EXAMINATION NUMBER: _____

BLANTYRE RURAL DISTRICT MOCK EXAMINATIONS

2024 MALAWI SCHOOL CERTIFICATE OF EDUCATION MOCK EXAMINATIONS

PHYSICS

PAPER 1

(100 marks)

Subject Number: M164/I

Friday, 22nd March, 2024 **Time Allowed: 2hours**

1. This paper contains **12 printed pages** with two sections **A** and **B. Please check**.
2. Answer **all** the **13** questions in this paper.
3. The maximum number of marks for each answer is indicated against each question.
4. Write your answers in the spaces provided on the question paper.
5. Calculators may be used.
6. Write your **examination number** at the top of each page of your question paper in the spaces provided.
7. In the table provided on this sheet, **tick** against the question number you have answered.
8. Write neatly and clearly.
9. For any mathematical question, show your working.

Question Number	Tick if answered	Do not write in These columns	
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			

Turn over

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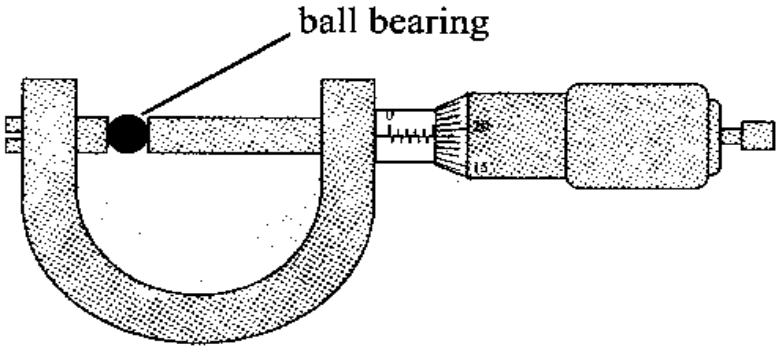
SECTION A (70 Marks)

1. a. Define the term fundamental quantity

_____

_____(1 mark)

b. **Figure 1** below is a micrometer screw gauge used to measure the diameter of a ball bearing



What is the diameter of the ball bearing

_____

_____(2 marks)

c. Mention **two** sources of zero errors in a scientific investigation

_____

_____(2 marks)

d. Convert 314K to degrees Celcius scale

(2 marks)

