**NAME: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO: \_\_\_\_\_\_\_\_\_\_\_\_CLASS:\_\_\_\_\_\_\_\_\_\_**

**DATE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ SIGN: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_TARGET\_\_\_\_\_\_\_\_\_**

**FORM THREE**

**PHYSICS**

**MID-TERM EXAM**

**TERM 1, 2024**

**INSTRUCTIONS: (ANSWER ALL THE QUESTIONS) TIME: (1 HOUR 30 MIN)**

1.Distinguish between the terms ‘uniform velocity ‘and ‘uniform acceleration.’ (2mks)

2.A body initially moving at **72km/h** accelerates uniformly to a velocity of **180km/h** in **3**seconds. Calculate its acceleration. (3mk)

3.The dots below were made by a ***ten tick- timer*** of **100Hz.** Determine the acceleration of the body

**45cm**

**25cm**

4.A stone is released from a height **h,** if the acceleration due to gravity is **g,** show that the velocity is **V=**$\sqrt{2gh}$ just before hitting the ground (2mks)

5.A bullet is fired horizontally at a velocity of 400m/s from a cliff which is 50m tall as shown below.

**50m**

**Bullet**

**Cliff**

i. On the diagram draw the trajectory of the bullet until it comes to rest. (1mk)

 ii. Find the time taken for the bullet to hit the ground. (2mks)

1. Find the range. (2mk)

6.The figure below shows a velocity – time graph for a motor-cycle

**Time (s)**

**A**

**2**

**150**

**4**

**6**

**-100**

**Velocity (m/s)**

**8**

**10**

Determine the distance covered in the first nine seconds

7.Define the term

1. Momentum (1mk)
2. Inelastic collisions (1mk)
3. Elastic collisions (1mk)

8.A bullet of mass **0.006kg** is fired from a gun of mass **0.5kg**. If the muzzle velocity of the bullet is **300m/s**. calculate the recoil velocity of the gun. 3mk

9.A minibus of mass **1200kg** travelling at a constant velocity of **15m/s** collides with a stationary car of mass **600kg.** The impact takes **1.5** seconds before the two move together at a constant velocity for **25** seconds. Calculate.

i) The common velocity (2mks)

ii) Distance moved after impact (2mks)

iii) The impulsive force (2mks)

iv) The change in kinetic energy (2mks)

10.A Carton of mass 50kg is attached to the hook of a spring balance from the roof of a lift. What is the reading on the spring balance when the lift is

1. Accelerating downwards at 1m/s2 (2mks)
2. Accelerating upwards at **8m/s2 (2mks)**
3. The lift breaks down and is under free fall. (2mks)

11 A ball bearing is released from rest just below the surface of lubricant contained in a tall measuring cylinder.

i. State any one force acting on the ball bearing (1mk)

ii. Sketch a velocity time graph for the motion briefly explain the nature of your graph. (2mks)

11.Define the term

i. refraction of light. (1mk)

ii. refractive index of a substance. (2mks)

13.Light is incident on an air-glass boundary at an angle of incidence of 400. If the refractive index of the glass is 1.7, determine the angle of refraction. (2mk)

14.A ray of light makes a glancing angle of incidence **i = 60o** with a flat glass surface as shown in figure

**Air**

**i**

**r**

**Glass**

Given that the critical angle for glass is **42o** determine;

 (i) The refractive index of glass (2mks)

(ii) The angle of refraction **r** (2mks)

1. Given that the speed of light in air **3.0 x 108 m/s**, find the speed of light in glass

 (2mks)

15.What is dispersion of light? (1mk)

16.Fig below shows white light falling on a prism.

**Y**

**X**

**White light**

a) Name the color at X and Y (1 mk)

b) Explain why a prism disperses white light into its component colours. (1 mk)