DEPARTMENT OF PHYSICS

END OF TERM ONE EXAMS 2019

535/2
PHYSICS

Paper 2

2 hours 15 minutes

INSTRUCTIONS TO CANDIDATES:

Answer any **five** *questions.*

Any additional question (s) answered will **not** *be marked.*

Mathematical tables and silent non – programmable calculators may be used.

Where necessary use the following constants.

Acceleration due to gravity, g, = $10ms^{-2}$.

Density of water = $1000Kgm^{-3}$

QTNS						TOTAL
MARKS						

1. (a) (i) State the principle of moments. (1 mark)

(ii) Figure 1 below shows a uniform metre rule, pivoted at the 10cm mark which balances when a mass of 300g is suspended at the 0 cm.

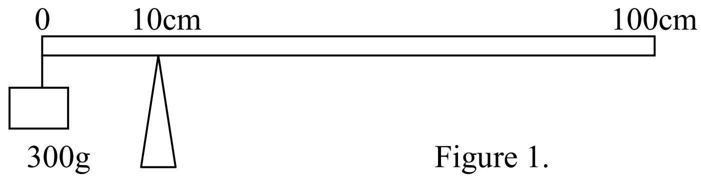


Figure 1.

Calculate the mass of the metre rule. (4 marks)

(b) (i) State the conditions for a body to be in equilibrium. (2 marks)

(ii) With the aid of a diagram, distinguish between stable and unstable equilibrium. (4 marks)

(iii) State any two ways in which stability of a body can be increased. (2 marks)

(c) Explain why passengers are not advised to stand while travelling in buses. (3 marks)

2. (a) (i) Define the terms ***density*** and ***relative density***. (02 marks)

(ii) Liquid X of mass 200g and density $1.0gcm^{-3}$ is mixed with another liquid Y of mass 300g and density $2.0gcm^{-3}$ to give a mixture.
Calculate the density of the mixture. (03 marks)

(b) (i) State the law of floatation. (01 mark)

(ii) An object floats in water with three quarters of its volume submerged. Calculate the density of the object. (03 marks)

(c) A stone weighs 40N in air and 20N in water. Calculate the;

(i) relative density of the stone. (02 marks)

(ii) the density of the stone. (02 marks)

(d) Describe an experiment to determine the relative density of a liquid using a density bottle. (03 marks)

3. (a) (i) What is meant by rectilinear propagation of light? (1 mark)

(ii) An object of height 250cm is placed at a distance of 150cm from a pinhole camera. If the camera is of length 7.2 cm, find the image height. (3 marks)

(b) (i) Describe an experiment to determine the focal length of a concave mirror using an illuminated object. (05marks)

(c) An object of height 2cm is placed 20cm infront of a concave mirror of focal length 15 cm. By graphical construction, determine the;

(i) position of the object. (4 marks)

(ii) height of the object. (2 marks)

(iii) nature of image formed. (1mark)

4. (a) Define the terms ***efficiency and mechanical advantage*** (2 marks)

(b) (i)Draw a pulley system of velocity ratio 5 with 3 blocks in the upper block. (2marks)

(ii)Find the efficiency of a pulley system above in (b)(i) above if it lifts a load of 1000N using an effort of 300N. (4marks)

(c) (i) Explain why the efficiency of a pulley system is less than 100%. (2 marks)

(ii) Give **two** examples where pulleys are used. (2 marks)

(d) Describe an experiment to determine the centre of gravity of an irregular cardboard. (4 marks)

5. (a) (i) Define the term ***pressure*** and state its S.I unit. (2 marks)

(ii) State any two factors on which the pressure exerted by a fluid depends. (2 marks)

(b) With the aid of a labeled diagram, describe how a ***force pump*** works. (5marks)

