FOCUS A365

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FORM 3 TERM 1 PHYSICS PP3 EXAMINATIONS 2018

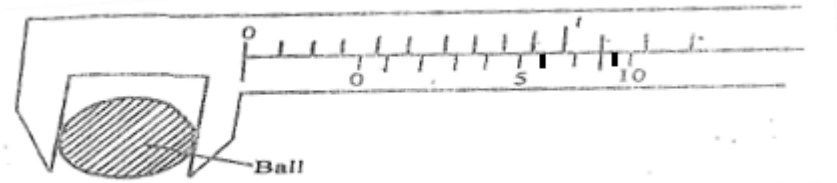
NAME:_____**ADM NO:**_____ **CLASS:** _____

INSTRUCTION TO CANDIDATES

a) Write your name and index number in the spaces provided above
b) This paper consist of TWO sections A &B
c) Answer ALL the questions in section A and B in the space provided.
d) ALL working MUST be clearly shown.

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

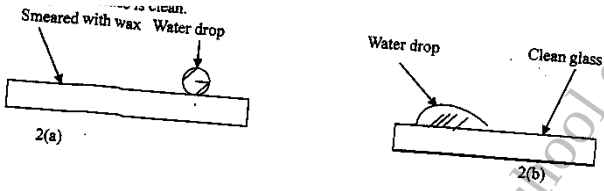
1. Figure 1 shows a venier calipers scale being used to measure the diameter of a ball bearing.



If the vernier calipers has a zero error of -0.04cm; record the diameter of the ball bearing. (1mk)

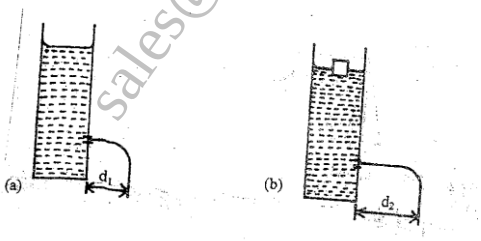
2. Explain why it is not advisable to use boiling water to sterilize a clinical thermometer? (1mk)

3. Figure 2 below shows water drops on two surfaces. In 2(a), the glass surface is smeared with wax while in 2(b) the glass surface is clean.



Explain the difference in the shapes of the drops. (2mks)

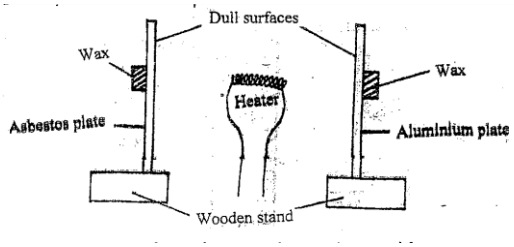
4. A tin with a hole on the side is filled with water to a certain height. Water jjets out as shown in figure 3(a). a second identical tin is filled with water to the same height and a block of wood floated on the water as shown in figure 2(b)



State the reason why the maximum distance of the jet d2, is greater than d1. (1mk)

5. Figure 4 shows a simple arrangement of apparatus used to study properties of different materials. Wax, Asbestos, plate, wooden stand, Dull surfaces, Wax, Aluminium plate, Heater.

Fig 4



The heater is placed equidistant from the two plates. State with a reason, what happens when the heater is switched on for some time. (2mks)

6. Figure 5 shows uniform metal rod whose length is 1.2M. the metal rod is balanced on a knife edge with a mass of 60g hanging at zero cm mark. It is pivoted at 30cm mark.

