PHYSICS PP2 FORM 3; 2017

TIME:2HOURS

Instructions to candidates

- ✓ Write your name and class in the spaces provided above.
- ✓ This paper consists of **TWO** sections; **A** and **B**.
- ✓ Answer **ALL** the questions in section A and B in the spaces provided after each question.
- ✓ **ALL** working **MUST** be clearly shown.
- ✓ Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

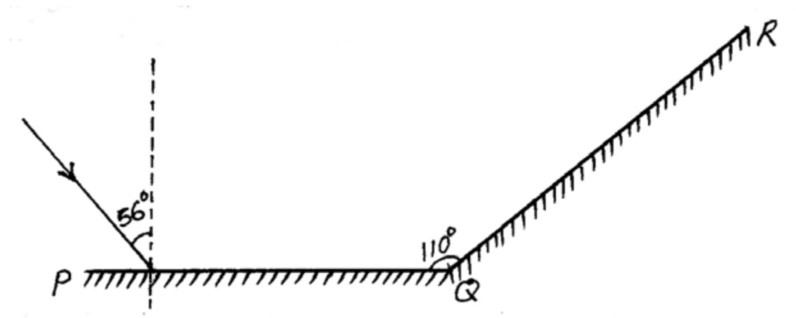
Take: Acceleration due to gravity g = 10 ms^{-2} Density of water = 1000 Kg/m^3

for free revision past papers visit: www.freekcsepastpapers.com

SECTION A: (25 MARKS) Answer all questions in this section in the spaces provided.

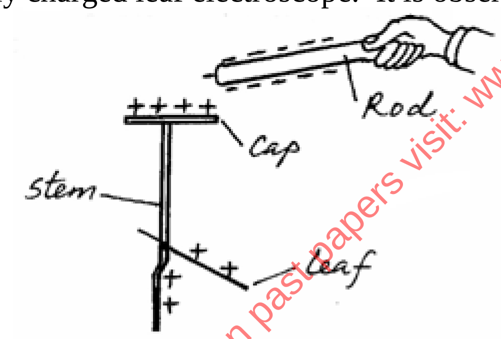
1. The figure below show two plane mirrors PQ and QR inclined at an angle of 110°.

   A ray of light is incident on mirror PQ at an angle 56°.



Complete the diagram to determine the angle of reflection of the ray in the mirror QR. (2 marks)

2. The figure below shows a highly negatively charged rod being brought slowly near the cap of positively charged leaf electroscope. It is observed that the leaf initially falls and then rises.

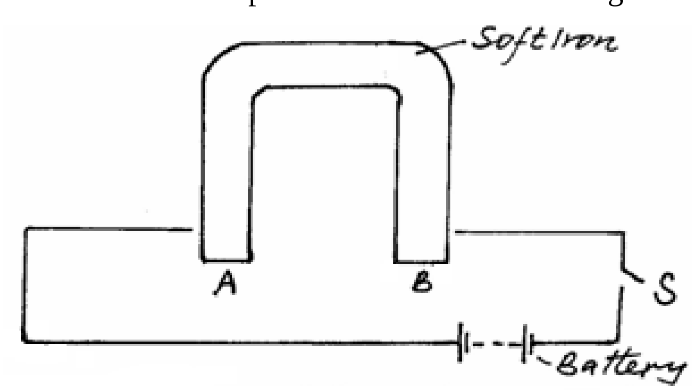


Explain this observation. (1 marks)

for free revision past papers visit: www.freekcsepastpapers.com

3. A current of 0.8A flows through an electric circuit. Determine the quantity of charge that passes a point in the circuit in 6 minutes. (2 marks)

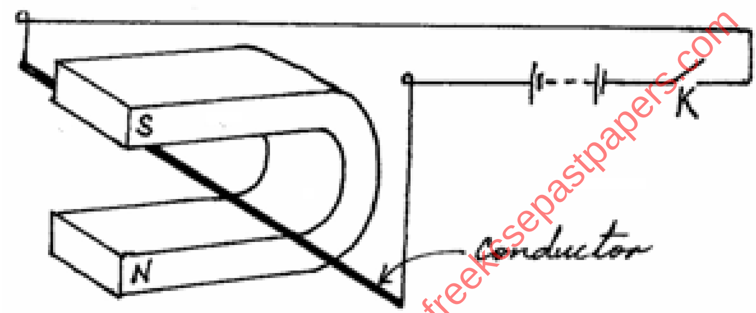
4. The figure below shows an incomplete circuit of an electromagnet.



Complete the circuit by drawing the windings on the two arms of the core so that A and B are both north poles when the switch S is closed. Indicate the direction of the current of the windings drawn. (2 mark)

5. A girl standing 120m away from a tall building claps her hands and hears an echo 0.75s. Determine the speed of sound in air at this place. (2 mark)

6. The figure below shows a thick copper conductor placed between two poles of a strong magnet. The wire is free to swing in between the poles.



