NOVA PIONEER

SCHOOLS FOR INNOVATORS & LEADERS

Form 3 End Term Exam

Physics (232/1) Paper 1

Term 2, 2020.

DATE: *…………………*

MARKS: 60 Marks

2 *hours*

Name: ………………………………………………………………………………………………………

Stream #: …………………………………………   **House:** …………………………………………

Part A Score: …………/25= ……. %   **Part B Score:** ………./45 = …….%

Total Score: …………. /70= ……. %

Instructions:

- o   Write your name, date and Stream in the space provided above.
- o   Answer **ALL** questions in this Question Paper.
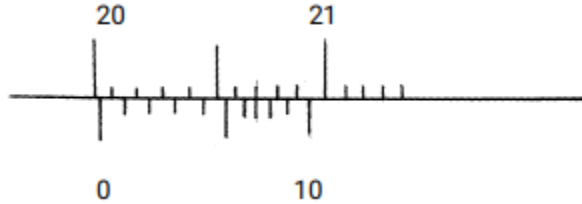- o   All answers must be written in the spaces provided.

Mark Tally: Teacher's use only

|										Total

SECTION A (25 MARKS)

Answer all the questions in this section

1. The figure below shows a diagram of part of a Vernier caliper that has zero error of- 0.02cm. Determine the length of the object using Vernier caliper   (2marks)


2. A block measuring 20 cm x 10 cm x 5 cm rests on a flat surface. The block has a weight of 3N. Determine the maximum pressure it exerts on the surface   (3marks)
3. The figure below shows a light body floating in a container
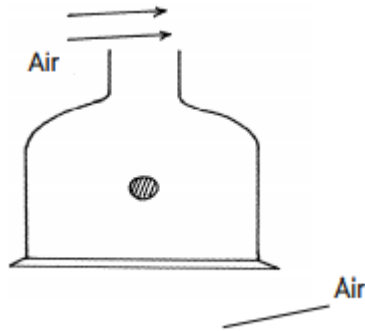
   State and explain the observation when a stream of air is blown over the mouth of the container as shown   (2 marks)
4. A uniform half – metre rule pivoted at the 10 cm mark, balances when a mass of 150 g is suspended at the 0 cm mark as shown below. Determine the mass of the half – metre rule.   (2marks)
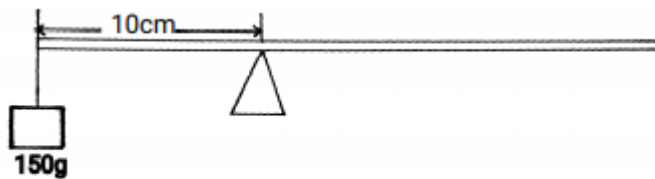
5. A person of mass 60 kg stands on a spring weighing machine inside a lift. The lift is accelerated upwards at $3m/s^2$, calculate the reading of the weighing machine   (3marks)
6. Explain why a hole in a ship near the bottom is more dangerous than one nearer the surface   (2marks)
7. Xcm^3 of substance A which has density of 800kg/m^3 is mixed with 100 cm^3 of water with a density of 1000kg/m^3. The density of the mixture is 960 kg/m^3. Determine the value of X   (3marks)
8. a. State the condition necessary for a body to float in a fluid.   (1marks)

b. A balloon is filled with gas which is lighter than air. It is observed to rise in air up to a certain height. State the reason why the balloon stops rising.   (2 marks)

9. A hippo of mass 500 kg is able to walk on a muddy river bank while a car of mass 220 kg is not able. Explain   (2marks)

10. A motorcycle accelerates from 8m/s to 20m/s in 10 seconds. What distance does it cover in this time   (3marks)

SECTION B (45 MARKS)

Answer all the questions in this section

11. The car of mass 500 kg is travelling on a level road as shown below.

a. Calculate:
    i.   The magnitude of the resultant force on the car.   (2marks)
    ii. Calculate the acceleration of the car   (2 marks)

b. The figure shows two trolleys of masses 2.0 kg and 1.5 kg traveling towards each other at 0.25 m/s and 0.4 m/s. The trolleys combine on collision

    i.   Calculate the velocity of the combined trolleys.   (4 marks)
    ii. In what direction do the trolleys move after collision? Explain   (2 mark)

