**FORM 3**

**PHYSICS**

**TIME: 1 HOURS.**

**NAME:………………………………………………………………………………**

**ADM NUMBER:…………………………**

***Attempt ALL the questions in the spaces provided ( 40 marks)***

Figure 7.0 (a) shows a displacement-time graph. Sketch a velocity-time graph on fig. 7.0(b) (1 mark)



**2. a)** Give the conditions necessary for total internal reflection to occur. (2 marks)

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**b)** i) The figure below shows the path of a ray of light passing through a rectangular block of perspex in air.



ii) A ray of light now travels from a transparent medium into the perspex as shown in the figure below.



Calculate the critical angle c. (2 marks)

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**c)** Give one use of an optical fibre. (1 mark)

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**d)** In a transparent liquid container, an air bubble appears to be 18cm when viewed from end A and 12cm when viewed from end B as shown in the figure below. Where exactly is the air bubble. If the length of the tank is 40cm? (3 marks)



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3. A ball is throne horizontally from the top of a vertical tower of height 75m and strikes the ground at a point of 80m from the bottom of the tower. Determine the:

i) Time taken by the ball to hit the ground (acceleration due to gravity= 10m/s) (2marks)

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ii) Initial horizontal velocity of the ball. (3mks)

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4. a) Show that V2 = u+2as (4mks)

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b) The figure below shows a graph of velocity against time for a moving body.



Describe the motion of the body during the 10 seconds. (2mks)

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**5.** (a). (i) Define the term velocity and state its SI unit. (2marks)

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(ii) The figure below show a tape obtained from a ticker timer operated at a frequency of 100 Hz.



Determine the time taken to move from one dot to the successive dot. (1 mk )

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(b) A student from Favour high school threw a stone horizontally at a velocity of 25 m/s from a top of a tree 45 m high. Calculate;

(i) The time taken by the stone to hit the ground. (Take g = 10 m/s2) (2 marks)

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(ii) The distance covered by the stone horizontally from the base of the tree. (2 marks)

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(c) A car started from rest and accelerated uniformly at 2 m/s2 for 5 seconds. It then travelled for 3 seconds with attained velocity before accelerating again at 2.5 m/s2 for 2 seconds. The car was brought to rest within 2 seconds.

i).Sketch a velocity - time graph for the car’s motion. (2 marks)

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ii).Calculate the total distance covered by the car from the graph in (i) above. (3 marks)

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6. (a) State Snell’s law of refraction. (1mark)

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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 used to locate the apparent position of the first pin. The values of real and apparent depth were used to plot a graph as shown below.



i) From the graph determine the refractive index of the liquid. (2 marks)

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(ii) Given that the velocity of light in vacuum is 3.0 x 108 m/s, what would be the velocity of light in the liquid above. (2marks)

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(c) The diagram below shows a ray of light incident on a glass-air interface.



Given that the refractive index of glass is 1.4, determine the value of θ (2marks)

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(d) The diagram below shows a ray of light incident a glass prism ABC at 900



Complete the ray to show how it emerges from the prism given the critical angle of the glass is 420 (1mark)