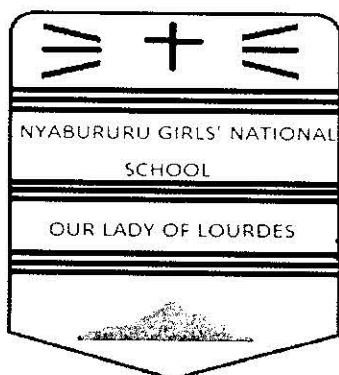


NAME.....ST..... ADM/NO.....



FORM THREE PHYSICS
PHYSICS CAT 1 TERM 2 2016
TIME: 2 HOURS

<i>Date done</i>	
<i>Invigilator</i>	
<i>Date returned</i>	
<i>Date revised</i>	

Instructions:

- 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 sections A and B in the spaces provided.
- All working must be clearly shown on the spaces provided.
- Non-programmable silent calculators may be used.

FOR EXAMINER'S USE ONLY

SECTION	QUESTION	MAX. SCORE	CANDIDATE'S SCORE
A	1 - 9	25	
B	10	13	
	11	13	
	12	9	
	13	11	
	14	9	
	TOTAL SCORE	80	

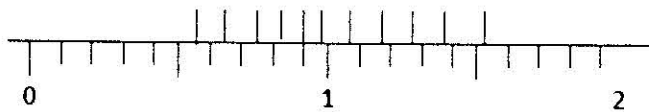
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SECTION I (25 MARKS)

1. (a) Name the instrument that would be used to measure the thickness of this question paper. Give a reason for your answer. (2mks)

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- (b) What is the reading on the vernier caliper shown in figure 1?



2. Name one defect of a simple cell. (1mk)

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3. Explain how an electroscope can be used to distinguish between an insulator and a conductor. (2mks)

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4. Explain the following:-

- (a) Alcohol thermometers are preferred by aratic explorers. (1mk)

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- (b) In a clinical thermometer, the bulb is not quite full of mercury at room temperature. (2mks)

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5. (a) Give two reasons why bulbs in a lighting circuit at home are connected in parallel and not in series. (2mks)

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- (b) If a current of 40mA passes through a lamp for 16 seconds, calculate the quantity of charge that flows in the circuit at any given point. (3mks)

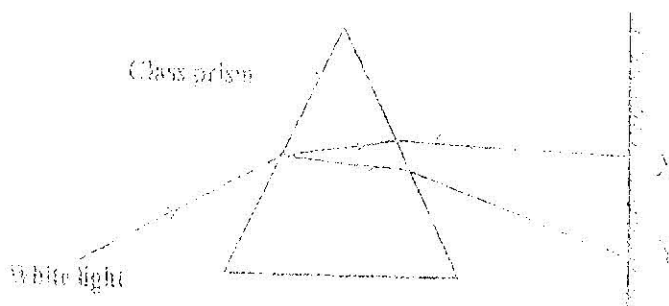
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6. The figure shows an experimental set up used to illustrate the behaviour of white light.



- (i) State the best term that describes the above observations. (1mk)

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- (ii) State the reason for the observation in (i) above. (1mk)

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- (iii) Identify the colours X and Y. (2mks)

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7. The masses of equal volumes of a certain liquid and water were found to be M_L and M_W respectively. Given that the density of water is 1 g/cm^3 , express the density of the liquid in terms of M_L and M_W . (Show your working). (3mks)

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8. State Newton's second law of motion. (1mk)

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9. (a) State two laws of refraction of light. (2mks)

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- (b) Figure 2 below shows a horizontal tube with two vertical tubes X and Y. Water flows through the horizontal tube from right to left. The water level in tube X is higher than water level in tube Y. Explain this observation. (2mks)