12.
a. What is diffusion?   (1 mark)

b. A smoke cell contains a mixture of trapped air and smoke. The cell is brightly lit and viewed through a microscope. State and explain what is observed.   (3 marks)

c. A beaker is filled completely with water. A spoon full of common salt is added slowly. The salt dissolves and the water does not overflow.
    (i)   Why is salt added slowly?   (2marks)
   (ii) Whys doesn't the water overflow?   (2 marks)

d. In the figure below, ammonia gas and an acid gas diffuse and react to form a white deposit on the walls of a long glass tube as shown.
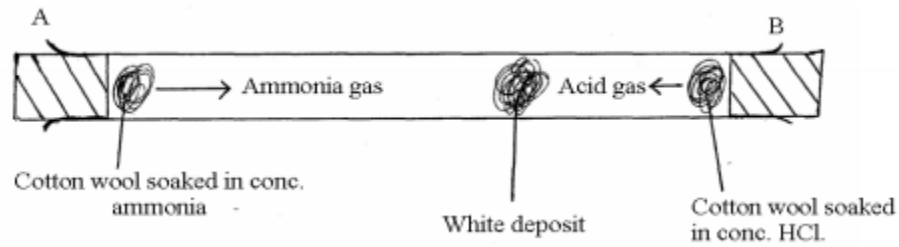
i.   What conclusion can be made from the result of this experiment?   (2marks)
ii. How does the size and mass of a gas affect its rate of diffusion?   (2marks)
iii. The experiment is performed at a lower temperature. Explain how the time taken to form the white deposit would be affected.   (2marks)
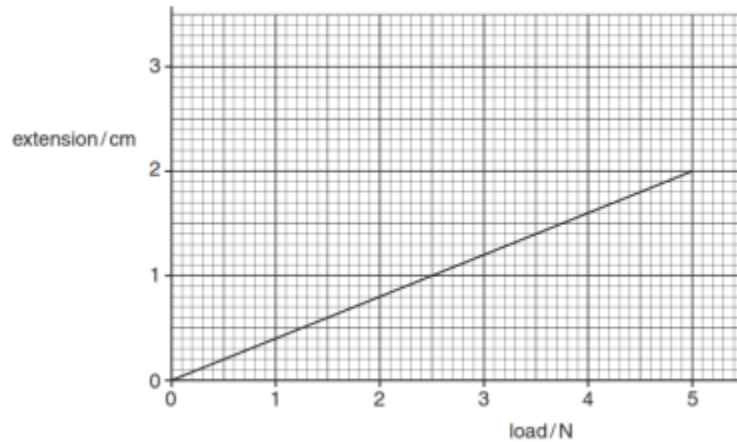
13.

a. State Hooke's Law   (1 mark)

b. A student hangs a spring vertically from a hook as shown in the figure below:
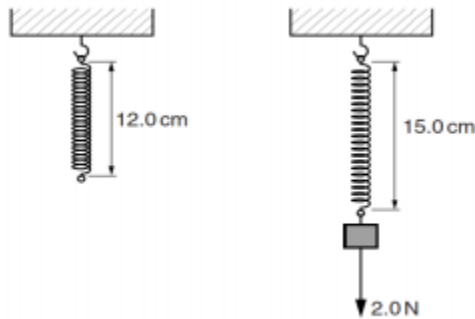
With no load, the spring is 12.0 cm long. With a load of 2.0N on the end of the spring, its length is 15.0cm. Calculate the extension of the spring.   (2marks)

c. When the graph of extension against load is drawn for the spring, the result is the line shown below.

The unstretched length of the spring is 9.0 cm
- i. Calculate the total length of the spring when a 5.0N load is hanging from the spring.   (2marks)
- ii. Calculate the energy stored in the spring when it stretches through2cm   (3marks)
- iii. Calculate the spring constant from the graph   (3 marks)

14.   I.   Explain in terms of kinetic theory how the increase in volume of a fixed mass of a gas at constant temperature results in a reduction of pressure.   (3 marks)

II.   In an experiment to find the relationship between volume and temperature of a given mass of air at constant pressure the following results were obtained

Volume (cm^3)	31	33	35	38	40	43
Temperature(^{0}c)	0	20	40	60	80	100

a. Plot an appropriate graph to show the relationship between volume and temperature.   (3marks)
b. Use the graph to calculate the increase in volume of the air per unit rise in temperature.   (3marks)
c. Give a reason why the volume of a real gas cannot be reduced to zero by cooling.   (1 mark)

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