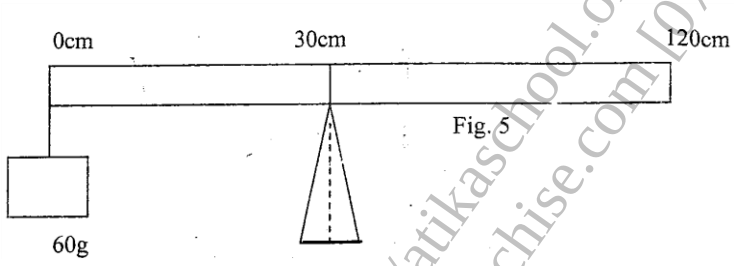


Fig. 5

Determine the weight of the metal rod. (2mks)

7. Figure 6 below shows a spring on which a mass of 200g is suspended.
If the length of the spring without the mass is 10cm, determine its spring constant. (3mks)

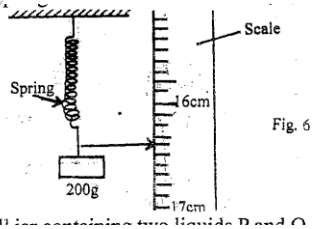


Fig. 6

8. Figure 7 shows a tall jar containing two liquids P and Q. the viscosity of P is higher than Q. A solid sphere is released at the top of the jar and falls through the liquids.

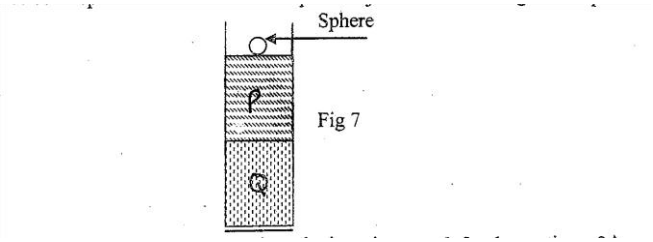
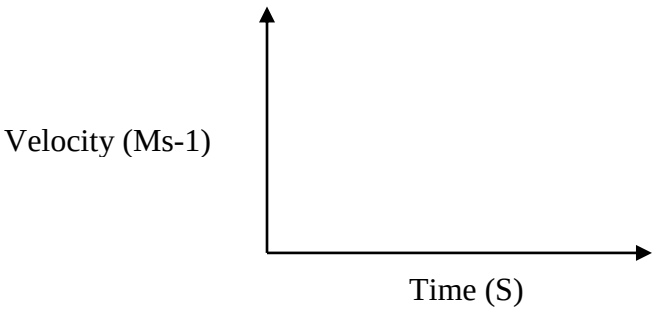


Fig 7

On the axis provided, sketch the velocity – time graph for the motion of the sphere through the liquids. (2mks)



9. a) Figure 8 shows a non-viscous fluid flowing through a pipe of varied cross-section area, along which manometers A, B and C have been fitted.

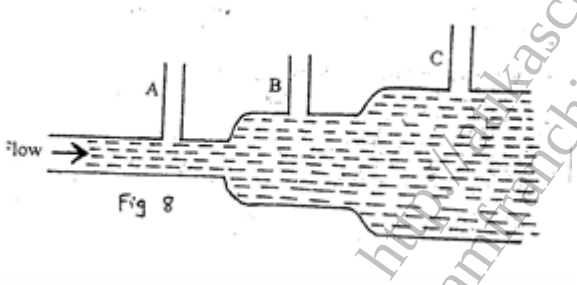


Fig 8

Complete the diagram by indicating the possible levels of the fluid in tubes B and C. (1mk)

b) Figure 9 shows motion of incompressible liquid in a tube of varying cross section area.

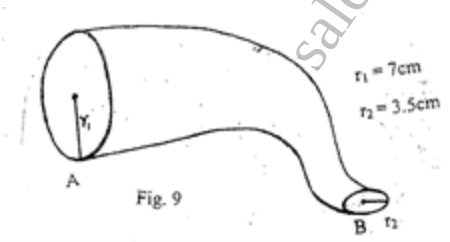
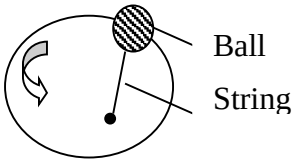


Fig. 9

The radius of A and B are 7cm and 3.5cm respectively. The rate of flow of the liquid through the tube is 15.4 litres per second. Determine the speed of the liquids at points A and B. (3mks)

10. Figure 10 shows a ball being whirled in a vertical plane.

Fig 10



Sketch on the same figure the path followed by the ball if the string breaks when the ball is at the position shown in the figure. (1mk)