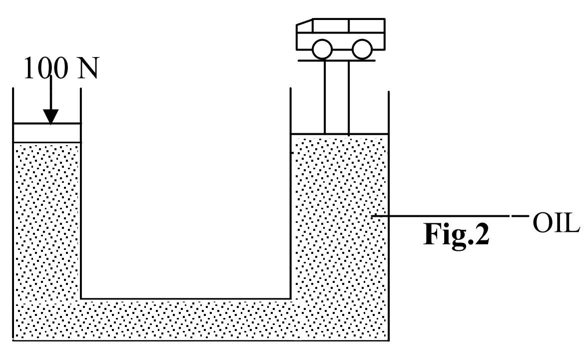


Fig.2

Figure 2 above shows a hydraulic machine.

(i) Give **one** example where this machine is used. (1 mark)

(ii) State the principle applied in the machine above. (1mark)

(iii) If an effort of 100 N is applied at the smaller piston of area 0.04 m^2, find the mass of the car raised if the area of the larger piston is 0.08 m^2. (3 marks)

(c) Explain why a sharp panga is preferred to a blunt panga when cutting a piece of wood. (2 marks)

6. (a) (i) Define the term v***elocity.*** (1mark)

(ii) Draw ***velocity - time*** graph for a stone thrown vertically upwards.(2marks)

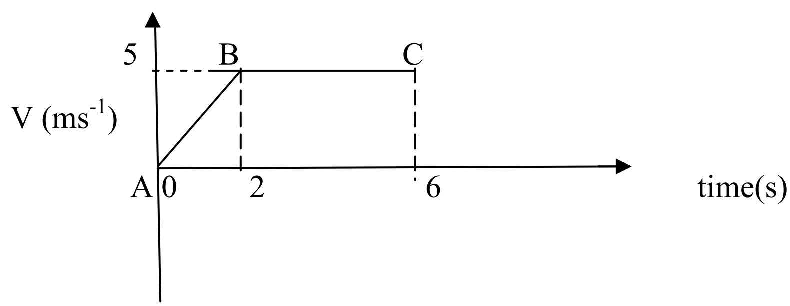
(b) Write down the **three** equations of uniformly accelerated motion. (*03 marks*)

(c) A body changed its velocity from $5ms^{-1}$ to $26ms^{-1}$ in 7 seconds.

(i) Calculate its acceleration. (*02 marks*)

(ii) If the body continues moving, find its velocity after 12 seconds. (2 marks)

(d) The figure 3 below shows a velocity time graph for a cyclist.



(i) Describe the motion of the cyclist from A to C (2 marks)

(ii) Calculate the total distance covered. (2 marks)

(e) If the ball of mass 0.03kg is raised 1.5 m above the surface and then released, what is its kinetic energy just before hitting the surface? (2marks)

7. (a) (i) What is meant by rectilinear propagation of light? (1 mark)

(ii) An object of height 250cm is placed at a distance of 150cm from a pinhole camera. If the camera is of length 7.2 cm, find the image height. (3 marks)

(b) (i) Describe an experiment to determine the focal length of a concave mirror using an illuminated object. (05marks)

(c) An object of height 2cm is placed 20cm infront of a concave mirror of focal length 15 cm. By graphical construction, determine the;

(i) position of the object. (4 marks)

(ii) height of the object. (2 marks)

(iii) nature of image formed. (1mark)

8. (a) Define the following terms:

(i) Lower fixed point (01 mark)

(ii) Upper fixed point (01 mark)

(b) (i) Give **two** *advantages* and **two** *disadvantages* of mercury over alcohol as a thermometric property. (4 marks)

(ii) Give any two examples of thermometric properties. (2 marks)

(c) (i) Define capillarity (01mark)

(ii) State **two** applications of capillarity (01mark)

(d) Explain why warm water makes washing of clothes easier. (2marks)

(e) In an unmarked thermometer, the length of the mercury thread was $4cm$ in ice and $24cm$ in steam. At what temperature would the length be $16cm$? (03 marks)

THE END.