NAME: _____ FORM 4: _____

2019 MSCE MZUZU DIOCESE MOCK EXAMINATION

PHYSICS

PAPER I

(100 Marks) Subject number: M164/I

Time Allowed: 2hours

Tuesday, 2nd April. 7:30 – 9:30 am

Instructions

1. This paper contains **13** printed pages. Please check.
2. There are **13** questions altogether in this paper.
3. Answer all the **13** questions.
4. The maximum number of marks for each question is indicated against each question.
5. There are **two** sections **A** and **B**. In section **A** there are 10 short answer questions, In section **B there are three restricted essay questions.**
6. Write your full **name** at the top of each page of the question paper.
7. Use of electronic calculators is allowed.
8. In the table provided on this page, tick against numbers you have answered.

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

SECTION A (70 MARKS)

1.a. State any **two** safety measures to be followed when there is fire outbreak in a labolatory.

_____

_____

_____**(2marks)**

.b. List the **three** types of errors in a scientific investigation.

_____

_____

_____**(3marks)**

c. Mention any **two** ways of presenting data in a scientific investigation.

_____

_____**(2marks)**

2. a. Distinguish between the two types of wave interference.

_____

_____

_____

_____**(2marks)**

b. A water wave whose wavelength is **7.5 cm** in the deep end of an inclined tank has a wavelength of **3.0 cm** in the shallow end. If the speed of the wave in the shallow end is **0.6m/s,** calculate its speed in the deep end.

(4 marks)

c. **Figure 1** is a diagram of a pendulum. The mass vibrates between points A and C through B.

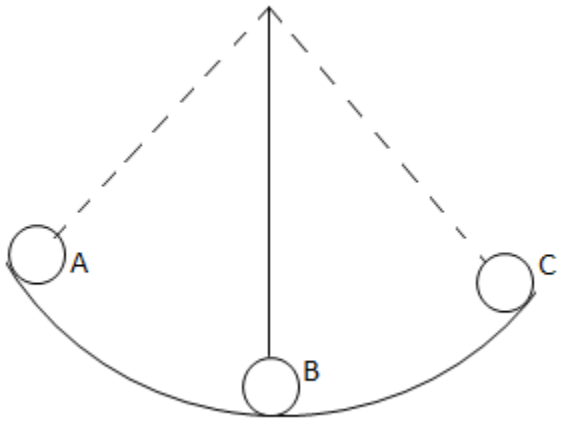

Figure 1

i. What happens to the speed of the mass as it moves from positions:

1. A to B?_____

_____**(1mark)**

2. B to C?_____

_____ **(1 mark)**

ii. What happens to the frequency and amplitude of oscillation as the time increases?_____

_____ **(1 mark)**

iii. State the energy changes of the mass as it moves from A to C.

_____

_____**(2 marks)**

iv. What happens to the frequency of a pendulum when the length of the string is changed?

_____

_____**(1 mark)**

. d. What do you understand by the following terms?

(i) Free vibrations

_____

_____**(1mark)**

(ii) Forced vibrations

_____

_____**(1mark)**

(iii) Natural vibrations.

_____

_____**(1mark)**

(iv) Resonance.

_____

_____**(1mark)**

3. **Figure 2** below is a diagram of an electric circuit. The **emf** =12V.

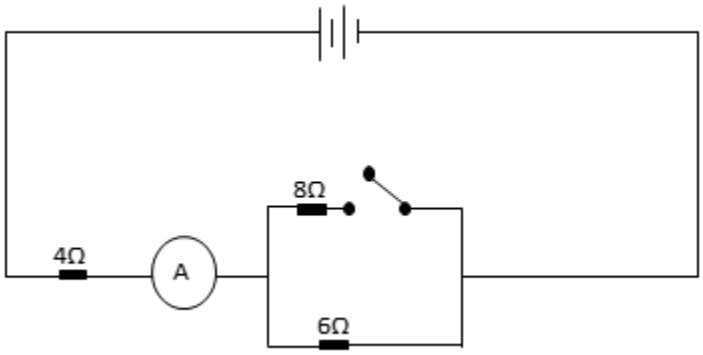

Figure 2

i. What will be the ammeter reading if the switch is closed?

(3marks)

ii.State **one** advantage of alternating current (ac) over direct current (dc).

_____(1mark)

4. a. Differentiate heat capacity from specific heat capacity of pure water.

_____

_____

_____**(1mark)**

b. Water in a basin absorbs 80 KJ of heat from the immersing electric heater for its temperature to rise from 24^0C to74^0C. Work out the heat capacity of water in the basin.

(3marks)

5.a. State **Newton's** second law of motion

_____

_____

_____**(1mark)**

b. A car of mass **6000 kg** is travelling at uniform speed of 45m/s from Mzuzu to Ekwendeni. A man steps out in front of causing the driver to brake suddenly. It takes 5 seconds to stop the car. Work out deceleration of the car.

(3marks)

C. A car of mass 100kg moves round a circular track of radius 100m with a linear speed of 20m/s. Calculate:

(i). the angular velocity.

(2marks)

(ii). centripetal force.

(2marks)

(iii). Centripetal acceleration

(2marks)

6. a. Define radioactive decay.

_____

_____

_____**(1mark)**

b. A radioactive sample has a half-life of 80 minutes. Work out the amount of radioactive sample remaining after 200 minutes if initially it was 600 g.

(3marks)

7. a. State the principle of moments.

_____

_____**(1mark)**

b. A machine uses a pulley machine with a velocity ratio of 6 to raise an engine out of a vehicle. The engine, which has a weight of 2800N, is raised a vertical distance of 1.5 m by the machine. If the mechanical pulls with an effort of 500N, calculate:

(i). the work done by the mechanic.

(2marks)

(ii). the useful work done by the pulley machine.

(2marks)

(iii). The efficiency of the machine.

(2marks)

8. a. State Faraday's law.

_____

_____**(1mark)**

b. (i) Mention **two** uses of a diode.

_____

_____**(2marks)**

(ii) The electric power input and output of a 100% efficient transformer is 200 kW. If the current in primary and secondary coils are 10 A and 0.5 A respectively, work out voltage in

1. Primary coil

(2marks)

2. Secondary coil.

(2 marks)

(iii) What type of transformer is it in **b (ii)** above?

_____**(1mark)**

9. (a) Give any **one** effect of force .

_____

_____**(1mark)**

b. State **one** factor of moment of force.

_____**(1mark)**

c. **Figure 3** is a diagram showing an object falling in air.

i. Name the forces **A, B** and **C.**

A._____

B._____

C._____ **(3marks)**

ii. What would be the relationship between magnitudes of **A, B** and **C** at equilibrium?

_____ **(1mark)**

10. At what angle must two mirrors be inclined in order to form **11** images?

(3marks)

SECTION B (30 Marks)

11 a. Explain why an egg boiled at sea level takes a short time than when boiled at high altitude.

_____

_____

_____

_____

_____

_____**(4marks)**

b. Name and explain **three** factors that affect the rate of diffusion in gases.

_____

_____

_____

_____

_____

_____

_____

_____**(6marks)**

12. a. A 6 KW of power is fed to a transmission cable of resistance 3 ohm. Calculate the power wasted in the cable if power is transmitted at 3000V

(3marks)

b. With the aid of a well labeled diagram, describe an experiment that could be done to find out if electrical resistance of a wire varies directly proportional to its length.

(7marks)

13. Design an experiment that you can conduct to determine the density of a liquid.

(10 marks)

END OF QUESTIONPAPER

This paper contains 13 printed pages