure it exerts (3mks)

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(c) State two factors affecting pressure in liquids. (2mks)

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(d) Explain why trucks which carry heavy loads have many wheels. (2mks)

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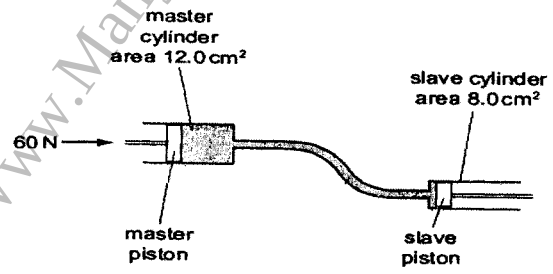
(e) The diagram shows the principle of an hydraulic system. The cross-sectional area of the master cylinder is 12.0 cm^2 and the cross-sectional area of the slave cylinder is 8.0 cm^2. The force applied to the master piston is 60 N.



Determine;

(i) Pressure at slave cylinder (2mks)

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(ii) Force at slave cylinder (2mks)

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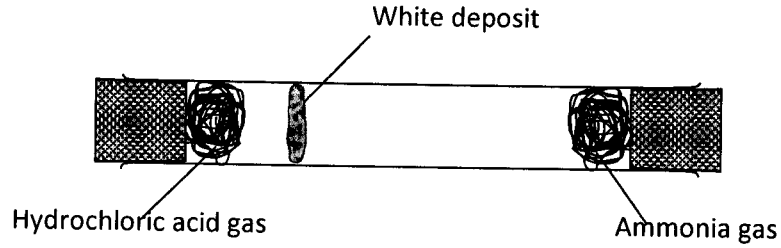
13. (a) In the figure below ammonia gas and an acid gas diffuse and react to form a white deposit on the walls of the glass tube.



(i) Name the gas that diffused faster. (1mk)

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(ii) Give **two** factors that affect the rate at which the gases diffuse. (2mks)

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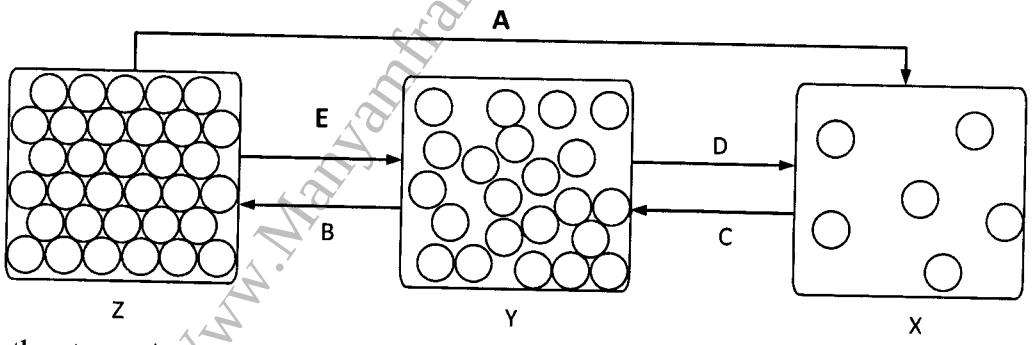
(b) Diagram below shows the arrangement of particles in the three states of matter.



(a) Name the state of matter Y. (1mk)

Y.....

(b) Name the processes: (3mks)

A.....B.....D.....

(c) Identify the state of matter where the particles possess the greatest amount of kinetic energy. (1mk)

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(d) State the role of the **lens** in a smoke cell experiment. (1mk)

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(e) In an experiment to determine the density of solid S which is not soluble in water. A student obtained the following;

- Mass of empty density bottle= **20g**
- Mass of density bottle when full of water =**45g**
- Mass of density bottle with small quantity of solid S =**152g**
- Mass of density bottle with small amount of solids S and topped up with water =**167g**

Given that the density of water is **1g/cm^3**,

Find;

i. The volume of the density bottle (2mks)

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ii. The mass of the solid S (1mk)

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iii. The volume of the solid S. (3mks)

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iv. Density of the solid. (2mks)

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14. (a) Define the term accuracy of a measuring instrument. (1mk)

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(b) Name one instrument that can be used to measure accurate volumes. (1mk)

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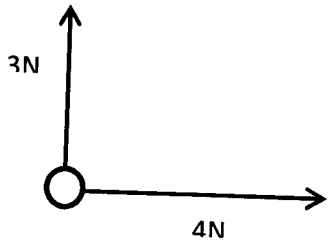
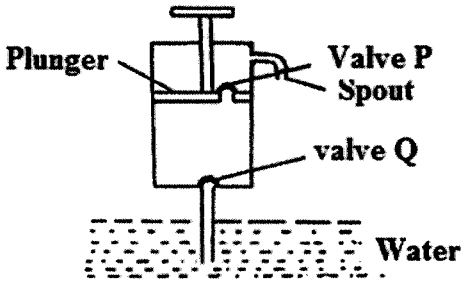
(c) The figure below sows two forces, one due north and the other due east acting on a point Q. Find the magnitude and direction of the resultant force. (3mks)



15. (a) The figure **below** shows a lift pump.



Explain why, when the piston is

(i) Pulled upwards, valve **Q** opens while valve **P** closes. (2mks)

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(ii) Pushed downwards, value **Q** closes while valve **P** opens. (2mks)

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(iii) State one advantage of a force pump over the lift pump. (1mk)

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(b) A lift pump can lift water up to a maximum height of 10m. Determine the maximum height to which the pump can raise paraffin. (Take density of paraffin as $800kgm^{-3}$ and density of water as $1000kgm^{-3}$) (3mks)

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