NAME……………………………….……….………..........ADM NO……..CLASS………

232/1 **Candidate's Signature…………………………………….**
Physics
Paper 1 **Date………………………………………………………**
June 2017
2 hours

Kenya Certificate of Secondary Education
PHYSICS
Paper 1
2 hours

INSTRUCTIONS TO CANDIDATES

*Write your **name, Adm no** and **class** in the spaces provided above.*
***Sign and write the date** of examination in the spaces provided above.*
*This paper consists of **TWO** sections: **A** and **B**.*
*Answer **ALL** the questions in sections **A** and **B** in the spaces provided.*
***ALL** working **MUST** be clearly shown.*
Non-programmable silent electronic calculators and KNEC mathematical tables may be used.

This paper consists of 14 printed pages; candidates should check the question paper to ascertain that all the pages are printed as indicated and that no questions are missing.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	**1 – 9**	**25**	
	10	**11**	
B	**11**	**5**	
	12	**12**	
	13	**10**	
	14	**9**	
	15	**9**	
	Total Score	**80**	

SECTION A

1. a) State the accuracy of surveyors tape. (1mk)

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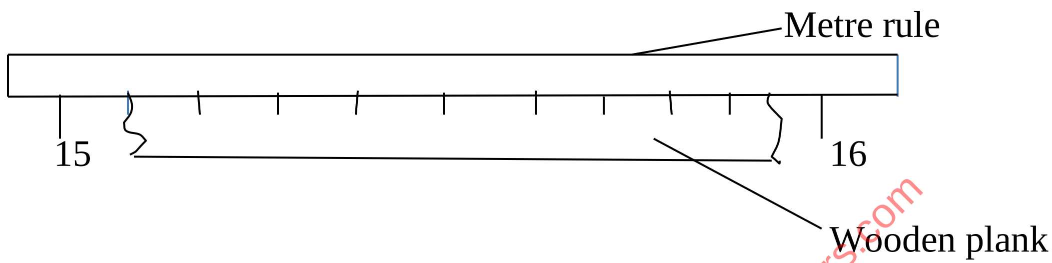
b) The figure below is a wooden plank whose length is to be measured using a surveyors tape.



State the length of the wooden blank. (1mk)

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2. The number of molecules in $18cm^3$ of a liquid is $6.0x10^3$. Assuming that the diameter of the molecule is equivalent to the side of a cube having same volume as the molecule. Determine the diameter of the molecule. (3mks)

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3. Two identical tubes **p** and **q** held horizontally contain air and water respectively. A small quantity of coloured gas is introduced at the end of **p** while small coloured water is introduced at end of **q**. State with reason the tube in which the colour will reach other end faster. (2mks)

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4. Thermodynamics is a branch of physics, what does it deal with? (1mk)

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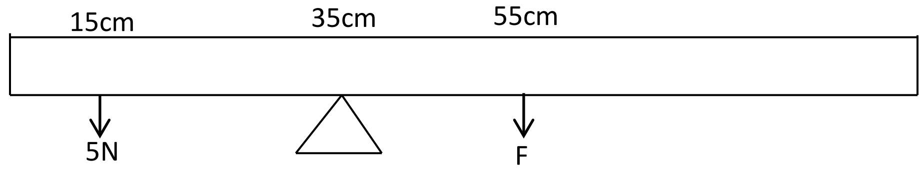
5. The figure below shows forces **5N** and **F** acting on a metre rule of mass 120g.



i) Indicate on the diagram the third force acting on the metre rule. (1mk)

ii) Determine the value of F (3mks)

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ii).State how the position of the center of gravity of a body in stable equilibrium changes when the body is slightly tilted. (1mk)

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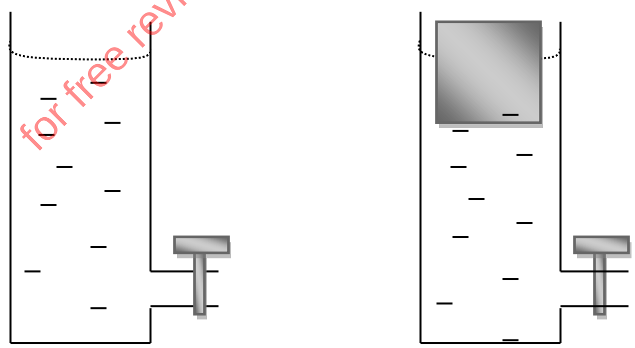
6. A can with a hole on the side is filled with water to a height ***h***. A second identical can is filled with water to the same height and a block of wood floated on the water as shown below.



i) Sate the observations that will be made in the two sets when the taps are opened simultaneously. (1mk)

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ii) Explain the observations made in (i) above. (2mks)

