GATITU SECONDARY SCHOOL END OF TERM1 PHYSICS EXAM

Form 3 Year 2015

Name.....adno.....class

1. A matatu starts from rest and accelerates to cover a distance of 49m in 7 seconds.
   Determine
   (i) Its acceleration; (3mks)

   (ii) Its velocity, after 7seconds (2mks)

   c) A trolley moving on a horizontal bench of height 1.2m, strikes a barrier at the edge of the bench. The brass mass on the top of the trolley flies off on impact and lands on the ground 2.5m from the edge of the bench.
   Determine:
   (i) The time taken by the brass mass to reach the ground; (2mks)

   (ii) The speed at which the trolley struck the barrier. (2mks)

2. In an experiment to determine the acceleration due to gravity g, a student measured the period, T and length L, of a simple pendulum. For a length L = 70.5 cm, the period T obtained as 1.7s. Given that $T = 2\pi \sqrt{L/g}$, determine the value of g correct to two significant figures

(2 mks)

3. The figure below shows a velocity-time graph for the motion of a certain body.

i) **Figure 9** shows a velocity-time graph for the motion of a certain body.

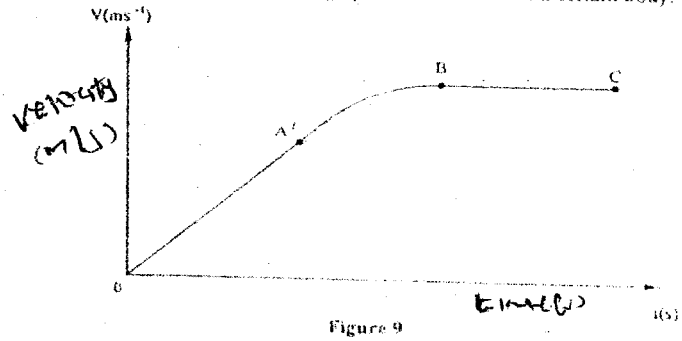


Figure 9

Describe the motion of the body in the region.

i) **OA** (1 mk)

i) **AB** (1 mk)

iii) **BC** (1 mk)

b) A car moving initially at 10ms-1 decelerates at 2.5ms-2
   a) Determine
   I its velocity after 1.5s:2(mks)

ii) the distance travelled in 1.5s (2 mks)

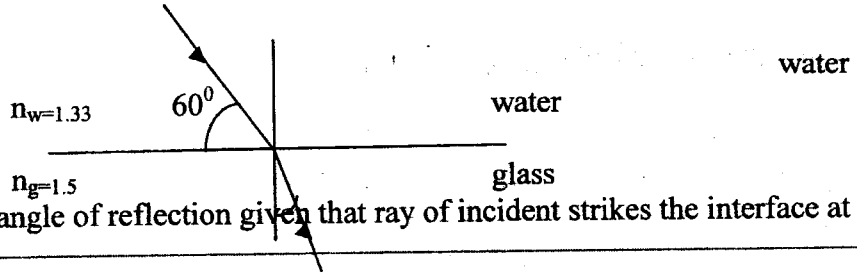
iii) the time taken for the car to stop (2 mks)

b) Sketch the velocity-time graph for the motion of the car up to the time the car stopped. (1 mk)

iii) From the graph, determine the distance the car travelled before stopping. (2 mks)

4. Light travels through glass of refractive index 1.5 with a speed v. Calculate the value of v (Take speed of light in air = 3.0×10^8 m/s) (3 mks)

5. A ray of light is incident on a glass –water interface as shown below:



Calculate the angle of reflection given that ray of incident strikes the interface at an angle of 60^0.

3mks

2mks

6. State laws of reflection.

7. A microscope is focused on a mark on horizontal surface. A rectangular glass block 30mm thick is place on the mark. The microscope is then adjusted dd10mm upwards; to bring the mark back to focus, determine the refractive index of the glass. (3 marks)

8.(a) Define the refractive index of a substance (1 mark)

(b) In an experiment to determine the refractive index of a liquid, the liquid was poured into a measuring cylinder. A pin was placed at the bottom of the cylinder and another pin was used to locate the apparent position of the first pin. The real depth and apparent depth were measured. The experiment was repeated with other values of real depth. The table below shows the results obtained.

Real depth (cm)	5	10	15	20	25
Apparent depth (cm)	3.3	6.7	10	13.3	16.7

(i) Plot the graph of real depth against apparent depth (5 marks)

(ii) From the graph determine the refractive index of the liquid (4 marks)

(c) Figure 9 shows a ray of light incident on a glass – air interface

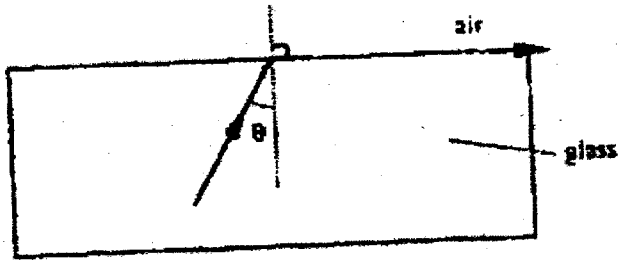


Figure 9

Given that the refractive index of the glass is 1.6. Determine angle θ (3 marks)

9. The figure below shows a non – viscous fluid flowing through a pipe a long which vertical tubes A, B and C have been fitted.

