**NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ ADM NO.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**SIGNATURE:\_\_\_\_\_\_\_\_\_\_\_\_**

**DATE:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**232**

**PHYSICS**

**2 1/2 Hours**

**FORM THREE TERM II END TERM EXAM - 2019**

**Instructions to Candidates**

* ***Write your Name and admission Number in the Spaces Provided above.***
* ***Answer all the questions in Section A and B in the spaces provided in the question paper.***
* ***ALL working MUST be clearly shown.***
* ***Non Programmable silent electronic calculators and KNEC Mathematical tables may be used.***
* ***Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.***

**For Examiner’s Use Only**

|  |  |  |  |
| --- | --- | --- | --- |
| **Section** | **Question** | **Maximum Score** | **Candidates Score** |
| **A** | **1-13** | **25** |  |
| **B** | **14** | **10** |  |
| **15** | **09** |  |
| **16** | **13** |  |
| **17** | **14** |  |
| **18** | **09** |  |
| **19** | **10** |  |
| **20** | **10** |  |
| **Total Score** | | **100** |  |

SECTION A (25 MARKS)

1. Define optics as a branch of physics. (1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. A liquid of density 1.2g/cm3 and volume of 300cm3 was mixed with 200g of liquid L. Determine volume of liquid L if density of the mixture is 1500Kgm-3. (3mks)
2. a) State one factor that affects surface tension of liquids. (1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) Define Hookes law (1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

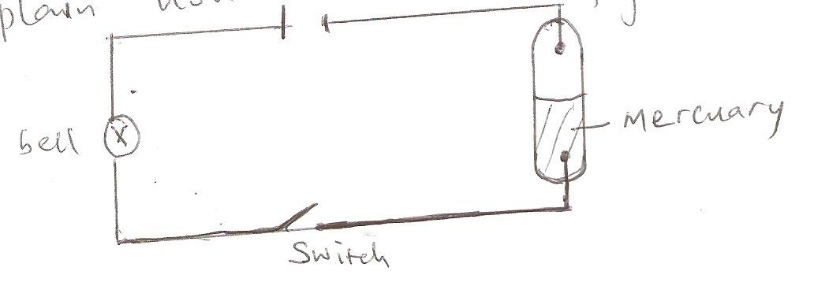
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. State what is observed in smoke cell experiment.(1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain how alarm in figure below operates. (2mks)



\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

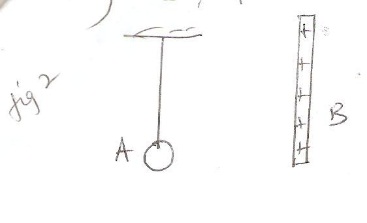
1. Explain how chimney in kitchen works. (2mks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine the number of images formed when two mirrors are inclined at 200 (2mk)
2. When a body A was brought close to a charged body B it was repelled. Identify the charge on body A. (1mk)



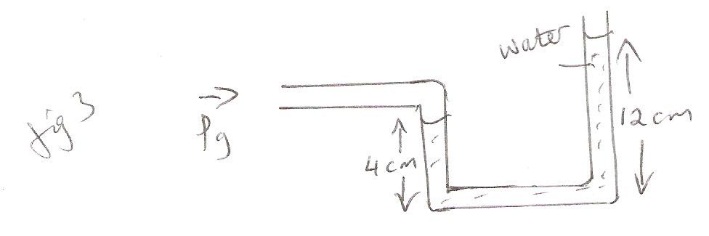
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Explain why topping in cells is done using distilled water. (1mk)

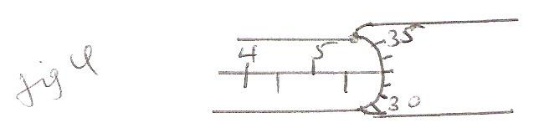
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine gas pressure in figure 3 below (g = 10N/Kg, density of water = 1g/cm3, atmospheric pressure =105NM2). (3mks)



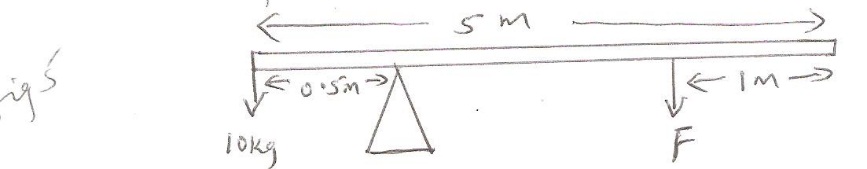
1. A bulb rated 75W, 240V was used. Determine its resistance. (2mks)
2. A micrometer screw gauge with zero error of -0.035 was used.



