NAME…………………………………………………………CLASS………………….ADM………………

**MID TERM 1 2023 EXAM**

**FORM 4**

**PHYSICS**

**TIME: 2 HOURS**

**INSTRUCTIONS TO STUDENTS**

* **Answer all then question in the spaces provided after each questions.**
* **You must show all your calculations /works giving correct SI units.**
* **Keep your work as clean as possible.**

1. Describe an experiment which you can perform to determine the volume of a stone using the following

 apparatus, measuring cylinder, water, string and stone. (3mks)

2. A cube having each edge 20mm is moulded into a sphere. Calculate the radius of the sphere in metres (3mks)

3. You are given three bars; one 15 magnetised with opposite poles at its ends. Another is magnetized with

 consequent poles. The third is not magnetized. Describe an experiment which you would perform to

 identify each. (3 mks)

 c) Explain the term particles and the kinetic theory

1. The observation that if a perfume is sprayed at one and of a room, it can be detected by the sense of smell throughout the room. ( 1mk

 ii) The process of diffusion is speed up by high temperatures (1mk)

4. An object is placed 10cm in front of a plane mirror. When the object is moved 4cm towards the mirror, calculate the distance between the object and the image (4mks)

5. A metre rule of negligible weight has 40g and 60g masses suspended at ends of the ruler. What position must the ruler be supported so that it balances horizontally (4mks)

6. An object dropped from a height h, attains a velocity of 6m/s, just before hitting the ground. Find the height, h and (ii) the time taken to reach the ground. Take g=10m/s2(6mks)

7. State the two laws of refraction of light and energy. (2mks)

8. The velocity of light in water is 2.2×108 m/s. Calculate the:-

i) Refractive index of light passing from water to diamond (3mks)

ii) Also determine /calculate the angle of refraction in the diamond given that the angle of incidence is 400 in water (3mks)

9i) Name 3 factors which affect the internal resistance to the flow of an electric current in a system (3mks)

ii) State three methods used to measure the resistance of an unknown resistor (3mks)

10. In the circuit below, determine

 12 V

 3Ω 6Ω

 B

 A

 9Ω

a) Total resistance between A and B (3mks)

b)Total effective resistance in the circuit (2mks)

11. Define the following terms in relation to convex and diverging lens

a) Principal axis. (1mk)

b) The centre of curvature. (1mk)

c) Principal focus (1mk)

12. Sketch the following diagrams and state 2 characteristics of the image formed. (2mks)

13. (a) arrange the following waves in order of increasing frequency. Visible light, Infra-red radiation, X-ray, U.V. radiation, Radio waves, and gamma rays. (1mk)

(b) Calculate the wavelength of ultra violet light of frequency 7.5 x 10 Hz. (3mks)

14. (a) State Archimedes principle. (1mk)

(b) A solid object has a volume of 50cm3 and density of 0.8g/cm3. Calculate the weight of the water displaced when it is floating freely. (take g=10Nkg-1) (3mks)

15. (a) State four applications of uniform circular motion (2mks)

 (b) A rotating object moves at a rate of 90 rev/min.

i) Calculate its angular velocity (2mks)

ii) Also determine its periodic time. (2mks)

16. State the following laws of electromagnetic induction. (1mk)

(i) Faraday’s law

ii) Lenz’s law (1mk)

b) Calculate the number of turns on the primary coil of a transformer which will enable a 40V appliance to be used with a 240a.c. mains power if there are 1000 turns on the secondary. (3mks)

17. State three reasons why transmission of electric power from the generating station, at high voltage is not transmitted by cables over buildings. (3mks)

18. A convex lens of local length 12cm forms an image on the screen which is 20cm away from the lens. Find the position of the object. (3mks)