

NAME: _____ ADM NO: _____ CLASS: _____

CANDIDATE'S SIGNATURE: _____ DATE: _____

PHYSICS PAPER 1

FORM THREE

END TERM 3 2024

TIME: 2 HOURS

Instructions to candidates

- This paper consists of two sections **A** and **B**.
- Answer **all** the questions in the two sections in the spaces provided after each question
- All working **must** be clearly shown.
- Electronic calculators, mathematical tables may be used.

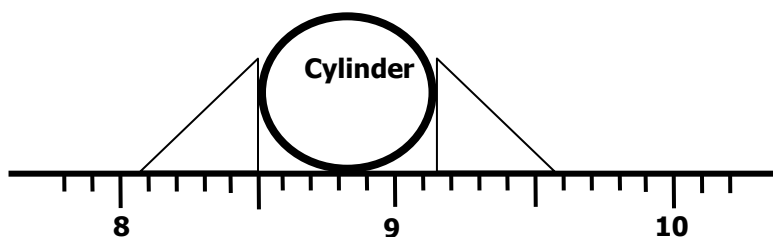
FOR EXAMINER USE ONLY

SECTION	QUESTION	MAX MARKS	CANDIDATE'S SCORE
A	1 – 10	25	
B	11	12	
	12	12	
	13	12	
	14	12	
	15	7	
	TOTAL	80	

SECTION A: 25 MARKS.

Instructions: Answer all the questions in the spaces provided.

1. A Figure below is an arrangement of two set squares and a rule being used to determine the external diameter of a cylinder.

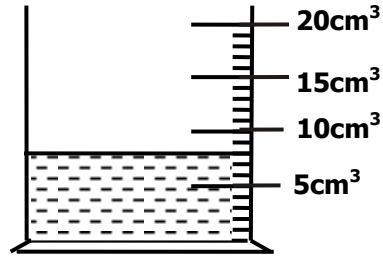


(a) State the accuracy of the rule. (1 mark)

(b) What is the radius of the cylinder? (2 marks)

2. Water flows along a horizontal pipe of cross sectional area 30cm^2 . The speed of the water is 4m/s but it reaches 7.5m/s in a constriction in the pipe. Calculate the area of the constriction. (3 marks)

3. The figure below shows water placed in a measuring cylinder calibrated in cm^3 ?



An object of mass **50.1g** and density **16.7g/cm³** is lowered gently into the water. Indicate on the diagram the new level. (2marks)

4. **1600 cm³** of fresh water of density **1g/cm³** are mixed with **1400cm³** of seawater of density **1.25g/cm³**. Determine the density of the mixture. (3 marks)

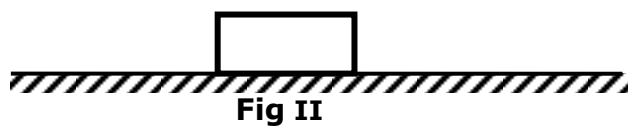
5. State **two** factors that lowers the surface tension force on a water surface. (2 marks)