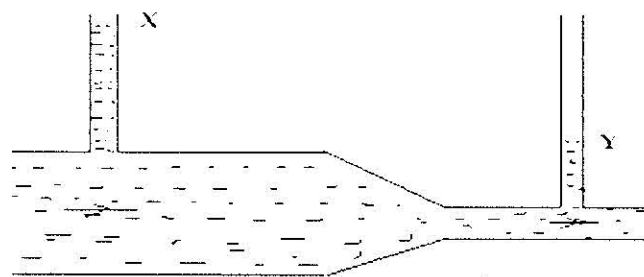


Figure 2

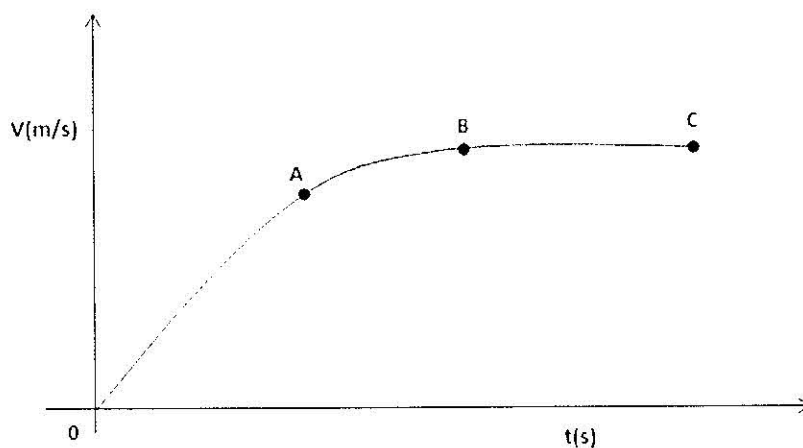
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SECTION B (55MARKS)

10. (a) Figure 3 shows a velocity-time graph for the motion of a certain body.



Describe the motion of the body in the region;

(3mks)

(i) OA

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(ii) AB

.....

(iii)BC

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(b) A car moving initially at 10ms^{-1} decelerates at 2.5ms^{-2} .

(i) Determine:

I. Its velocity after 1.5s

(2mks)

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II. The distance travelled in 1.5s

(2mks)

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III. The time taken for the car to stop (2mks)

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(ii) Sketch the velocity-time graph for the car up to the time the car stopped. (2mks)

(iii) From the graph, determine the distance the car travelled before stopping. (2mks)

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11. (a) Define the refractive index of a substance. (1mk)

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(b) In an experiment to determine the refractive index of a liquid, the liquid was poured into a measuring cylinder. A pin was placed at the bottom of the cylinder and another pin was used to locate the apparent position of the first pin. The real and apparent depths were measured. The experiment was repeated with other values of real depth. The table below shows the results obtained.

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Real depth (cm)	5	10	15	20	25
Apparent depth (cm)	3.3	6.7	10	13.3	16.7

- (i) Plot the graph of real against apparent depth. (5mks)



- (ii) From the graph determine the refractive index of the liquid. (4mks)

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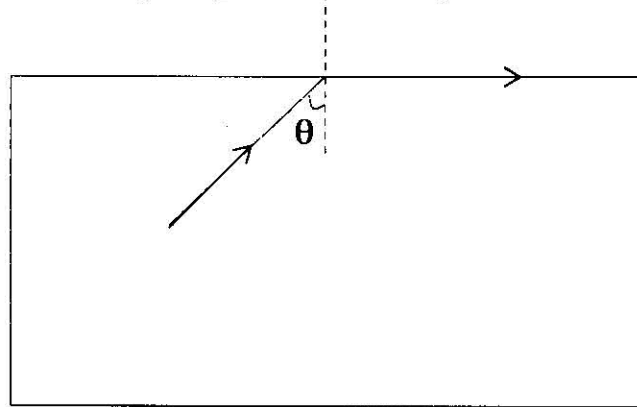
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(c) Figure 4 shows a ray of light incident on a glass-air interface.



Given that the refractive index of the glass is 1.6, determine angle θ (3mks)

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12. (a) Figure 5 shows a lorry towing a trailer using a rope.

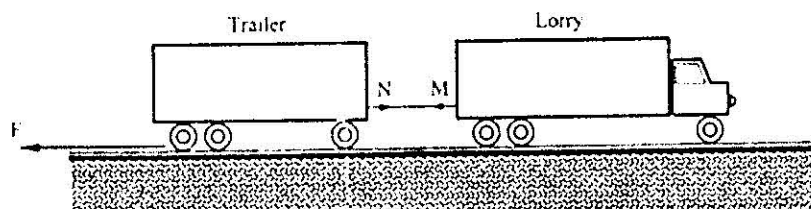


Figure 5

(b) The lorry exerts a force N on the trailer and the trailer exerts an equal but opposite force M on the Lorry. The frictional force between the trailer and the road is Explain how the forces N, M and F enable the trailer to move. (2mks)

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- (c) Figure 6 shows a frictionless trolley of mass 2kg moving with uniform velocity towards a wall. At the front of the trolley is a spring whose spring constant is 25Nm^{-1} . The trolley comes to rest momentarily after compressing the spring by 3cm and then rebounds from the wall.

