FIRST NAME _____ SURNAME_____ CLASS_____

2022 CHINSAPO CLUSTER MOCK

2022 MALAWI SCHOOL CERTIFICATE OF EDUCATION EXAMINATION

PHYSICS

PAPER I

(100 marks)

Subject Number: M164/I

Time Allowed: 2 hours

Instructions

1. This paper contains **10 pages. Please check**.
2. Fill in your **examination number** and **school name** at the top of each page.
3. This paper contains two **sections A and B**. in Section A there are eight short answer questions while in section B there are five restricted essay questions.
4. Answer all the thirteen questions in the spaces provided.
5. Use of electronic calculators is allowed.
6. The **maximum number** of marks for each answer is indicated against each question.

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

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Section A (70 marks)

Answer all questions

1. a. Classify the following as vector or scalar quantity: distance, acceleration, displacement and temperature.

   Vector: _____(2marks)

   Scalar :_____ (2 marks)

   b. Force is defined as mass multiplied by acceleration (F = ma). The SI unit of force is a Newton. What is 1N in base units?

   _____ (2 marks)

   c. The figure 1 below shows a 20 kg box being pulled by three forces.

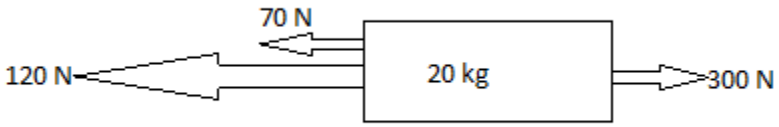


figure 1

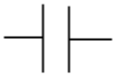
   i. calculate the resultant force on the box.

(2 marks)

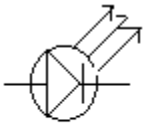
   ii. calculate the acceleration of the box.

(2 marks)

2. a. What electrical components are represented by the symbols below?



A



B

i. identify the components A and B.

A: _____

B: _____

(2 marks)

ii. what is the function of the component labelled A.

_____

_____ (1 mark)

b. In a circuit, a 7Ω resistor and an 3Ω resistor are connected in parallel and a 3Ω resistor is connected in series with them.

i. Draw a circuit diagram using the given information.

(2 marks)

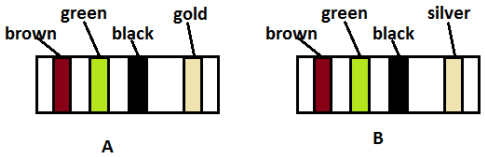
ii. Calculate the total resistance in the circuit in 2b(i) above.

(3 marks)

3. Figure 1 is a diagram showing colour codes and resistors marked A and B.

Colour	Black	Brown	Red	Orange	Yellow	Green
Code	0	1	2	3	4	5

Tolerance: Gold = 5% Silver = 10%



a. What is the resistance of resistor B? (2 marks)

b. Which one of the two resistors is better and why?

_____

_____ (2 marks)

4. a. With the aid of a diagram describe destructive interference.

_____

_____

_____ (2 marks)

b. The diagram below shows a wave.

i. What type of wave is shown above? Give a reason for your answer.

_____

_____ (2 marks)

ii. Calculate wavelength of the wave above.

(2 marks)

iii. Calculate the frequency if the 50cm distance is covered in 8 seconds.

(2 marks)

c. i. Define 'focal length of a convex lens

_____

_____ (1 mark)

ii. An object is placed 10cm away from a lens of focal length 5cm.
use the lens formula to find the image distance.

(3 marks)

e. Which parts of the camera works similar to the parts of the eye below

i. Retina? _____ (1 mark)

ii. Iris ? _____ (1 mark)

5. a. What is the difference between 'heat capacity' and 'specific heat capacity'?

_____

_____

_____

_____ (2 marks)

b. How much energy is needed to increase the temperature of 500g of lead from 20^oC to 45^oC? (specific heat capacity of lead is $128J/Kg^oC$)

(3 marks)

c. i. Give any two applications of specific heat capacity in everyday life.

_____

_____ (2 marks)

6. a. A machine with a velocity ratio of 5 requires 5000 J of energy to lift a load of 80 N through a vertical distance of 5m.

i. Calculate the efficiency of the machine.

(3 marks)

ii. The mechanical advantage of the machine.

(3 marks)

b. Why is a hydraulic press called a force multiplier?

_____

_____

_____(2 marks)

7. a. State Newton's second law of motion.

_____

_____ (1 mark)

b. A car of mass 2000Kg accelerates uniformly from rest to a velocity of 10m/s in 5 seconds.

Calculate;

i. acceleration of the car

(2 marks)

ii. force required to produce the acceleration.

(2 marks)

8. a. Define half-life

_____

_____ (1 mark)

b. A sample of iodine-131 has 40 million atoms with unstable nuclei. If the half-life of Iodine-131 is 8 days, how many nuclei will be left after 40 days?

(3 marks)

9. a. What is doping in relation to semi – conductors?

_____
_____ (1 mark)

b. State two functions of transistors?

_____
_____
(2 marks)

c. Are electromagnetic waves longitudinal or transverse?

_____ (1 mark)

d. Give a reason for the answer in "c" above.

_____
_____ (2 marks)

10. a. Why is a hypothesis important in any scientific investigation?

_____
_____
_____
_____ (2 marks)

b. Why is it important to control some variables in a scientific investigation?

_____
_____
_____
_____(2marks)

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Section B (30 marks)

Answer all questions

11. a. With the aid of a diagram, describe how a step up transformer works.

_____
_____
_____
_____
_____(4 marks)

b .State two ways in which a transformer loses energy.

_____
_____
_____ (2 marks)

a. How can the loses in a transformer mentioned above be minimized?

_____
_____
_____

(4marks)

12. a. Explain why a balloon that is inflated with air burst when it is rising in the atmosphere ?

_____
_____
_____
_____
_____
_____(5 marks)

b. Describe how the thickness of a sheet of plastic could be controlled using radiation during manufacturing

_____
_____
_____

_____

_____

_____(5 marks)

13. a. Figure 4 below shows a velocity-time graph for a cyclist.

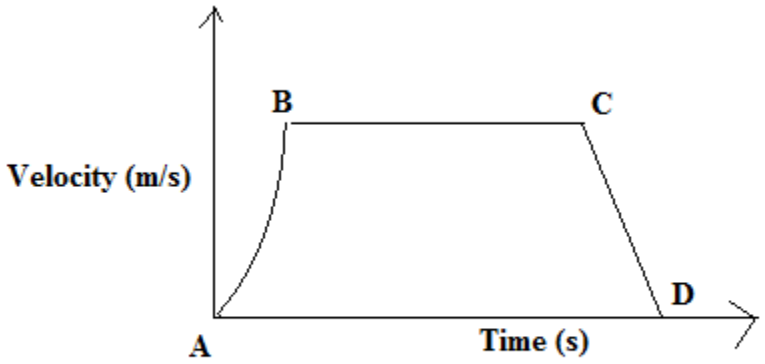

figure 4

Describe the motion of the motorist between the following points.

i. A to B: _____(1 mark)

ii. B to C: _____(1 mark)

iii. C to D: _____(1 mark)

b .Explain how the speed of an athlete could be determined using a stop watch and a tape measure.

_____

_____

_____

_____

_____

_____

_____

_____

(7 marks)

END OF QUESTION PAPER