535/2
Physics
Paper 2

2 ¼ hrs

INTERNAL MOCK EXAMINATIONS – 2019

Uganda Certificate of Education

Physics Paper 2

Time allowed: 2 hrs 15minutes

INSTRUCTIONS TO CANDIDATES

- *Answer any **five** questions.*
- *These values of physical quantities may be useful to you,*

Acceleration due to gravity	*= 10ms^{-2}*
Density of water	*=1000kgm^{-2}*
Specific heat capacity of water	*=4200Jkg^{-1}K^{-1}*
Specific latent heat fusion of water	*=340000Jkg^{-1}*
Speed of sound in air	*=330 ms^{-1}*
Specific heat capacity of copper	*=4000Jkg^{-1}k^{-1}*

1. (a) (i) Define **momentum**; (01mk)

ii) Explain why the occupants of a car move forward when the vehicle suddenly brakes. (03mks)

b) Two identical masses, each of mass 1 kg, are hung from strings 10 m above the surface of the earth and the moon respectively. If the acceleration due to gravity on the moon is $1.6ms^{-2}$.

i) Find the tensions in the strings. (03mks)

ii) determine the kinetic energy of the mass on reaching the surface of the moon if the string is cut. (03mks)

c)

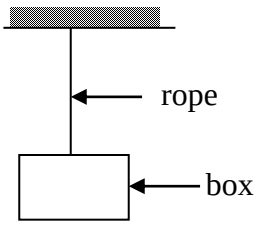


Fig.1

A box of concrete of mass 400 kg is raised by a string of a crane as shown in fig.1.

i) show the major forces acting on the box. (02mks)

ii) if a force of 4800 N is experienced in the string, find the acceleration of the box as it rises. (03mks)

iii) what tension will produce a steady velocity? (01mk)

2. (a) Use the kinetic theory of matter to explain why ice melts faster when salt is sprinkled on it. (02mks)

b) A drop of olive oil of volume $0.1mm^3$ is carefully placed on the surface of clean water. it spreads out completely into a patch of area 1.0×10^4 mm^2.

i) Calculate the thickness of the oil patch (03mks)

ii) Estimate the number of molecules in 0.1 mm^3. (03mks)

c) (i) Explain the importance of having a thin –walled bulb in mercury –in –glass thermometer.

ii) In an ungraduated thermometer, the length of the mercury thread is 4 cm when the thermometer is immersed in pure melting ice and 12 cm in steam at 100°C. What temperature corresponds to a thread length of 7.6 cm? (03mks)

d) Distinguish between **heat** and **temperature**; (02mks)

3. (a) Give the difference between **transverse** and **longitudinal waves.** (02mks)

b) (i) Describe a simple echo method of determining the speed of sound in air. (05mks)

c) Explain why echoes are not heard in small rooms. (02mks)

c) A vibrator of frequency 50 Hz produces circular waves in a ripple tank. If the distance between any **two** consecutive crests is 4.5 cm, find the speed of the waves. (03mks)

d) Give **two** examples which show that waves carry energy. (02mks)

4. (a) Define the following terms as applied to concave mirrors;

i) **Principal focus** (01mk)

ii) **Radius of curvature** (01mk)

b) With the aid of a ray diagram, describe how a concave mirror can be used as a magnifying mirror.

c) An object 2 cm long is placed perpendicular to the principal axis of a concave mirror at a distance of 20 cm from the pole. If the focal length of the mirror is 15 cm, draw a scale diagram and use it to find;

i) the position of the image. (05mks)

ii) the size of the image (02mks)

5. (a) (i) What is **a magnetic field**? (01mk)

ii) State the **law of magnetism**; (01mk)

iii) Draw a diagram of the magnetic field pattern between the north poles of two bar magnets placed near each other. (02mks)

b) (i) Describe a single touch method for magnetizing a piece of steel. (04mks)

ii) Explain why the strength of a magnet cannot be increased beyond a certain limit. (03mks)

iii) State, with a reason, the material you would consider most suitable for a permanent magnet. (02mks)

c)