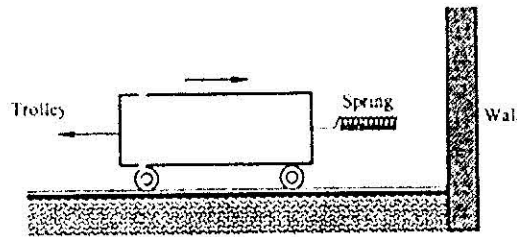


Figure 6

Determine:-

- I. The force exerted on the wall by the spring. (3mks)

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- II. The maximum acceleration of the trolley as it rebounds from the wall. (2mks)

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- (ii) State the reason why the trolley acquires a constant velocity after it rebounds. (2mks)

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13. (a) (i) What is the difference between longitudinal and transverse waves? (2mks)

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(ii) State two distinctions between the way sound waves and electromagnetic waves are transmitted. (2mks)

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(iii) Calculate the wavelength of the KBC FM radio wave transmitted at a frequency of 100 Mega Hertz. (3mks)

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(b) A mine worker stands between two vertical cliffs 400m from the nearest cliff. The cliffs are X distance apart. Every time he strikes the rock once, he hears two echoes; the first one after 2.5s. While the second follows 2s later. From this information calculate:

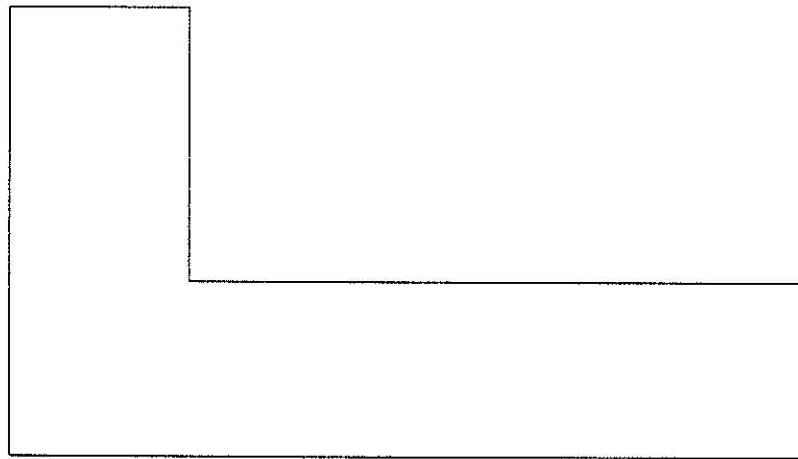
(i) The speed of the sound in air. (2mks)

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(ii) The value of X. (2mks)

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14. (a) Determine geometrically the centre of gravity of the figure below. (1mk)



- (b) Define the term efficiency of a machine. (1mk)

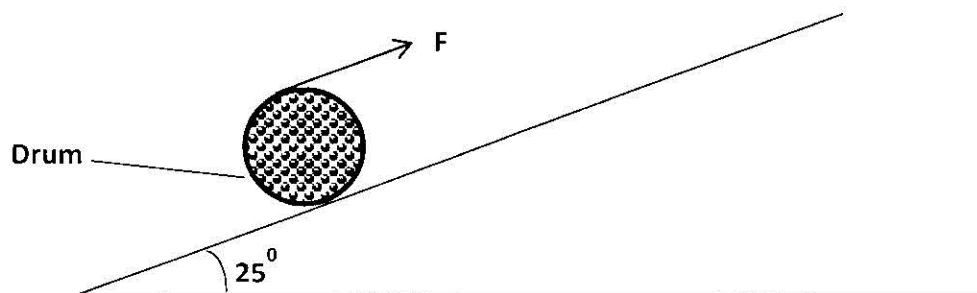
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- (c) Figure 9 shows a drum of mass 90kg being rolled up a plane inclined at 25° to the horizontal. The force F applied is 420N and the distance moved by the drum along the plane is 5.2m.



Determine:

- (i) The work done by the effort. (2mks)

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(ii) Word done in raising the drum. (3mks)

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(iii) The efficiency of the inclined plane as a machine. (2mks)

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