

END OF TERM 1 EXAMS

PHYSICS

FORM 3

PAPER 1

TIME: 1 & 1/2 HOURS

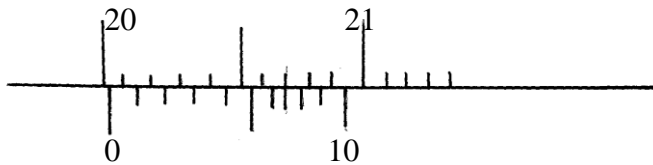
NAME.....ADM NO:.....

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SECTION A

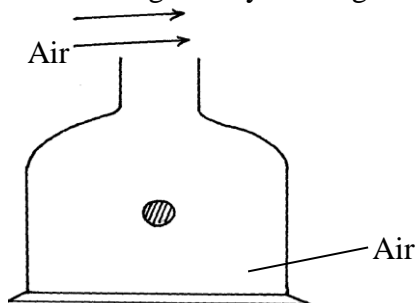
Answer all question

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 (2mks)



2. A block measuring $20\text{cm} \times 10\text{cm} \times 5\text{cm}$ rests on a flat surface. The block has a weight of 3N . Determine the maximum pressure it exerts on the surface (3mks)

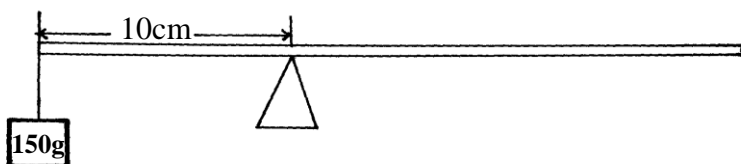
3. The figure below shows a light body floating in a container



State and explain the observation when a stream of air is blown over the mouth of the container as shown (2mks)

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4. A uniform half-metre rule pivoted at the 10cm mark, balances when a mass of 150g is suspended at the 0cm mark as shown below. Determine the mass of the half-metre rule. (2mks)



5. A person of mass 60kg 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 (3mks)

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

7. Explain why a hole in a ship near the bottom is more dangerous than one nearer the surface (2mks)
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8. $X\text{cm}^3$ of substance A which has density of 800kg/m^3 is mixed with 100cm^3 of water with a density of 1000kg/m^3 . The density of the mixture is 960kg/m^3 . Determine the value of X (3mks)
9. Explain in terms of the arrangement of particles the kinetic theory of matter. (3mks).
10. A hippo of mass 500kg is able to walk on a muddy river bank while a car of mass 220kg is not able. Explain (2mks)
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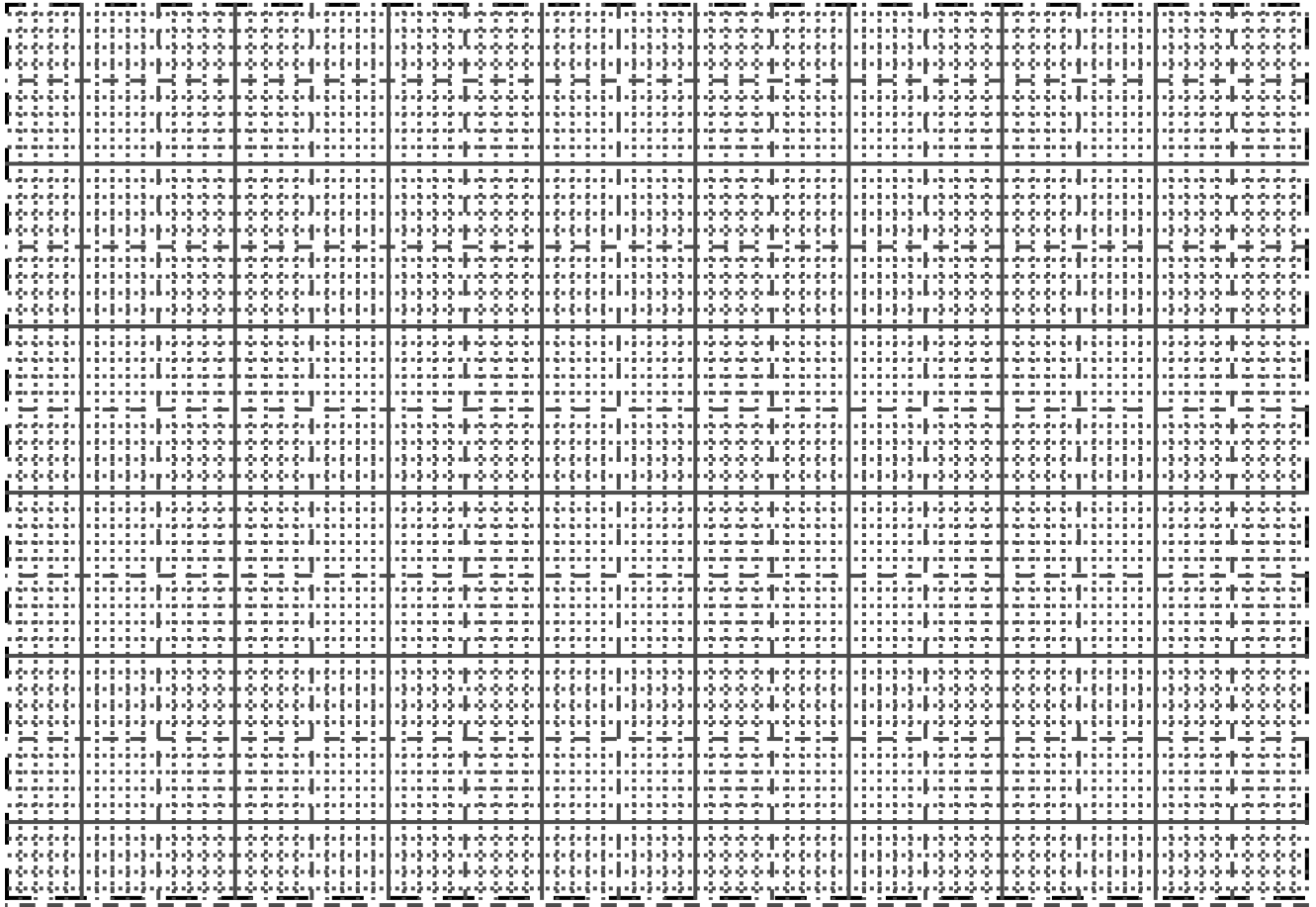
SECTION B: (55MARKS) ANSWER ALL QUESTIONS