2. a. Define half life

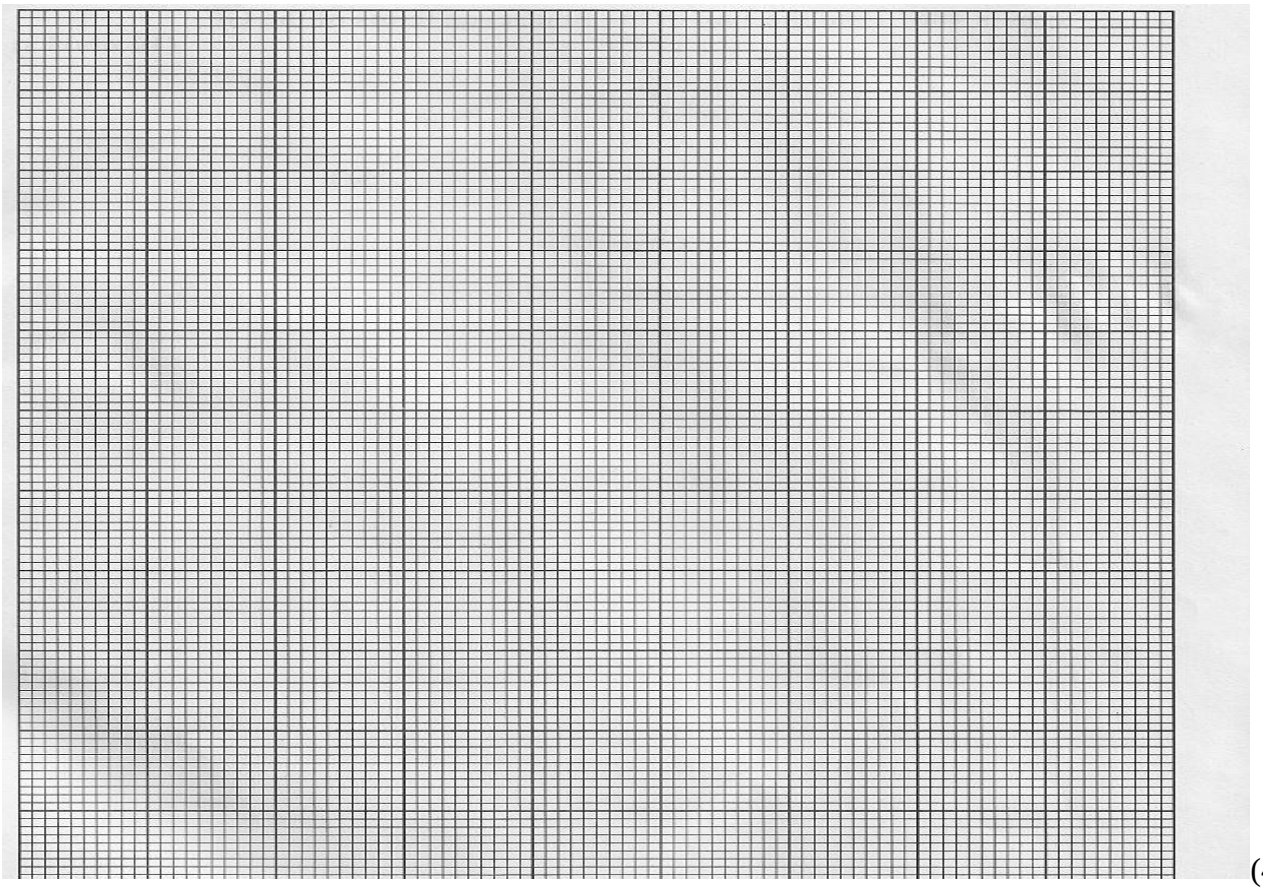
_____

_____(1 marks)

b. Table 1 shows the radioactive decay process of uranium – 238

Time (yr)	0	7	14	21	28	35
Activity counts/sec	1600	875	470	260	140	77

(i) Plot a graph of activity against time



(4 marks)

(ii) Estimate the half life of uranium – 238. Use the graph

_____

_____(2 marks)

3. Figure 6 is a diagram showing a person rowing a boat on a lake.

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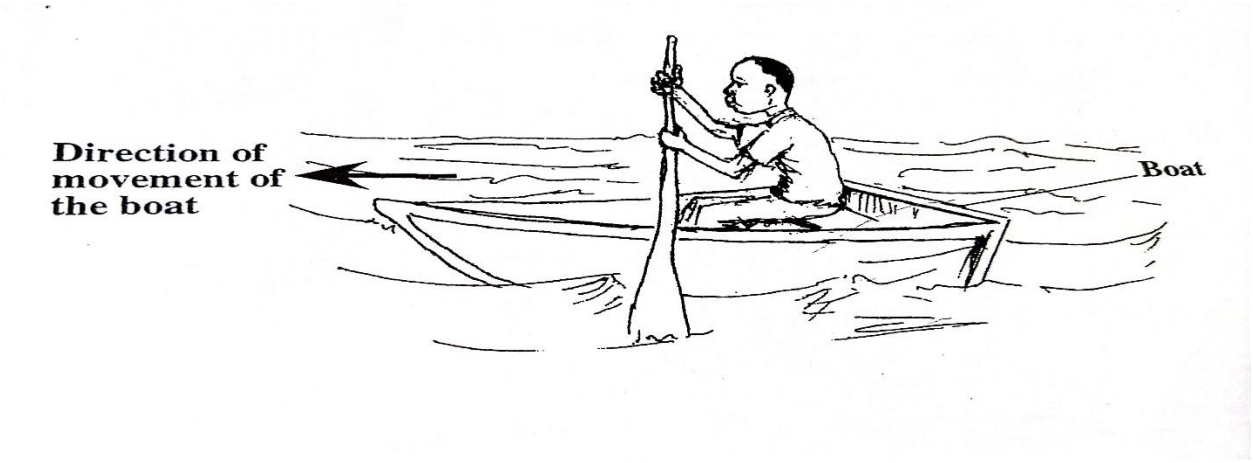


a. Explain how rowing causes the boat to move

_____

_____

_____(3 marks)

b. Which Newton's law of motion is demonstrated in the diagram?

_____(1 marks)

c. Mention any **two** forces acting on the boat.