Determine its reading. (2mks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

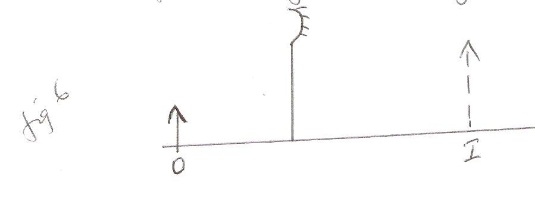
1. A uniform body of length 5m and mass 2kg is pivoted and balanced by 10kg at one end and force F



Determine force F(3mks)

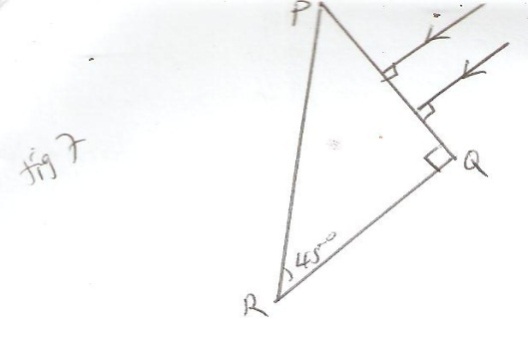
SECTION B (55 MARKS)

1. a) Determine the focal length in figure 6 below(4mks)



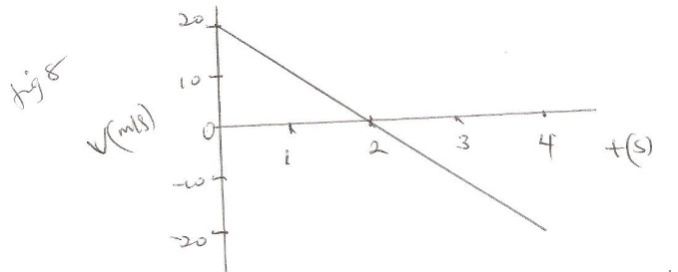
b) A convex mirror of focal length 12cm form an image 9cm from the mirror. Determine the object distance. (3mks)

c) Figure 7 below shows two rays incident normally to face PQ of a glass prism whose critical angle is 420 complete the diagram to show the paths of the two rays as they pass through the prism. (3mks)



1. a) An object dropped from a height h attains a velocity of 6m/s just before hitting the ground. Find the value of h. (3mks)

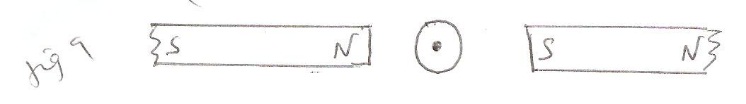
b) The graph below shows how the velocity varies with time for a body thrown vertically upwards.



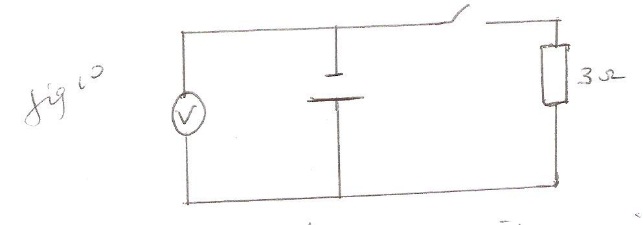
Determine the total distance moved by the body. (3mks)

c) A horizontal force of 12N is applied on a wooden block of mass 2Kg placed on a horizontal surface. It causes the block to accelerate at 5m/s2. Determine the frictional force between the block and the surface. (3mks)

1. Indicate with an arrow on the diagram the direction in which the conductor will move when it is released. (1mk)



b) The figure 10 below shows a cell in series with a 3Ω resistor and a switch. A high resistance voltmeter is connected across the cell.



