NAME: ..... ADM NO: .....

SCHOOL: ..... DATE : .....

CANDIDATE'S SIGNATURE: .....

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

2016

FORM 3

PHYSICS
PAPER 2
TIME: 2 HOURS

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INSTRUCTIONS TO CANDIDATES:

(a) *Write your **Name, Admission Number** and **School** in the spaces provided above.*

(b) ***Sign** and write the **date** of examination in the spaces provided above.*

(c) *This paper consists **two** sections **A** and **B**.*

(d) *Answer **all** questions in Section A and B in the spaces provided below all questions.*

(e) *All working **MUST** be clearly shown.*

(f) *Non-programmable silent electronic calculators and KNEC Mathematical tables may be used.*

Take g = 10Nkg^{-1}

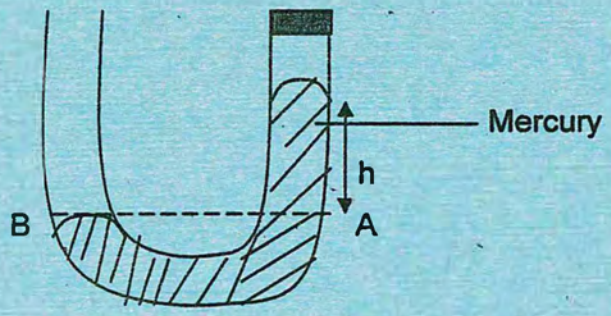
FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE'S SCORE
A	1 - 10	25	
B	11		
	12		
	13		
	14		
TOTAL SCORE		80	

SECTION A (25 MARKS)

Answer ALL questions in this section in the spaces provided

1. A U-tube manometer is half-filled with mercury. One arm is then connected to vacuum pump and air is then pumped out for some time. The end is then sealed. The figure below shows the level of the mercury in the arms after pumping out air.



Determine the pressure y the trapped air if h = 30mm (density) of mercury = $1.36 \times 10^4 kg/m^3$; Atm pressure = $1.0 \times 10^5 pa$. (4mks)

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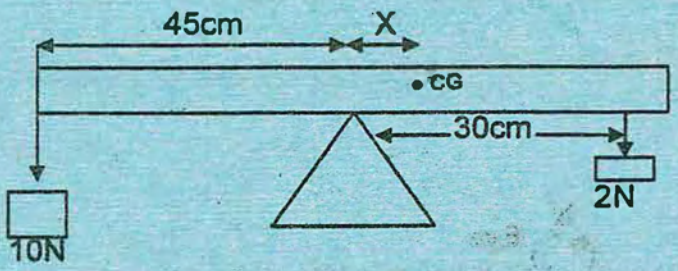
2. The diagram shows two trolleys, X and Y held together at rest against a compressed spring. When they are released at the same time, X moves to the left at $8ms^{-1}$.

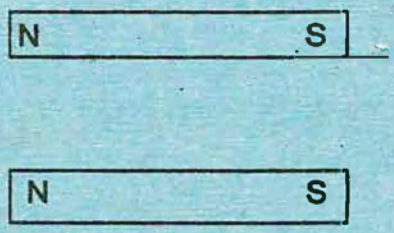
Calculate the potential energy which was stored in the compressed spring. (3mks)

3. The figure below shows a uniform bar of weight 20N pivoted as shown.



Write expressions for the clockwise moments and determine the distance X. (3mks)

4. The figure below shows the magnets placed such that the like poles are on the same side.



Sketch the magnetic field pattern due to the magnets and indicate the neutral points. (2mks)

5. State Pascal's principle of transmission of fluids. (1mk)

6. Explain how a metal gauze placed between a Bunsen burner flame and a glass vessel prevents the glass from breaking during heating. (2mks)

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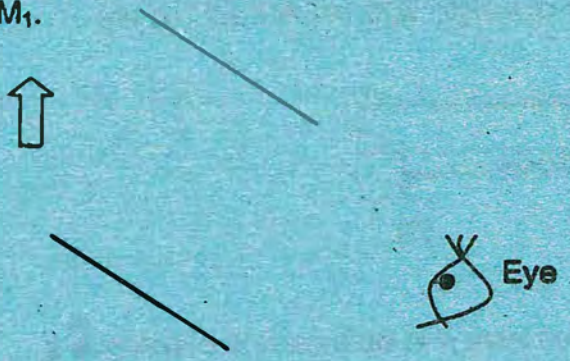
7. The figure below shows two mirrors, M_1 and M_2, inclined at 450 to the vertical. A vertical object is placed in front of M_1.