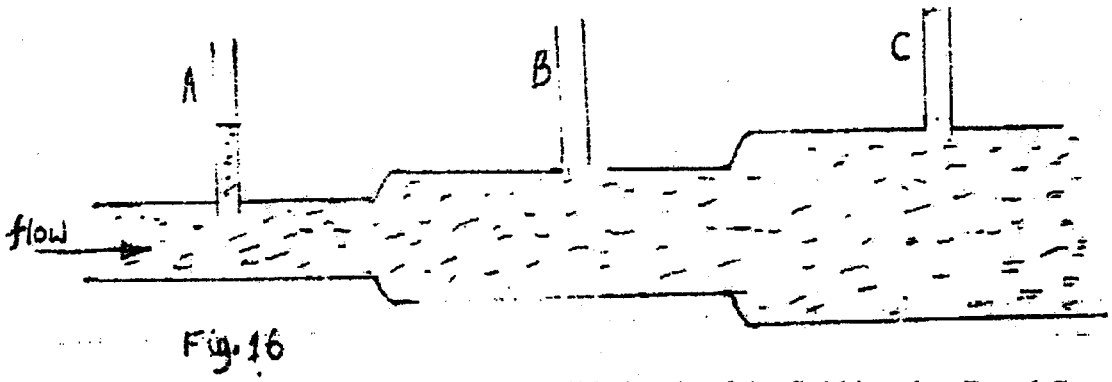


Fig. 16

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

10. State Bernoulli's principle. (1mk)

11. A pipe of radius 6 mm is connected to another pipe of radius 9 mm. If water flows in the wider pipe at the speed of 2 ms^{-1}, what is the speed in the narrower pipe?

(3 marks)

12. A mineworker stands between two vertical cliffs 400m from the nearest cliff. The cliffs are X distance apart. Every time he strikes the rock once, he hears two echoes, the first one after 2.5 s, while the second follows 2s later. From this information; calculation:

(i) The speed of the sound in air (2 mks)

(ii) The value of X (3 mks)

13. A boy standing in front of a cliff blows a whistle and hears the echo after 0.5s. He then moves 17 meters further away from the cliff and blows the whistle again. He now hears the echo after 0.6s. Determine the speed of the sound. (3 marks)

14. A wire fixed at one end extends by 4mm when a load of 20N is suspended from the other end. Determine the load that would cause an extension of 1.5 mm on the wire (assume elastic limit is not exceeded) (3 marks)

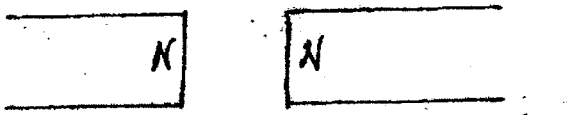


Fig 7

Sketch the magnetic field pattern in the space between the poles (2 marks)

19. The figure below shows a horse – shoe magnet whose poles are labeled and two other magnets near it.

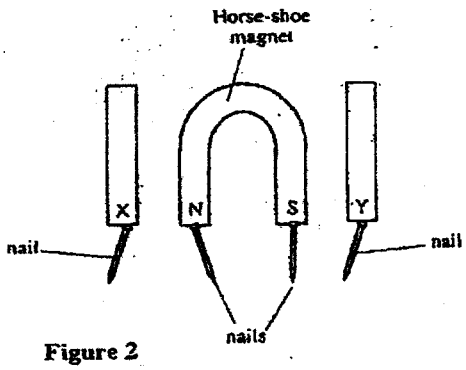


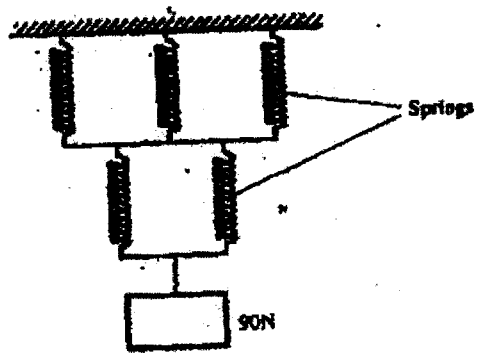
Figure 2

Iron are attracted to the lower ends of the n\magnets as shown.
Identify the poles marked X and Y (1 mark)

20. Name the instrument that would be most suitable for measuring the thickest of one sheet of this question paper. (1 mk)

21. State the assumption made when calculating the size of a molecule in the thin oil film experiment (1mk)

15. 1.



The spiral springs shown in figure 4 are identical. Each spring has a spring constant k= 300N/m Determine the total extensions caused by the 90N weight. (ignore the weight of the spring and connecting rods) (3 marks)

16. Give a reason why attraction in magnesium is not regarded as a reliable method of testing for polarity. (1 mk)

17. Distinguish between soft and hard magnetic materials (1 mark)

18. The figure below shows the poles of two magnets close together.

22. The micrometer screw gauge represented below has thimble scale of 50 divisions

What is the reading shown (1 mk)

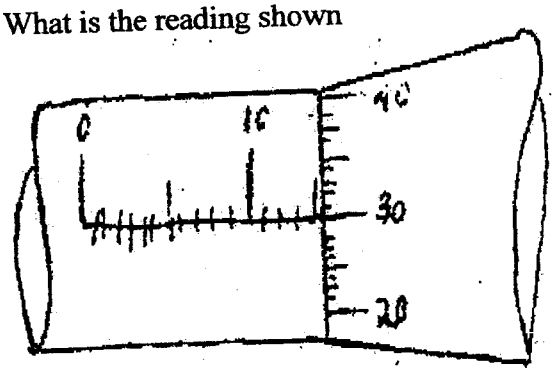


Fig. 1

23. (a) In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter 0.05 cm spreads over a circular patch whose diameter is 20 cm

Determine

(i) The volume of the oil drop (2 marks)

(ii) The area of the patch covered by the oil (2 marks)

(iii) The diameter of the oil molecule (3 marks)

(b) State

(i) Any assumption made in (b) (iii) above (1 mark)

(ii) Two possible sources of errors in this experiment (2 marks)