_____

_____(2 marks)

4. a. A ball is thrown vertically upwards with an initial velocity of u m/s. sketch the speed – time graph for the motion of the ball

(3marks)

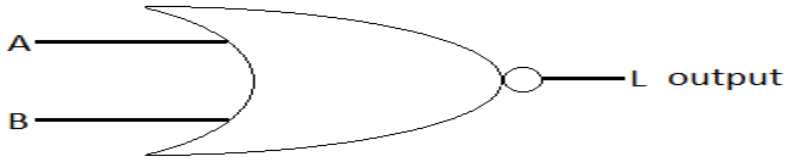
b. (i) Define centripetal force

_____(1 mark)

(ii) A giant wheel of radius 20m is rotating about its axle at a frequency of 5Hz. Find the angular velocity in radians/second

(3 marks)

5. Figure 2 is a logic gate



What type of logic gate is this?

_____(1 mark)

b. Mention **three** properties of electromagnetic radiations

_____

_____

_____(3 marks)

c. State **one** difference between ohmic conductors and non – ohmic conductors

_____

_____(2 marks)

6. State the law of floatation

_____(1 mark)

A concrete block of mass 20000kg and volume 0.8m^3 is totally immersed in a sea of density 1.04 × 10^3 kg/m^3. Find the weight of the block in sea water.

(3 marks)

b. In a ripple tank, plane wavelength are produced and a glass block of uniform thickness is placed inside the tank as shown in figure 3

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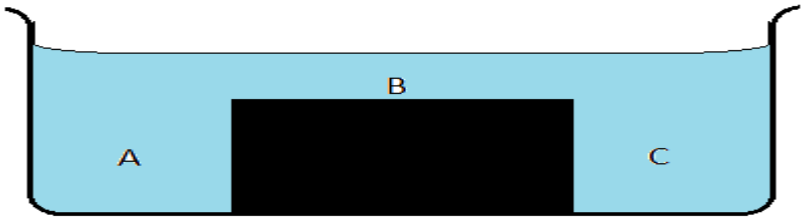


(2 marks)

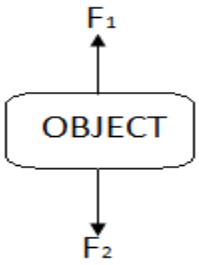
Draw a diagram to shown the wave fronts as observed from above regions A, B and C.

7. a. State **two** factors that affect the terminal velocity of a free-falling object in air

_____

_____(2 marks)

b. Figure 4 is a diagram showing an object falling at terminal velocity. F_1 and F_2 are forces acting on the object.



(I) Name the forces F_1 and F_2

F_1_____(1 mark)

F_2_____(1 mark)

(II) Describe the relationship between F1 and F2 at terminal velocity

_____

_____(2 marks)

c. Describe any **two** uses of a diode

_____

_____(2 marks)

8. Figure 5 is a diagram of a transformer.

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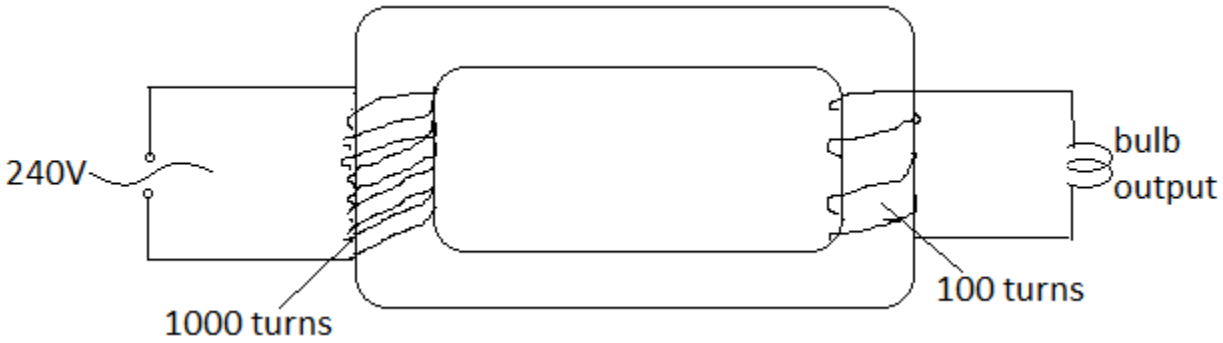