The voltmeter reads 1.5V with switch open and 1.2V with switch closed.

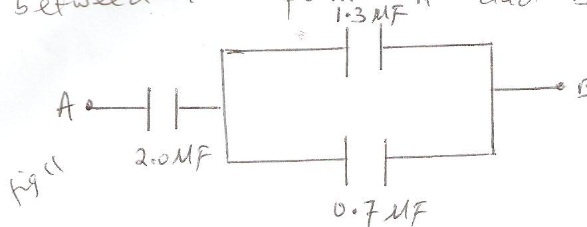
1. State the e.m.f. of the cell. (2mks)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Determine the current through the 3Ω resistor when the switch is closed. (2mks)
2. Determine the internal resistance of the cell(2mks)
3. Another resistor R is connected in series with the 3Ω resistor so that a current of 0.15A flows when the switch is closed. Determine the resistance. (3mks)

c) The figure below shows three capacitors connected between two points A and B.



Determine the capacitance across AB (3mks)

d) State the effect of decreasing the distance between the plates of a parallel plate capacitor on the capacitance. (1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

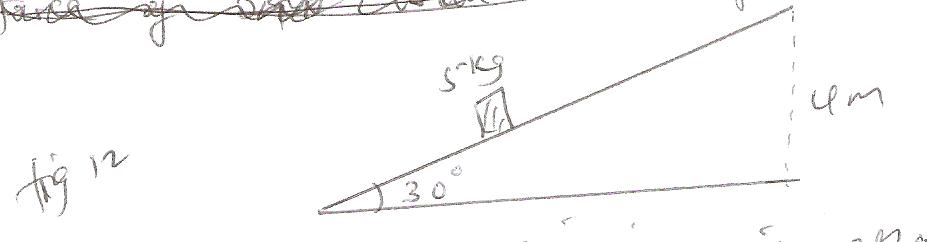
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. a) Name the device used to convert light energy directly into electrical energy. (1mk)

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

b) The figure below shows a body of mass 5Kg placed on a surface which is inclined at an angle of 300 to the horizontal.



Determine the efficiency if effort used is 30N. (4mks)

c) A crane lifts a load of 2000Kg through a vertical distance of 3.0m in 6seconds. Determine the:

1. Work done. (3mks)
2. Power developed by the crane. (3mks)
3. Efficiency of the crane if mortar is rated 12.5Kw (3mks)
4. a) Determine the wavelength of sound wave of frequency 30Hz.

(Speed of sound in air = 330m/s). (3mks)

b) A block of ice of mass 40g at 00c is placed in a calorimeter containing 400g of water at 200c. Ignoring the heat absorbed by calorimeter, determine the final temperature of the mixture after all the ice has melted. (Lf = 334,000j/Kg/K, SHC = 4200j/Kg/K) (6mks)

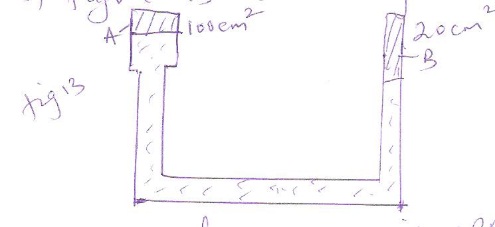
1. a) Explain why it is advisable to use pressure cooker for cooking at high altitude(2mks)

b) Water of mass 5kg at 300is heated in an electric kettlerated 5KW. The water is heated until it boils at 1000c (SHC of water = 4200j/Kg/K, Ckettle= 450j/K, Lv= 2.26x106j/Kg)

Determine

1. Heat absorbed by water. (3mks)
2. Heat absorbed by the electric kettle. (3mks)
3. Time taken for the water to boil. (3mks)
4. a) Define the term velocity ratio. (1mk)

b) Figure 13 shows hydraulic machine



If load of 200Kg is applied at A determine the force lifted at B (4mks)

c) A machine of velocity ratio 45 overcomes load of 4500N due to effort of 135N. Determine

1. Mechanical advantage. (2mks)

1. Efficiency of the machine. (3mks)