Sketch rays to show the image of the object as seen by the eyes. (2mks)

8. (a) State advantages of electrical method of magnetization. (2mks)

(b) State the advantages of double stocking and single stocking. (2mks)

9. State and explain factors affecting the stability of an object. (4mks)

10. (a) Explain the anomalous expansion of water. (2mks)

(b) State the effects of the phenomena above. (2mks)

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SECTION B (55 MARKS)

Answer ALL questions in this section in the spaces provided

11. Using a well labelled diagram, explain how land breeze and sea breeze occur. (5mks)

12. A bullet is fired horizontally from a platform 15m high. If the initial speed is $300ms^{-1}$, determine the maximum horizontal distance covered by the bullet. (5mks)

13. In an experiment to determine the density of sand using a density bottle, the following measurements were recorded.
    - Mass of empty density bottle = 43.2g
    - Mass of density bottle full of water = 66.4g
    - Mass of density bottle with some sand = 67.5g
    - Mass of density bottle with sand filled up with water = 82.3g

    Use the above data to determine the:-

    (a) Mass of water that completely filled the bottle. (1mk)

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(b) Volume of water that completely filled the bottle. (2mks)

(c) Volume of the density bottle. (1mk)

(d) Mass of sand. (3mks)

(e) Mass of water that filled the space above the sand. (1mk)

(f) Volume of sand. (3mks)

(g) Density of sand. (2mks)

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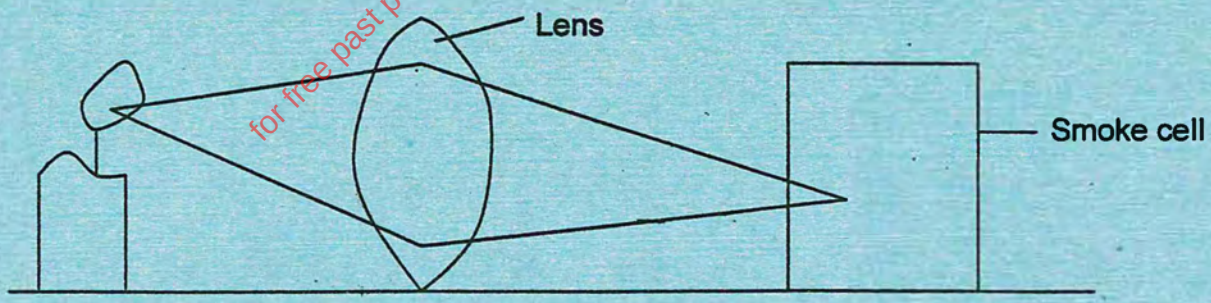
14. The springs of negligible insights and of constant $K_1 = 50Nm^{-1}$ and $K_2 = 100Nm^{-1}$ respectively are connected end to end and suspended from a fixed point. Determine:-

(a) The total extension when a mass of 200kg is hung from the lower end. (2mks)

(b) The constant of the combination. (2mks)

15. (a) What is Brownian motion? (1mk)

(b) Brownian motion of particles can be studied using the apparatus shown below. To observe the motion, some smoke is enclosed in the smoke cell and then observed through a Microscope.



(i) Explain the role of smoke particles and the lens in the experiment. (2mks)

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(ii) State and explain the nature of the observed motion of the smoke particles. (3mks)

(iii) State and explain what is observed if temperature in the smoke cell is increased. (2mks)

16. A disk of damp rubber of radius 2.5cm is held in constant with a sheet of thick glass by the atmospheric pressure. A force of 200N acting perpendicular to the glass surface is just sufficient to detach the disk from the glass. Estimate the atmospheric pressure. (4mks)

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