11. a. State two differences between heat transfer by convection and radiation (2mks)
b. Give a reason why a thick glass bottle cracks when boiling hot water is suddenly inside it. (1mk)

12. Figure 11 shows a smooth card placed on the open end of a can. A coin is placed on the card. The card is pulled horizontally away suddenly. State and explain the observation made. (2mks)

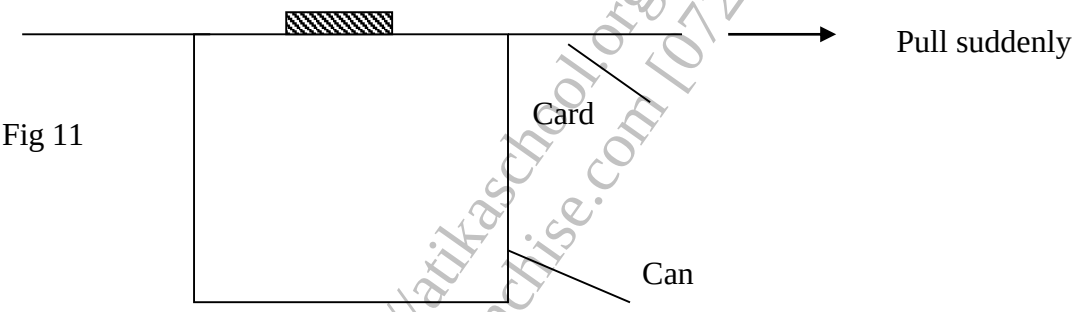
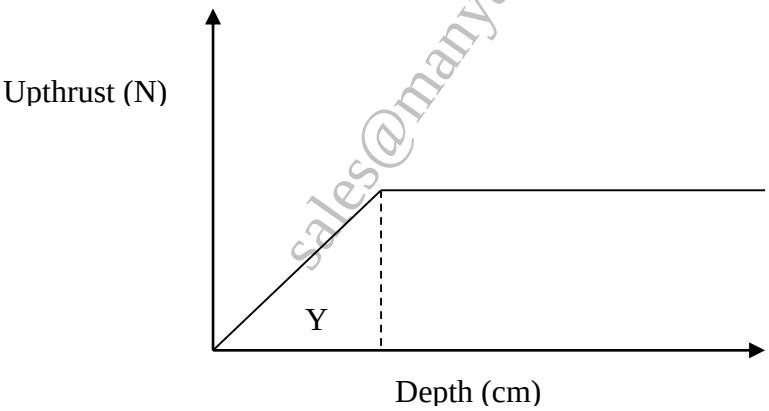


Fig 11

13. A glass block is suspended from a spring balance and held inside a beaker without touching the beaker. Water is added gradually into the beaker. The graph shows the variation of the upthrust on the glass block with depth of water in the beaker.



State the reasons for the change observed at depth Y.

SECTION B (55MKS)

Answer all the questions in this section in the spaces provided.

14. a) Oil is leaking from a car as it travels along a straight road. One drop falls on the ground every 2 seconds. The figure 12 below shows the pattern of the drop on the road.

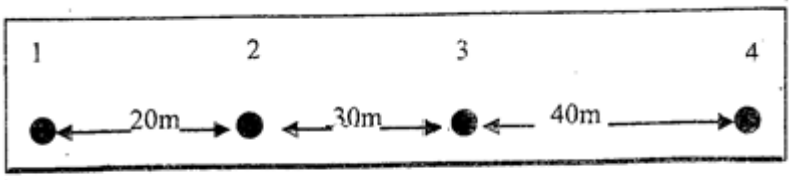


Fig 12

i) Describe the motion of the car. (2mks)

ii) Determine the acceleration of the car. (3mks)

b) Figure 13

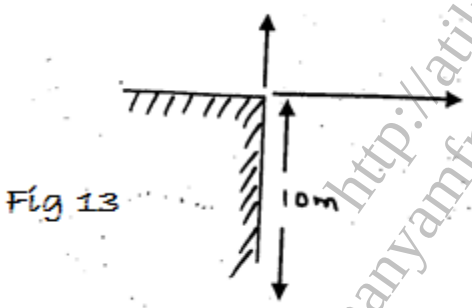


Fig 13

The figure 8 shows the starting of motion of two arrows 10m above the ground. Both arrows were shot with initial velocity of 20m/s from one point and at the same instant.

