THE ELITES JET

232/1 **PHYSICS** **Paper 1**

PRE-MOCK

March 2025 – Time: 2 hours

Name …….. Adm No……..…….. Class……

School……..…… Date……....…Sign……..…….

Instructions to candidates

a) Write your name and admission number in the spaces provided above.
b) Write your class, the date of examination and sign in the spaces provided above.
c) This paper consists of **two** sections **A** and **B.**
d) Answer **all** the questions in sections **A** and **B** in the spaces provided.
e) **All** working **must** be clearly shown.
f) Silent non-programmable electronic calculators may be used.
g) **This paper consists of 12 printed pages.**
h) **Students should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.**
i) **Students should answer the questions in English.**

For Exerminer's Use Only

Section	Questions	Maximum Score	Candidate's Score
A	1-13	25	
B	14	11	
	15	13	
	16	13	
	17	08	
	18	10	
	TOTAL	80	

SECTION A (25 marks)
*Answer **all** questions in this section in the spaces provided*

1. **Figure 1** shows part of main scale of a vernier callipers.

Figure 1

Insert the vernier scale to the main scale, to show a reading of 3.14cm. (1 mark)

2. State the reason why a steel sphere resting on a horizontal surface is said to be neutral. (1 mark)

……

……

……

3. A light spiral spring extends by 6 mm when loaded with a weight W. The spring is connected in series with an identical spring. The combination is loaded with the weight W. Determine the extension of the combination. (2 marks)

……

……

……

4. **Figure 2** shows air flowing through a pipe of different cross-section areas. Two pipes A and B bare dipped into water.

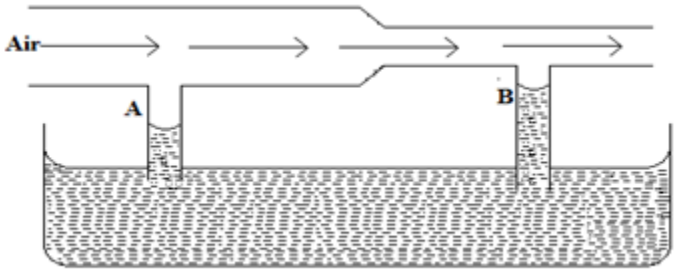


Figure 2

Explain the cause of the difference in the levels of water in the pipes A and B. (2 marks)

……

……

……

5. **Figure 3** shows the path of a light ball projected horizontally.

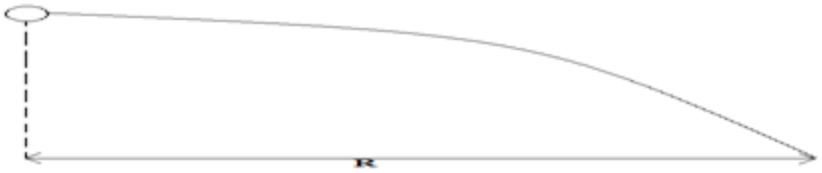


Figure 3

The ball is then made to spin in anticlockwise direction as it moves.

a) On the same axis, sketch the new path of the ball. (1 mark)

b) Explain how the ball attains the new path. (2 marks)

……

……

……

6. A student pulls a block of wood along a horizontal surface by applying a constant force. State the reason why the block moves at a constant velocity. (1 mark)

……

……

……

7. A horizontal force of 15N is applied on a wooden block of mass 2kg placed on a horizontal surface. It causes the block to accelerate at $5m/s^2$. Determine the frictional force between the block and the surface. (3 marks)

……

……

……

……....

8. In a wheel and axle system, state the advantage of having a large wheel diameter compared to the axle diameter for a frictionless system. (1 mark)

……

……

……

9. **Figure 4** shows a graph of the variation of temperature with time for pure substance heated at constant rate.

