**Name:** ………………………………………………..………… **Adm No**: ….…………**Class:** ………… **Candidate’s Sign**: ………...............**Date:** ………………………………............................................

**OPENER EXAMS**

**TERM 3 2023**

**FORM THREE PHYSICS**

1. An object is placed near a plane mirror as shown below. Using two rays complete the diagram showing the position of the image as seen by the observer. (2 marks)

 **Object**

**Observer**

2. The figure below shows a Vernier calipers scale

**7**

**8**

**9**

**0**

**10**

State the correct reading of scale if the instrument has a zero-error of **-0.02cm** (2 marks)

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3. State **two** factors that affect the rate of diffusion. (2 marks)

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4. In a vacuum flask how is heat loss by radiation minimized. (1 mark)

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5. The figure below shows a longitudinal wave that takes 0.5s to move from point A to B and at a speed of 36m/s.

**A**

**B**

**0.5s**

Calculate

(a) The frequency of the wave (1 mark)

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(b) the wavelength (2 marks)

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6. A uniform meter rule pivoted at its centre is balanced by a force of **100N** at **20cm** and another force of **F** at the **75cm** mark.

 **50cm**

**100N**

**F**

 **75cm**

 **20cm**

**0**

**100cm**

Calculate the force **F.** (3 marks)

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7. Figure below shows an object placed in front of a concave mirror. Using ray diagram, locate the image position. (2 marks)

**O**

**F**

**C**

8. Find the current that a 500Ω resistor connected to a source of 240V draw? (3 marks)

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9. Figure shows how a freely suspended simple pendulum settles.

**Rigid support**

**Thread**

**Pendulum**

State the type of equilibrium of the pendulum. (1 mark)

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10. State how polarization is reduced in a dry cell (1 mark)

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11. What is the effect of increasing temperature on cohesive force (1 mark)

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12. A negatively charged rod is brought near the cap of a lightly charged electroscope. The leaf divergence first reduces but as the rod comes nearer, it diverges more. State the charge of the electroscope. (1 mark)

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13. (a) The figure below shows circular waves approaching a straight reflector. Complete the sketch to show what happens when the waves hit the reflector (1 mark)

**Straight reflector**

(b) State two effects that would be observed when water waves pass from deep to shallow water. (2 marks)

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14.

(a) (i) The dots below were made by a ten tick- timer of **100Hz.** Determine the acceleration of the body moving in the direction shown by the arrow (3 marks)

**45cm**

**25cm**

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(ii) A ball is thrown vertically upwards and returns to its starting point after 6 seconds. Calculate the maximum height reached (g=10m/s2) (3 marks)

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(iii) Figure below shows a velocity-time graph for a moving object.

**Velocity (m/s)**

**Time (s)**

**A**

**B**

Draw graphs on axis below for displacement against time for **A** and **B** and label them **A** and **B** respectively. (2 marks)

**Displacement (m)**

**Time (s)**

(b) (i) State Newton’s **2nd**Law of Motion (1 mark)

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(ii) A motor cyclist wears a helmet in the inside with sponge. Explain how this minimizes injuries to the motorists’ head when involved in an accident. (2 marks)

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(iii) A boy of mass **58kg** jumps with a horizontal velocity of **3ms-**1 onto a skateboard of mass **2kg** as shown below

**3 m/s**

What is his velocity as he moves off on the skateboard? (2 marks)

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15. (a) Define the term refraction of light. (1 mark)

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(b) Determine the refractive index of the water with respect to air (3 marks)

**420**

**Water**

**Air**

**300**

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(c) Calculate the refractive index of glass given that the velocity of light in air is 3x 108 ms-1 and velocity of light in glass is 2.4 x 108ms-1. (3 marks)

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(d) State two conditions necessary for total internal reflection to occur (2 marks)

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(e) The fig 1 below shows a ray of light incident on a glass prism

**400**

**400**

**1000**

**A**

**B**

**C**

Given that the critical angle for the grass is 390, **sketch** on the diagram the path of the ray through the prism (2 marks)

16. (a) In the set-up, the suspended meter rule is in equilibrium balanced by the magnet and the weight shown. The iron core is fixed to the bench.

**K**

**Iron core**

**S**

**N**

**Suspender**

**Weight**

**Meter rule**

(i) State and explain the effect on the meter rule when the switch **K** is closed (3 marks)

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(ii) What would be the effect of reversing the battery terminals? (1 mark)

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(b) State three factors that can increase the strength of a U-shaped soft iron core electromagnet (3 marks)

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17. (a) (i) The height of mercury column in a barometer is found to be 67cm at a certain place. What would be the height on a water barometer in the same place. (Density of water is 1000kg**/**m3 and density of mercury is 13600kg**/**m3). (3 marks)

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(ii) A force pump must be used instead of a lift pump to raise water from a deep well over 10m. Give a reason for that (1 marks)

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