6. The fig (I) below shows a body acted on by two forces **F₁=3N** and **F₂=8N**

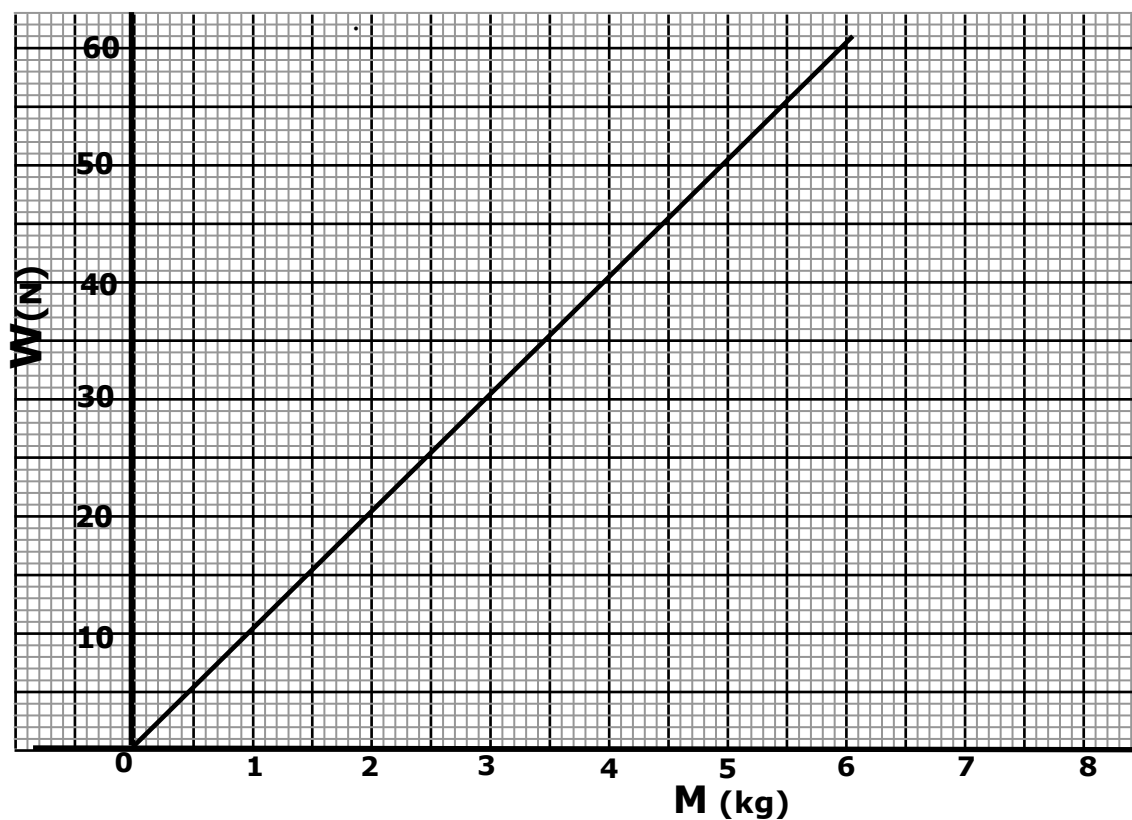


On the fig (II) below draw the force F_3 that has the same effect on the body as the two forces.

(2 marks)



7. The graph in the figure below shows the variation of the weights W of various objects with their respective masses,



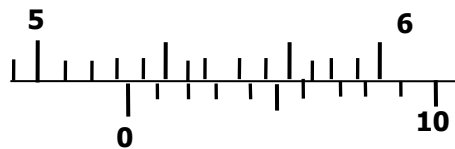
Use the graph to determine the gravitational field strength.

(2 marks)

8. A pick – up carrying stones weighs **20,000N**. The weight is evenly spread across the four tyres. The area of contact of each tire with the ground is **0.025m²**. Calculate the pressure exerted by each tire on the ground. (3 marks)

9. Name **two** factors that affect pressure in fluids. (2marks)

10. The figure below shows a vernier caliper scale.



State the correct reading of the scale if the instrument has a zero error of -0.01cm. (3 marks)

SECTION B: 55 MARKS

INSTRUCTIONS: answer all the questions in the spaces provided.

11. a) Distinguish between distance and displacement. (1 mark)

b) A body accelerates uniformly from initial velocity, **U** to the final velocity **V**, in time **t**, the distance traveled during this time interval is **S**. If the acceleration is shown by the letter **a**, show that;

(i) **V = U + at** (2 marks)

(ii) $S = Ut + \frac{1}{2}at^2$ (3 marks)

(iii) $V^2 = U^2 + 2aS$ (3 marks)

c) A body initially moving at 72km/h accelerates uniformly to a velocity of 180km/h in 3seconds. Calculate its acceleration. (3marks)

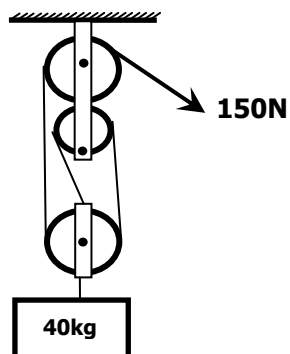
12.a) Differentiate kinetic energy from potential energy. (1 mark)

b) A **50** tonne rocket takes off vertically and attains a velocity of **800m/s** at an altitude of **20km**. calculate at this point;

i) Its kinetic energy. (2 marks)

ii) Its potential energy. (3 marks)

c) Figure shows a pulley system



(i) What is the velocity ratio of the system (1mark)

(ii) Calculate the efficiency of the system (3marks)

(iii) Give two reasons why efficiency is not 100% (2marks)

13. A bus of mass 3000kg traveling at a velocity of 20m/s collides with a stationary car of mass 600kg. The two then moves together at a constant velocity for 30 seconds. Find

(i) The common velocity after impact (3 marks)

(ii) The distance moved after impact (2 marks)

(iii) The impulse (2 marks)

(iv) Kinetic energy before collision. (2 marks)

(v) Kinetic energy after collision. (2 marks)

(vi) State a reason why kinetic energy before collision is not the same as kinetic energy after collision. (1mark)

14. a) state the hook's law. (2 marks)

b) The following results were obtained in an experiment to verify Hooke's law when a spring was extended by hanging various loads on it.