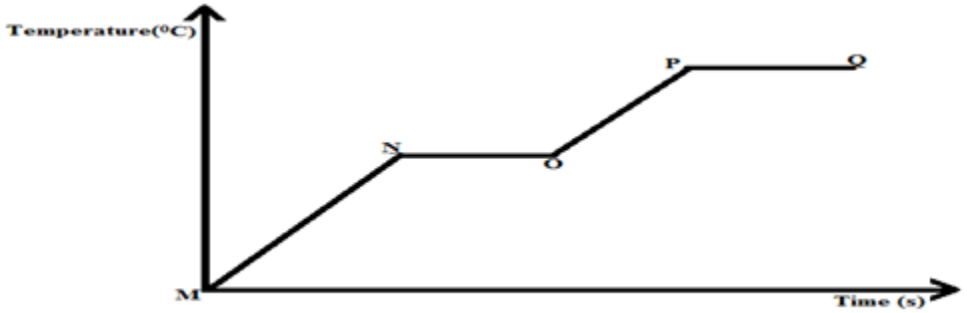


Figure 4

Assuming that heat transfer to the surrounding is negligible, state the changes observed on the substance in the region;

a) NO (1 mark)

……

……

b) PQ (1 mark)

……

……

10. A balloon is filled with a gas which is lighter than air. It is observed to rise in air up to a certain height. State a reason why the balloon stops rising. (1 mark)

……

……

……....

11. A long horizontal capillary tube of uniform bore sealed at one end contains dry air trapped by a drop of mercury. The length of the air column is 142mm at 17°C. Determine the length of the air column at 25°C (3 marks)

……

……

……

……....

12. Figure 5 shows tubes inserted in water and mercury respectively.

Figure 5

It is observed that the water meniscus is higher than the meniscus in the beaker. While in mercury the meniscus in the capillary tube is lower than the meniscus in the beaker. Explain these observations.
(2 marks)

……

……

……

……....

13. State **three** ways of increasing the sensitivity of a liquid-in-glass thermometer. (3 marks)

……

……

……

……....

SECTION B (55 marks)

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

14. **Figure 6** shows a trolley of weight 20N pulled by a force of 4N from the bottom to the top of an inclined plane at uniform speed.

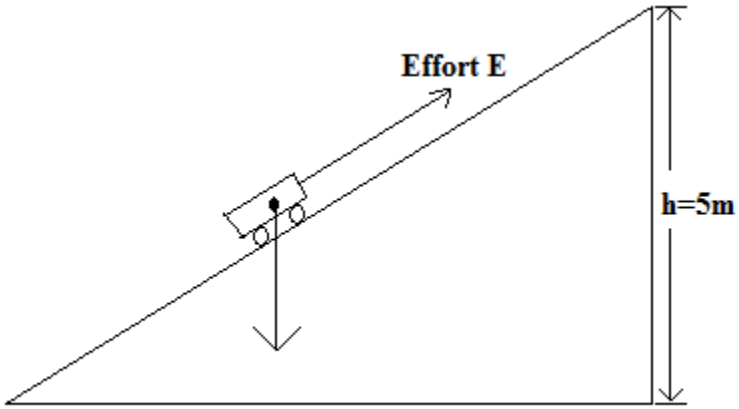


Figure 6

a) State the value of the force acting downwards along the inclined plane. (1 mark)

……

……

b) Explain how the value in the question above is obtained. (2 marks)

……

……

……

c) For the system, determine the;

i. Mechanical advantage. (3 marks).

……

……

……

……

ii. Velocity ratio. (3 marks)

……

……

……

iii. Efficiency. (2 marks)

……

……

……

15. Figure 7 shows a log of wood of mass 20kg submerged in water in a pond and held in position by a string fixed to the bottom of the pond.

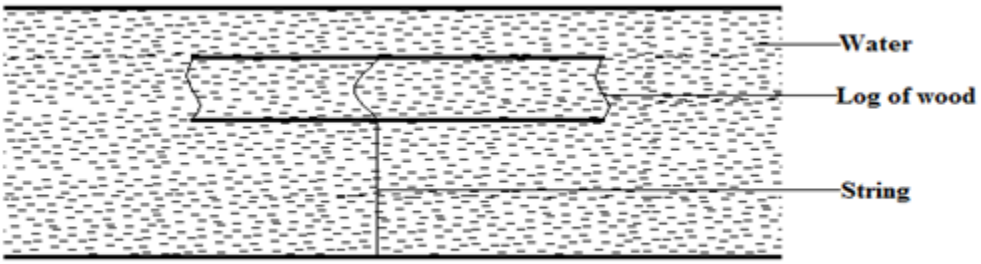


Figure 7

a) Given that the density of water is 1000kg/m^{3}and that of the wood is 800kg/m^3, determine the ;

i. Volume of the log. (3 marks)

……

……

……

……

ii. Upthrust on the log. (2 marks)

……

……

……

……

iii. Tension in the string. (2 marks)

……

……

……

b) **Figure 8** shows a hydrometer with a thin a stem floating in water in a beaker.