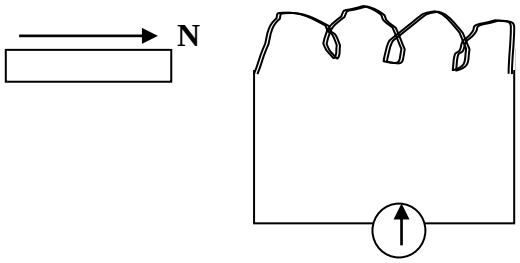


Fig.2

The diagram in fig. 2 shows a north pole of a bar magnet moving towards a coil connected to a centre –zero galvanometer. Explain what happens. (03mks)

6. (a) (i) State the energy conservation in a solar cell. (01mk)

ii) Give **two** examples where solar cells are used. (01mk)

b) A box of mass 2.5 kg is pushed 3 m across a floor against a frictional force of 5N.

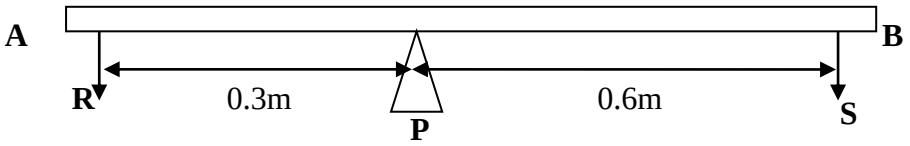
i) How much work is done? (02mks)

ii) Explain what happens when the box is pushed across the floor by a force of 8 N? (03mks)

c) (i) State the **principle of moments**. (01mk)

ii) Describe an experiment to determine the mass of a metre rule given a mass of 100 g. (05mks)

d) A uniform beam AB of weight 2.5 N is pivoted at its mid –point P, as shown in fig.3.



Fg.3

The beam remains in equilibrium when forces R and S act on it. If R is 5N, find the;

i) Value of **S**. (02mks)

ii) Reaction at the pivot (01mk)

7. (a) (i) State **Ohm's law**.

ii) With the aid of a circular diagram, describe an experiment to determine the relationship between potential difference across an Ohmic conductor and the current flowing through it at constant temperature. (6mks)

b) The circuit diagram in fig. 4 shows a battery of e.m.f 6v and negligible internal resistance connected to resistors of resistance 4Ω, 6Ω, and 2.6Ω,.

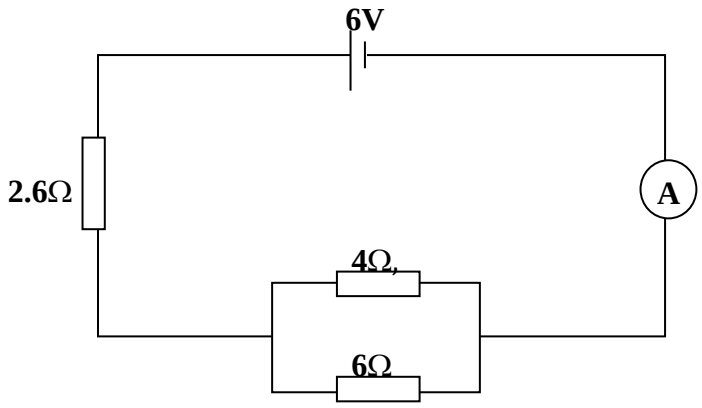


Fig.4

Determine the;

i) Ammeter reading (04mks)

ii) Power dissipated in the 6Ω, resistor (03mks)

c) Explain why a fuse is usually fixed in an electric plug of a flat iron. (02mks)

8. (a) (i) A radioactive nuclide $^{226}_{88}Ra$ decay emission of two alpha particles and two beta particles to a nuclide Y.

i) Define **radioactivity**. (01mk)

ii) Give **three** differences between **alpha** and **beta particles**. (03mks)

iii) State the atomic number and mass number of Y. (02mks)

b) Give any **two** precautions taken when handling radioactive materials. (02mks)

c) A certain mass material contains 2.7×10^{24} radioactive atoms.

How many atoms will have decayed after 3,200 years if the half life of the material is 1600 years? (04mks)

d) Describe briefly how radioactivity can be used to detect leakage of an underground pipe. (04mks)

END