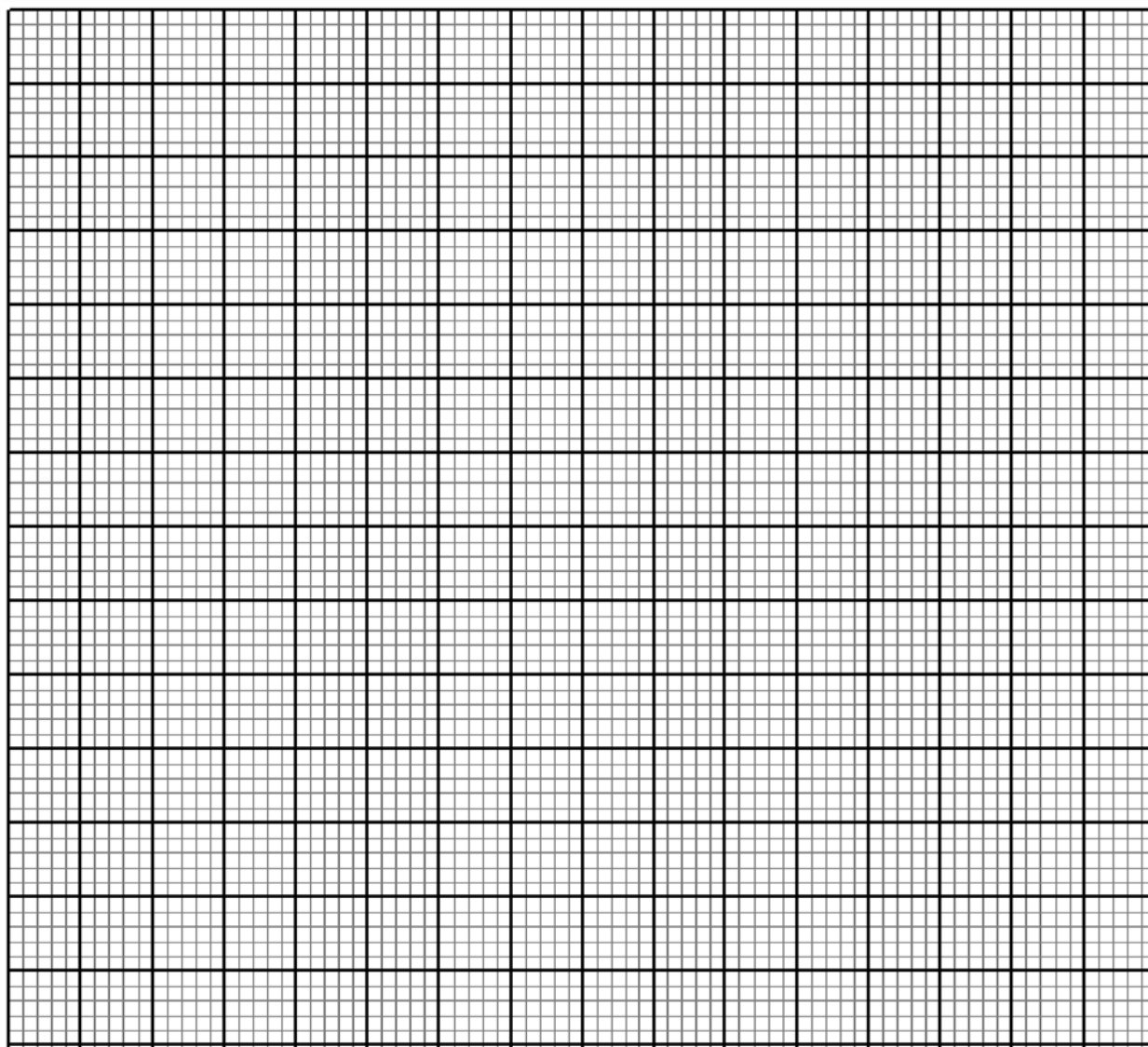
Load, L(N)	0.00	1.00	2.00	3.00	4.00	5.00	6.00
Length of spring (cm)	10.00	11.50	13.00	14.50	16.00	18.50	24.00
Extension, e (cm)							

i) Complete the table for extension, e , above

(2 marks)

ii) Plot a graph of Load (y-axis) against extension.

(5 marks)



iii) From the graph, determine the spring constant, k .

(3 marks)

15. In an experiment to estimate the diameter of an oil molecule, an oil drop of diameter **0.05 cm** spread over a circular patch whose diameter is **20cm**

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 patch covered by the oil. (2 marks)

(iv) State any assumption made in (b) above. (1 mark)