(a) Indicate on the same diagram the direction in which the conductor swings when the switch K is closed. (1 mark)

(b) State one change that can be made on the set up so that the direction of swing of the conductor is reversed.(1mks)

7. Explain why;

(i) It is dangerous to carry a pointed umbrella when it is raining.(1mk)

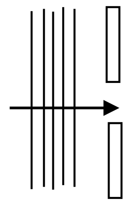
(ii) It is not advisable to take shelter under a tree when it is raining(1mk)

8.State two ways in which polarization reduces the potential difference across a simple cell(2mks)

9.State the main difference between a transverse wave and a longitudinal wave(1mk)

for free revision past papers visit: www.freekcsepastpapers.com

10. The figure below shows plane waves approaching a very narrow slit S.



S

Complete the diagram to show the pattern after crossing the slit. (2marks)

11. Give a reason why lecture theatre halls are covered with soft perforated materials.(1mark)

12.A heating coil draws 100 watts from a 220-volts supply. What change in resistance would be required for the coil to draw the same power from a 200-volt supply(2mks)

13.Give two reasons why soft iron is used as a core of the coil in an electric bell(2mks)

14.State two conditions necessary for total internal reflection to occur.(2mks)

for free revision past papers visit: www.freekcsepastpapers.com

<u>SECTION B (55 MARKS)</u> ***Answer ALL questions in this section in the spaces provided***

15. (a) Students set up a mass attached to a spring such that when it oscillates it taps on water surface in a wide shallow tank as in figure 11 below.

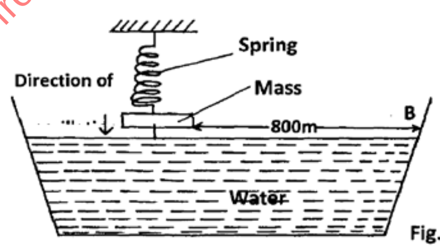


Fig. 11

The students measured time for 20 oscillations and found that the mass takes 36 seconds.

Determine;

(i) The periodic time of the mass. (2marks)

(ii) The frequency of the waves produced on the water surface. (1mark)

(iii) The speed of the waves if the students counted four ripples between the mass and end **B** of the tank (3marks)

(b) An echo sounder of a ship received the reflected waves from a sea bed after 0.20s.

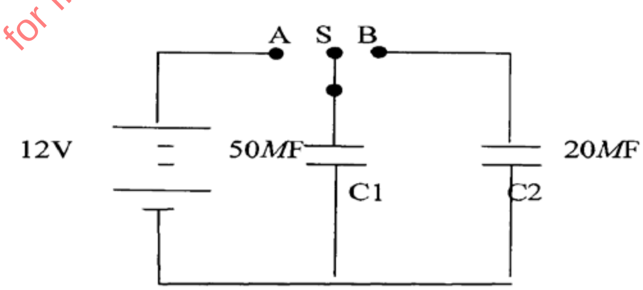
(i) Determine the depth of the sea bed if the velocity of sound in water is 1450m/s (2marks)

(ii)When the ship above passes over a sunken reef, the echo sounder receives an echo after 0.16s.

Determine the height of the sunken reef (2marks)

16. (a) State the basic law of electrostatics. (1mark)

(b)The figure below shows an arrangement which may be used to charge a capacitor of capacitance 50*MF* and then to connect it to a capacitor of capacitance 20*MF*.

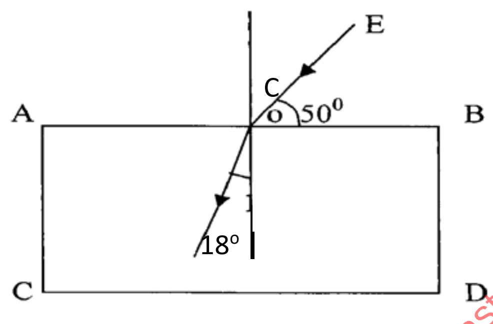


(i) The switch S is first placed at position A, so that the capacitor C, is connected to the 12V dc supply. Calculate the charge stored in the capacitor. (3marks)

for free revision past papers visit: www.freekcsepastpapers.com

(ii) The switch S is now changed to position B. Calculate the final potential difference across the capacitors (3marks)

17. A ray of light traveling in the direction EO in air enters a rectangular block as shown in the diagram. The resulting angle of refraction is 18°.