11. (a) The table below shows values of pressure P in fresh water at different depth

Pressure P(Kpg)	110	140	180	200	220
Depth h(cm)	1.0	4.0	8.0	10.0	12.0

(i) On the grid provided, plot a graph of pressure against depths.

(5mks)



(ii) Given that the equation $P = P_o + pgh$, determine from the graph (I) the value of P_o . (1mk)

(iii) The density of fresh water

(4mks)

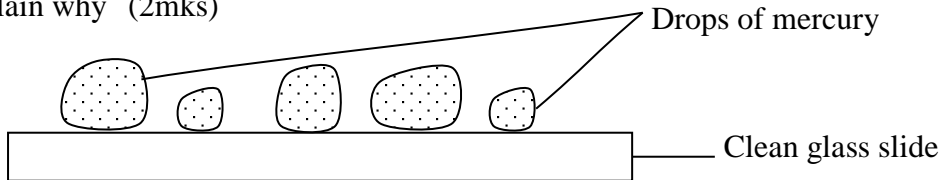
(b) The mass of density bottle is 20.0g when empty. 70g when full of water and 55g when full of a second liquid. Calculate the density of the liquid (take density of water to be 1000kgm^{-3})

(4mks)

12. a) Explain why it is easier to ride a bicycle round a bend on a road if the surface is dry than when it is wet (2mks)

b) Give **one** difference between limiting and dynamic forces of friction (2mks)

c.) Mercury on a clean glass slide collects into small spherical balls as shown in figure below. Explain why (2mks)



d.) State Pascal's principle of transmission of pressure (2mks)

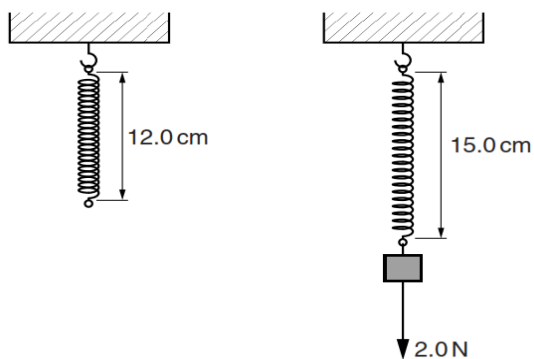
e.) A helical spring extends by 1 cm when a force of 1.5N is applied to it. Find the spring constant. (2mks)

17(a) State Hooke's law

(1mark)

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(b) A student hangs a spring vertically from a hook, as shown in Figure below.



