**NAME …………………………………. CLASS:………….. ADM NO: …………….**

**PHYSICS FORM 3**

**MIDTERM 1 EXAMS 2023**

**TIME: 2 HOURS**

**Attempt all the questions in the spaces provided.**

1. State the reason why electricity transmission cables are left sagging between the pylons.

 (1 mk)

2. The air pressure at the base of the mountain is 75.0cm of mercury while at the top it is 60.0cm.given that the average density of air is 1.25kgm-3 and the density of mercury is 13600kg/m3.calculatre the height of the mountain. (3mks)

3. State two factors that would raise the boiling point of water. (2 mks)

4. The level of water in a burette is 2.5cm3. 40 drops each of volume 0.05cm3 are added to the

 Burette. What would be its new reading? (2 mks)

5. Explain how the efficiency of a vacuum flask is affected if the double-walled glass surface is

 replaced with a double walled metal surface. (2 mks)

6. A body moving at 50m/s decelerates uniformly at 2/ms2 until it comes to rest. What distance

 does it cover from the time it starts to decelerate to the time it comes to rest. (3 mks)

7. Sketch a graph of displacement vs time for a body moving with variable velocity (3 mks)

8. Three identical springs A, B and C are used to support 25.5N weight as shown below.

 The weight of the horizontal bar is 2.5N, determine the extension on each spring given

 that 6N causes an extension of 2cm. (2 mks)

9. State the two laws of refraction (2 mks)

10. Define the following terms:-

 (a) Displacement - (1 mk

 (b) Speed – (1 mk)

 (c) Distance – (1 mk)

 (d) Velocity (1 mk)

11. State two factors that affect surface tension of a liquid. (2 mks)

**SECTION B: (55 MARKS)**

**Answer all the questions from this section.**

12. A stone is projected vertically upwards with a velocity of 30ms-1 from the ground. Calculate:-

 (a) The time it takes to reach the maximum height. (2 mks)

 (b) the time of flight. (2 mks)

 (c) The maximum height reached. (2 mks)

 (d) The velocity with which it lands on the ground (Take g = 10ms-1) (2 mks)

13. Define the following terms:-

 a(i) Critical angle (1 mk)

 (ii) Refractive index (1 mk)

 b(i) Calculate the critical angle of a metal given that its refractive index is 2.42

 (ii) If the critical angle for a liquid is 48.6o. Calculate the refractive index of the liquid. (2 mks)

 (ii) Determine the critical angle for glass-water interface (refractive indices of glass and

 water are 3/2 and 4/3 respectively) (3 mks)

14. (a) State the Newton’s second law of motion. (2 mks)

 (b) Determine the change in momentum produced when a force of 3.5 x 103 acts on a body

 which is at rest for 0.02 seconds. (2 mks)

 (c) What velocity will be given to the body if it has a mass of 20kg. (3 mks)

15. (a) State any three laws of friction. (3 mks)

 (b) A wooden box of mass 60kg rests on a rough floor. The coefficient of friction between

 the floor and the box is 0.6.

 (i) Determine the force required to just move the box. (3 mks)

 (ii) If a force of 400N is applied to the box, with what acceleration will it move?

 (Take g = 10m/s) (3 mks)

16. (a) Define the term mass. (1 mk)

 (b) The density of mercury is 13.6gcm-3. Find the volume of 2720g of mercury in m3. (3 mks)

17. How does temperature affect Brownian motion? (2 mks)

18. An object of height 5m is placed 10m away from a pinhole camera. Calculate:

 (a) The size of the image if its magnification is 0.01 (3 mks)

 (b) The length of the pinhole camera. (3 mks)

19. State four methods of magnetizing a magnetic material. (2 mks)

20. (a) State the principle of moments. (2 mks)

 (b) A uniform metre rule pivoted at the centre is balanced by a force of 4.8N at 20cm mark

 and other two forces F and 2.0N at the 66cm and 90cm marks respectively. Calculate the

 force F. (4 mks)