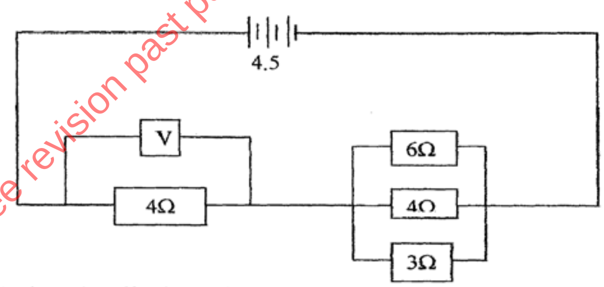


Find:(i) The refractive index of the block. (2marks)

(ii) The critical angle C of the block. (3marks)

for free revision past papers visit: www.freekcsepastpapers.com

18. (a) Study the circuit diagram below and answer the questions that follow.

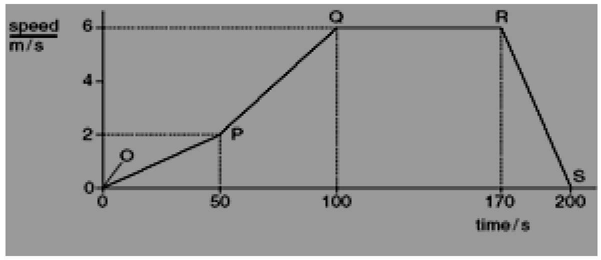


(i) Calculate the effective resistance of the circuit. (3marks)

(ii) Find the voltmeter reading. (2marks)

(b) A cell drives a current of 3.2A through a 2.8Ω resistor. When it is connected to 1 .6Ω resistor, the current that flows is 5A. Find the e.m.f. (E) and internal resistance of the cell. (3marks)

19..The figure below shows the speed/time graph for a journey travelled by a tractor.



(a) Use the graph to describe the motion of the tractor during section PQ,(1mks)

(b) Which two points on the graph show when the tractor is stationary? [1mk]

(c)Calculate the total distance traveled by the tractor after 200seconds.(2mks)

(d)Calculate the average speed of the tractor.(1mks)

20. A student wanted to change 5kg of ice at -20^{0}C to water at 0^0 C{specific heat capacity of ice=2100J/kg/k ,specific latent heat of fusion of ice=34000J/kg/k}.

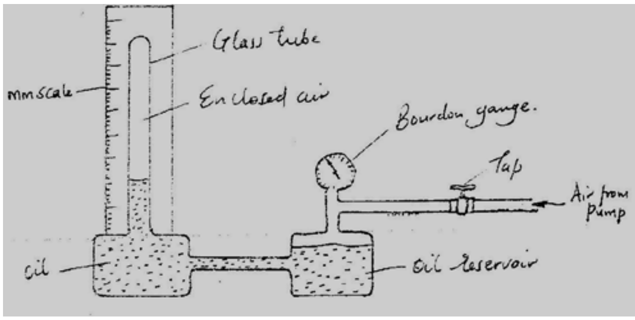
(i)Calculate the amount of heat required to change ice at -20^{0}C to ice at 0^{0}C [2mk].

(ii) Calculate the amount of heat required to change ice at 0^{0}C to water at 0^{0}C (2mk)

(ii)Hence calculate the total amount of heat required to change 5kg of ice from -20^{0}C to water at 0^{0}C(1mk)

21.(a) The figure below shows a set-up that may be used to verify Boyle's law.

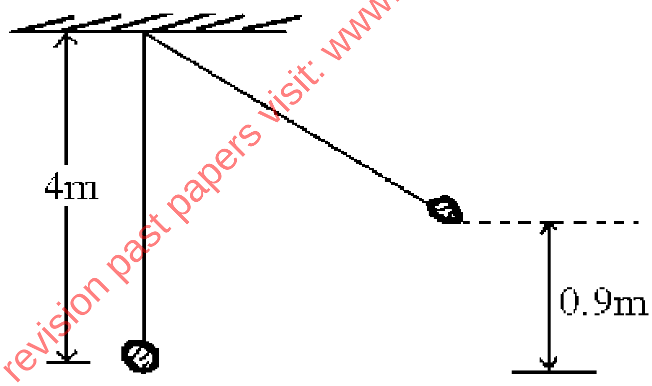
for free revision past papers visit: www.freekcsepastpapers.com



(i) Describe the measurements that should be taken in the experiment(2mks)

(ii)Explain how the measurements taken in (i) above may be used to verify Boyle's law.(2mks).

22.(a)A body of mass 20Kg hangs 4m and swings through a vertical height of 0.9m as shown below



for free revision past papers visit: www.freekcsepastpapers.com

Determine;

i)the potential energy at its position. (2 marks)

ii)the speed of the body when passing through the lowest point.(3 marks)

b) A crane lifts a load of 2000Kg through a vertical distance of 3.0m in 6 seconds.

Determine the;

i) Work done by the crane. (2 marks)

ii)Power developed by the crane. (2 marks)

iii) Efficiency of the crane given that it is operated by an electric motor rated 12.5kw.(2mks)

for free revision past papers visit: www.freekcsepastpapers.com