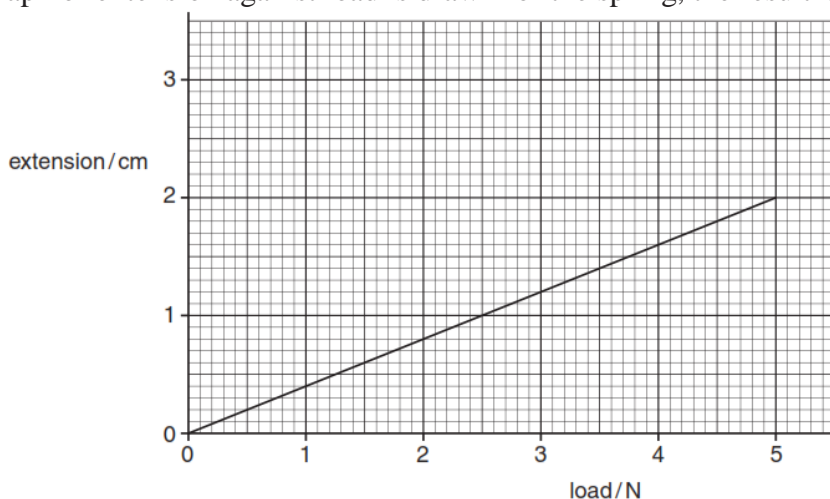
With no load, the spring is 12.0 cm long. With a load of 2.0 N on the end of the spring, its length is 15.0 cm. Calculate the extension of the spring. (2 marks)

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(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 5.0 N load is hanging from the spring. (2 marks)

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(ii) Calculate the energy stored in the spring when it stretches through 2cm (2 marks)

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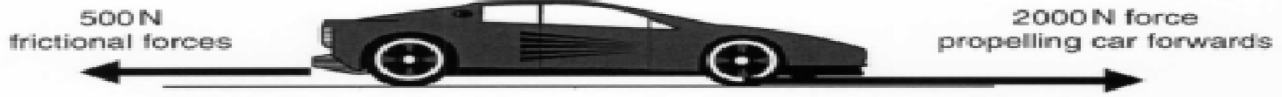
(iii) Calculate the spring constant from the graph (3 marks)

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



(i) Calculate the magnitude of the resultant force on the car. (2mks)

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(ii) Calculate the acceleration of the car. (2 marks)

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



(i) Calculate the velocity of the combined trolleys. (4 marks)

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(ii) In what direction do the trolleys move after collision (1mark)

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

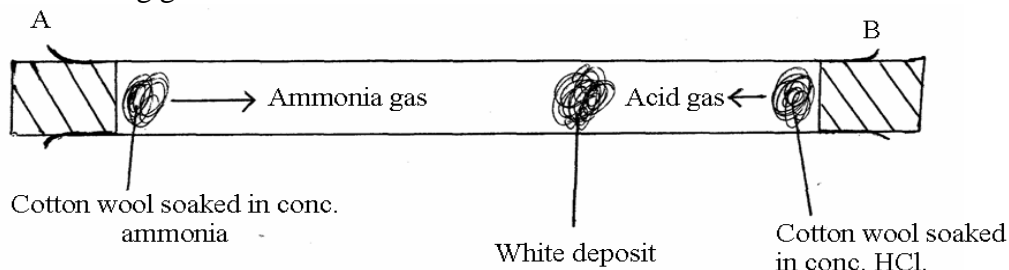
(b) A smoke cell contains a mixture of trapped air and smoke. The cell is brightly lit and viewed through a microscope. State and explain what is observed. (3 marks)

(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? (2 mark)

(ii) Why doesn't the water overflow? (2 mark)

(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? (2mark)

(ii) How does the size and mass of a gas affect its rate of diffusion? (2 marks)

(iii) The experiment is performed at a lower temperature. Explain how the time taken to form the white deposit would be affected. (2 marks)