(i) Name the type of transformer shown in the diagram

_____

_____(1 marks)

(ii) Give a reason for your answer

_____

_____(2 marks)

(iii) Calculate the output voltage of the transformer

(3 marks)

b. Define the term doping in relation to semiconductors

_____

_____(1 marks)

c. Mention **two** uses of moments in our daily life

_____

_____(2 marks)

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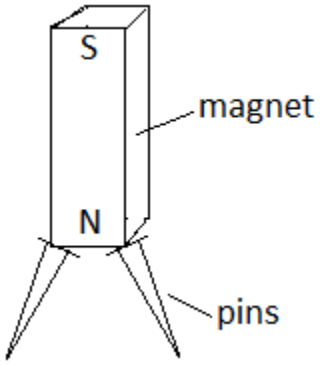
9. Figure 4 shows two pins attracted to the north pole of a bar magnet

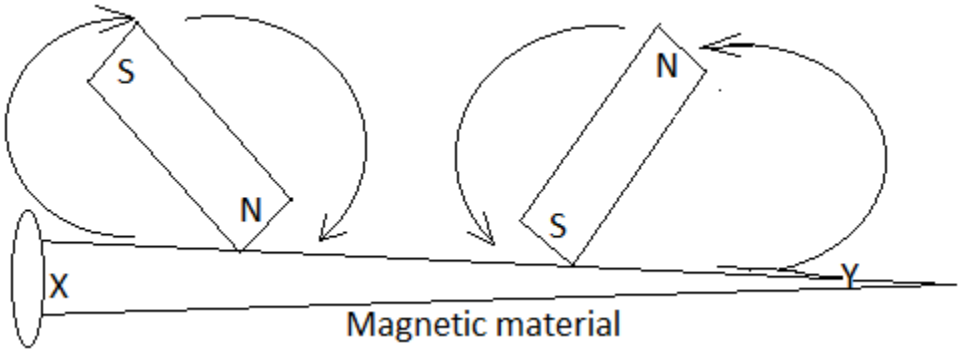


Explain why the pins fan out

_____

_____(2 marks)

b. Figure 6 shows a magnetic material being magnetized with two unlike pole of two magnets



(i) Name the method of magnetization used

_____(1 mark)

(ii) Identify the poles produced at the ends of the magnetic material

X_____(1 mark)

Y_____(1 mark)

Figure 6 are graphs that show two signals labelled X and Y that can be produced by a circuit. Use it to answer question **9 a** and **9 b**

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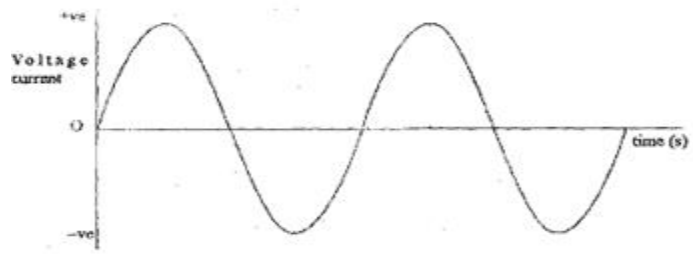

X

Y

a. What type of signal is shown in graph **X**

_____(1 mark)

b. What name is given to the process of converting signal **Y** to signal **X**

_____(1 mark)

10. State any **two** differences between a real image and a virtual image -

_____

_____(2 marks)

An object 6 cm long is placed 30 cm in front of a convex lens of focal length 10cm. use the lens formula to calculate:

(i) Image distance

(3 marks)

(ii) Magnification of the object

(2 marks)

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SECTION B (30 Marks)

11a. Describe **two** applications of unusual expansion of water in our day-to-day life

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_____

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_____(4 marks)

b. Describe an experiment that can be done to determine the speed of sound

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_____(6 marks)

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12a. Using well labelled diagram, describe the effect of narrow and wide gaps on the diffraction of water waves in a ripple tank.

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_____(4 marks)

b. Describe how a clinical thermometer works

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_____(6 marks)

13a. Describe how a transistor works as an amplifier in a circuit

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_____(4 marks)

b. Describe **three** ways in which the magnitude of induced current can be increased.

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_____(6 marks)

END OF QUESTION PAPER