i) Determine the total height reached by the arrow shot vertically. (3mks)

ii) Calculate the time of flight taken by the arrow shot horizontally as it strikes the ground. (3mks)

iii) Calculate the horizontal distance covered by the arrow shot horizontally as it strikes the ground. (2mks)

15. A car of mass 2000kg traveling at 5ms-1 collides with a minibus of mass 5000kg travelling in the opposite direction at 7ms-1. The vehicles stick and move together after collision. If the collision lasts for 0.1 seconds;

a) Determine the velocity of the system after collision to 3 decimal places. (3mks)

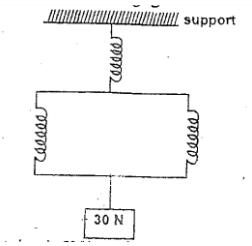
b) Calculate the impulsive force on the minibus. (3mks)

c) Calculate the change in kinetic energy of the system. (3mks)

d) Explain the change in kinetic energy of the system (1mk)

16. a) State Hooke's law. (1mk)

b) Three springs which are identical and have negligible mass are arranged as shown in the diagram below.

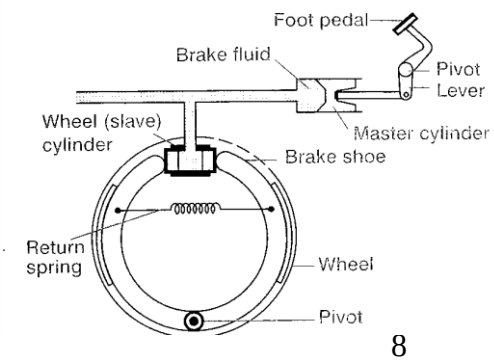


The spring constant of each spring is 2N/cm. calculate the total extension due to the 30N weight. (4mks)

c) A student was provided with a wire, assortment of masses, a test-tube a mounted retort stand a metre rule. Describe how she could use the provided materials to verify Hook's law for a spring. (5mks)

17. a) Explain how a person is able to draw milk from a glass using a straw. (2mks)

b) The following diagram shows a simplified hydraulic braking system of a car.



i) State the property of the liquid (oil) that makes it more suitable for use as a brake fluid than a gas. (1mk)

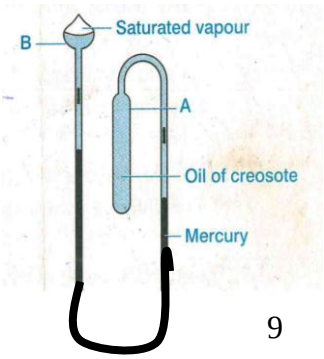
ii) Explain how the system works, starting from when the driver presses the foot pedal. (4mks)

iii) Why would the system not function properly if air leaker into the cylinder? (1mk)

c) A hydraulic jack has a piston (large piston) of diameter 0.32m while its plunger (small piston) has a diameter of 0.052m. A force of 500N is exerted on the plunger. Determine the upward force in the large piston. (3mks)

18. a) State two properties of mercury that make it a suitable thermometric liquid. (2mks)

b) The diagram below shows a Six's maximum/minimum thermometer.



(i) What is it the thermometric liquid in this thermometer? (1mk)

(ii) Why is necessary for the vapour in bulb B to be saturated? (1mk)

(iii) Explain how the thermometer indicates maximum and minimum temperature. (4mks)

(iv) Indicate on the figure the two points where the reading of the temperature shown by the thermometer can be made. (2mks)

(v) A small magnet (not shown) is usually hung on the frame of this thermometer. What is its use? (1mk)