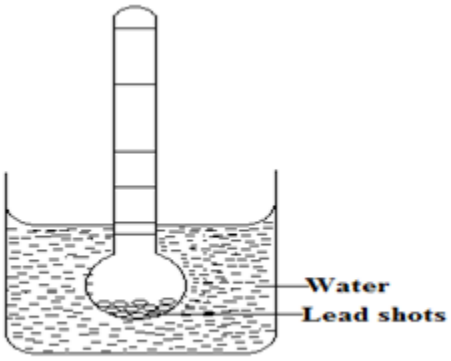


Figure 8

i. State with a reason what is observed on the hydrometer when the temperature of the water is raised. (2 marks)

……

……

……

……

ii. State how the hydrometer would be improved to measure small differences in densities of liquids. (1 mark)

……

……

iii. State **two** measurements you would take in an experiment to determine the upthrust on an object which is immersed in kerosene. (2 marks)

……

……

……

iv. State how measurements above are used to determine the upthrust on the object. (1 mark)

……

……

……

16. a) When a bus goes round a bend on a flat road, it experiences a centripetal force. State what provides the centripetal force. (1 mark)

……

……

b) A student whirls a stone of mass 0.2kg tied to a string of length of 0.4m in a vertical plane at constant speed of 2 revolutions per second. (take acceleration due to gravity as $10ms^{-2}$)

i. State **two** forces acting on the stone when it is at the highest point. (2 marks)

……

……

……

ii. Determine the;

I. Angular velocity of the stone. (3 marks)

……

……

……

II. Tension in the string when the stone is at the highest point. (3 marks)

……

……

……

……

c) **Figure 9** shows a pendulum bob suspended by a thread moving in a horizontal circle.

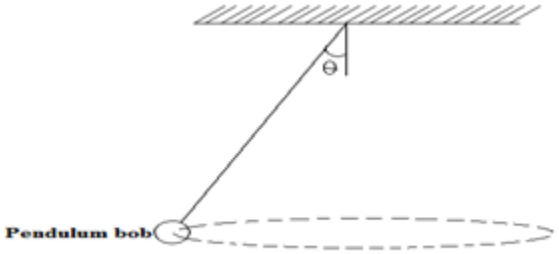


Figure 9

i. Name **two** forces acting on the pendulum as it moves. (2 marks)

……

……

……

ii. State what happens to each of the forces when the angular velocity of the pendulum bob is increased. (2 marks)

……

……

……

17. a) A paper windmill in a horizontal axis was placed above a candle as shown in **Figure 10**.

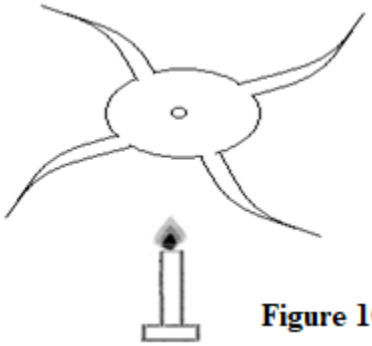


Figure 10

When the candle was lit, the paper windmill begun to rotate. Explain this observation. (2 marks)

……

……

……

……

b) **Figure 11** shows the relationship between volume and temperature in degrees centigrade for a sample of gas. Study the figure and answer the questions that follow:

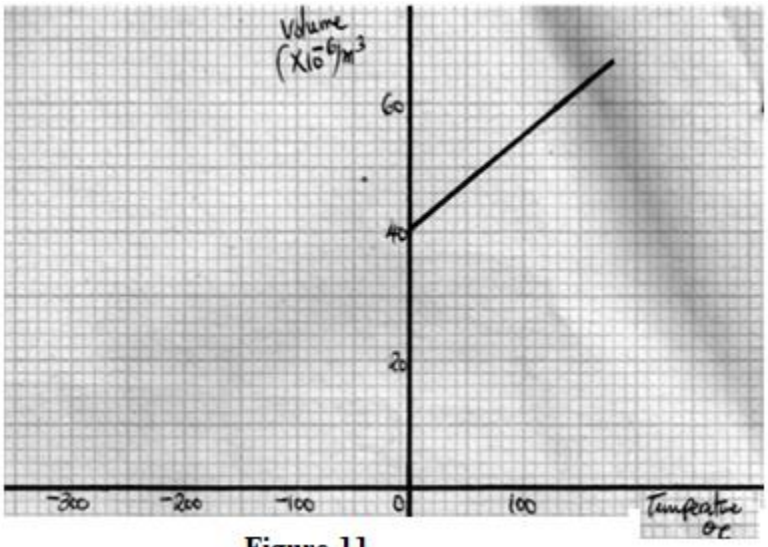


Figure 11

Determine from the graph;

i. The volume of the gas when the temperature is 0°C. (1 mark)

……

……

ii. The temperature at which the volume of the gas is zero. (1 mark)

……

……

iii. Explain why it is not easy to attain absolute zero temperature under normal conditions. (1 mark)

……

……

c) The pressure of air inside a car tyre increases if the car stands out in the sun for some time on a hot day. Explain the pressure increase in terms of the kinetic theory of gases. (3 marks)

……

……

……

……

18. **a)** A stone thrown vertically upwards reaches a height of 100m. Determine the;

i. Initial velocity of the stone (2 marks)

……

……

……

……

ii. total time taken by the stone in air. ***(Neglect air resistance and take g=10ms^{-2})*** (2 marks)

……

……

……

……

b) **Figure 12** shows the graph of velocity against time for a ball bearing released at the surface of viscous liquid.

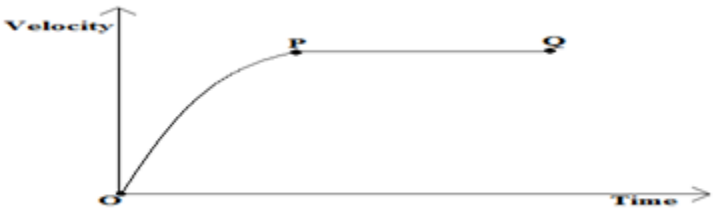


Figure 12

Explain the motion of the ball bearing for parts;

i. OP (2 marks)

……

……

……

ii. PQ (2 marks)

……

……

……

c) **Figure 13** shows a trolley on a smooth surface being pulled by a constant force F.

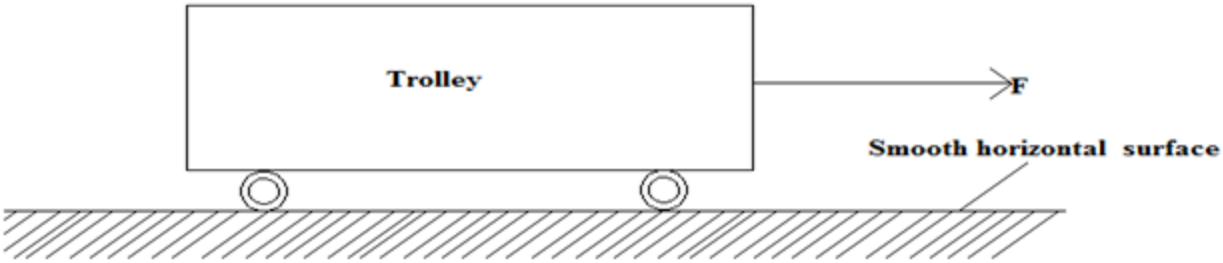
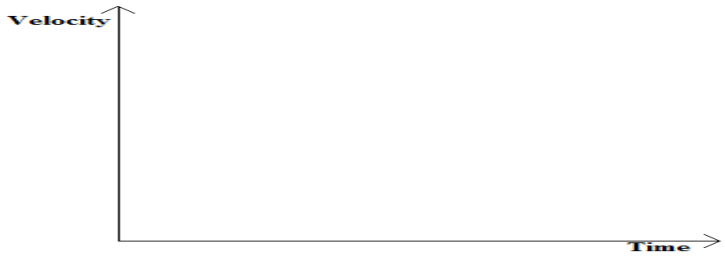


Figure 13

On the axis provided, sketch the velocity-time graph for the motion of the trolley. (2 marks)



THIS IS THE LAST PRINTED PAGE