S.4 PHYSICS Assignment (UCE Style)

535/2

PAPER 2

TIME: 2¹/₄ HOURS

Attempt the Work and Submit to Mr. Ssendawula in the eLearning Platform Physics Forum or on WhatsApp +256 700 377992. You could so the work on paper and scan or photograph it using a Smartphone

Instructions:

Answer any five questions

Any additional questions answered will not be marked

These values of physical quantities may be useful to you;

Acceleration due to gravity = 10ms^{-2}

Specific latent heat of vaporization of water $= 2.26 \times 10^6 \text{Jkg}^{-1}$

Specific heat capacity of water $= 4200 \text{ Jkg}^{-1} \text{ K}^{-1}$

- 1. (a) (i) Name the suitable instrumentfor measuring the diameter of a pendulum bob.
 - (1 mark)
 - (ii) Describe how the density of a small piece of stone can be determined.

(4 marks)

(b) A builder has 2.5m³ of concrete delivered to a building site. If he wants it to be carried up on a wheelbarrow which carries a load of 600N per trip, determine the number of trips he will make given that the density of concrete is 3000kgm⁻³

(5 marks)

(c) (i)Define the term pressure and state its SI unit.

(2 marks)

- (ii)A nurse applies a force of 6N to inject a patient. If the area of the sharp end of the needle is $8 \times 10^{-6} \text{ m}^2$, find the pressure exerted on the patient's body. (2 marks)
- (d) In a hydraulic brake system;
 - (i) Give one reason why oil is used instead of air.

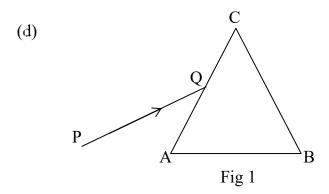
(1 mark)

2.		(ii) Wl (a)		ald be the effect if an air bubble enters the system? e the following terms with respect to machines.	(1 mark)
۷.		(b)	(i) (ii)	(01 mark) (01 mark) load of 5000 <i>N</i>	
			(i) (ii)	Draw a diagram to show the pulley system. Determine how far the load is raised when the effort by $4m$. (02 1)	(02 marks) is moved down narks)
	(c)	A uniform beam AB of length 1m and weight 20N is suspended using a string at a distance of 0.40m from A.			
		(i) State the principle of moments. (1 mark) (ii) Draw a diagram to show the forces acting on the beam. (1 mark) (iii) Find the distance from A at which a weight of 8N should be suspended so tha the beam is in equilibrium (3 marks)			
	(d)	Explai hinge.		it is easy to open a door when the door handle is fixed	l away from the (2 marks)
	(e)	A man pushes a block of mass 24kg along a rough horizontal floor using a force of 90N. The friction force between the floor and the block surface is 48N.			
		Determine the acceleration of the block. (3 marks)			
3.		(a)(i) S (ii)	(1 mark) o verity the (5 marks)		
		(b) Dry air at a pressure of 3500 Nm ⁻² and a temperature of constant volume to a pressure of 4950 Nm ⁻² .			is heated at a
		Find the new temperature. (3 marks) (c) Use the kinetic theory of matter to explain what happens to the pressure of a fixed mass of gas when compressed at constant temperature. (2 marks)			
		(d)	(ii) Wa	fine latent heat of vaporization ater of mass 600g at 30°C is contained in a brass color If 70g of pure steam is bubbled into the water and the	

temperature rises to 89.5°C, find the specific heat capacity of brass.

(4 marks)

- 4. (a) With the aid of a labeled diagrams, explain regular and diffuse reflection.
 - (b) Give two reasons why convex mirrors are suitable for use as driving mirrors. (2 marks)
 - (c) An object of height4cm is placed 10cm infront of a concave mirror of focallength 15cm perpendicular to the principal axis. Use a scale diagram to find;
 - (i) the position and nature of the image formed. (5 marks)
 - (ii) the magnification (2 marks)



The diagram in Fig 1 shows a ray of white light incident on a glass prism. Explain what happens to the ray as it passes through the prism. (3 marks)

- 5. (a) Define the following terms as applied to waves.
 - (i) amplitude (1 mark)
 - (ii) wavelength (1 mark)
 - (b) A progressive wave of frequency, f, and wavelength, λ , is moving at a speed, v Derive an equation to show the relation between f, λ and v. (3 marks)
 - (c) A radio signal is transmitted at a frequency of **3.5MHz**. Find the wavelength of the signal. (2 marks)
 - (d) Describe an experiment to show that sound does not travel through a vacuum (5 marks)
 - (e) (i) What is **an echo**? (1 mark)
 - (ii) Explain why echoes are not heard in a small room. (3 marks)

- 6. (a) (i) What is an alternating current? (01 mark)
 - (ii) State any **two** advantages of alternating current over direct current. (02 marks)
 - (b) Distinguish between step up and step down transformer. (02 marks)
 - (c) (i) A transformer with a secondary to primary ratio of 1: 60 draws power from the mains voltage of 240V. Determine it's out put voltage. (03 marks)
 - (ii) State **two** precautions taken during house wiring. (02 marks)
 - (d) Give **two** ways of minimizing power loss during transmission of electric power over long distances. (02 marks)

(e)

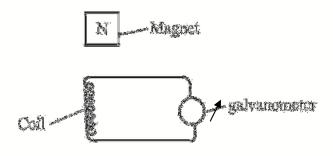


Fig. 2

State and explain what is observed when the magnet in figure 2 above is brought near and then withdrawn from the coil. (04 marks)

- 7.(a) Describe how a gold leaf electroscope can be used to detect the presence of charge on a glass rod. (3 marks)
 - (b) Explain how an insulator gets charged by rubbing (3 marks)
 - (c) With the aid of a circuit diagram, describe an experiment to verify **Ohm's law.** (6 marks)

(d)

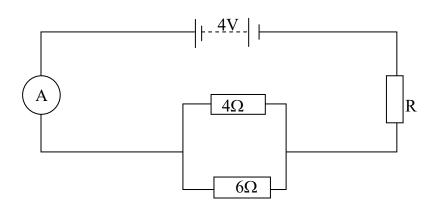


Fig 3

Fig 3 shows a battery of emf 4V and negligible internal resistance connected to resistors of resistances 4Ω , 8Ω and $R\Omega$. Determine the value of R if the ammeter reading is 0.5A (4 marks)

8. (a) Define the term half life.

(1 mark)

- (b) A nitrogen nuclide ${16 \over 7}N$ decays to become an oxygen nuclide by emitting a beta particle.
- (i) Write down an equation to show this process.

(1 mark)

- (ii) If the half life of the nuclide $\frac{16}{7}N$ is 6.5minutes, calculate the fraction of the original radioactive isotope remaining after 32.5minutes. (3 marks)
- (iii) Give **two** medical uses of radio isotopes.

(2 marks)

(c) State the functions of the *cathode, time base, and anodes* of a CRO.

(03 marks)

- (d) (i) Describe briefly how x-rays are produced. (04 marks)
 - (ii) Distinguish between hard and soft x-rays.

(02 marks)

END