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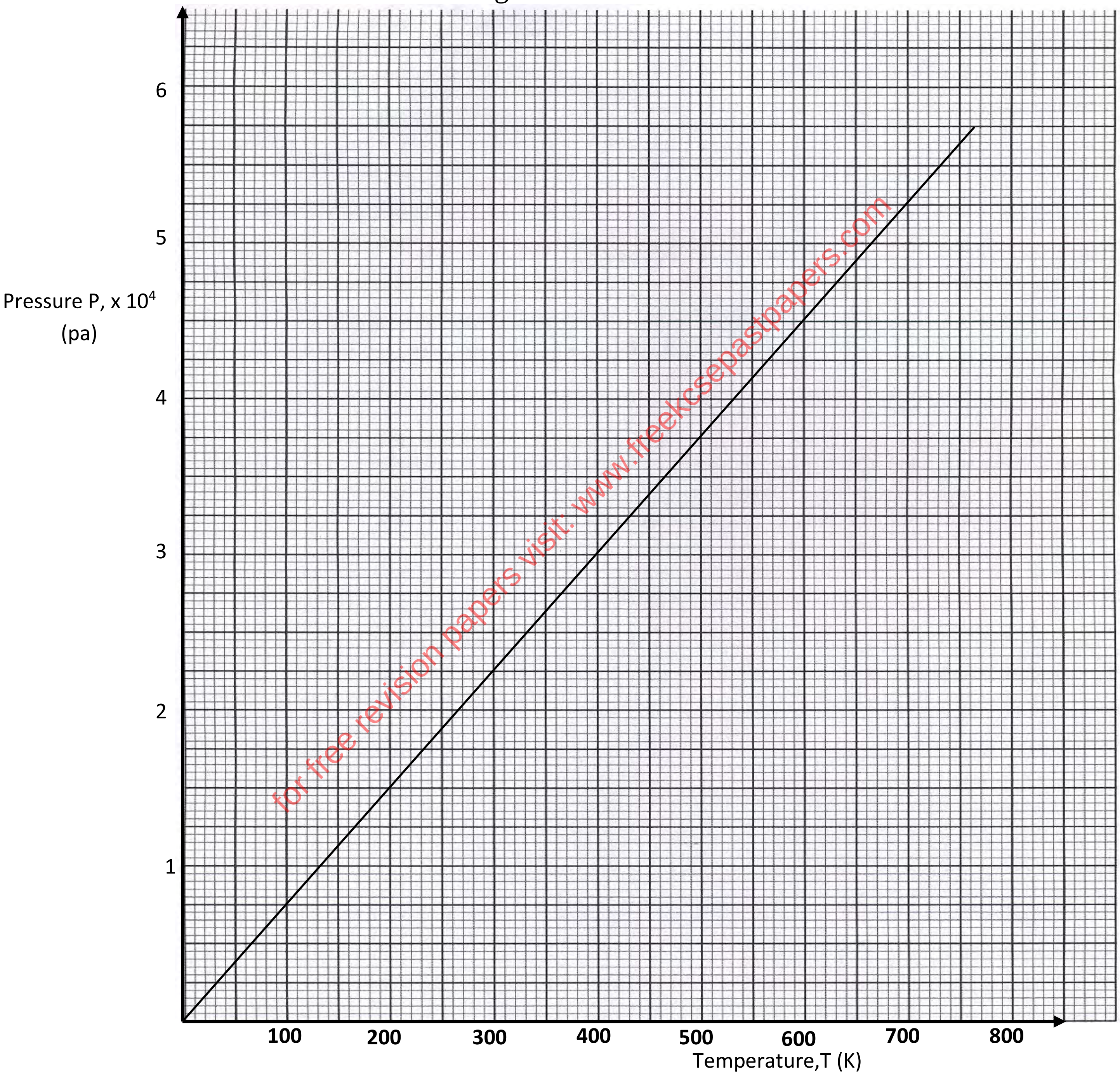
7. The graph below shows the relationship between pressure and temperature for a fixed mass of an ideal gas at constant volume.



Given that the relationship between pressure **(P)** and temperature **(T)** is of the form P= **kT +C** where **k** and **C** are constants, from the graph, Determine the value of;

i) **C** (1mk)

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ii) **k** (2mks)

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8. A horse pipe of cross- sectional area 0.6 cm^2passes water at 10m/s to a nozzle sprinkler of diameter 0.8cm^2 having 40 holes. Determine the velocity of the water emitted from each hole. (3mks)

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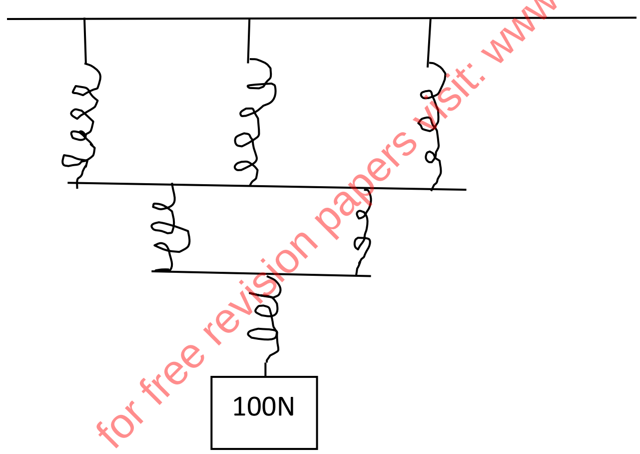
9. The diagram below shows an arrangement of springs.



If each spring has a spring constant of 25N/cm, determine the total extension. (3mks)

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SECTION B (55 marks)

10. a) State one similarity between the law of flotation and Archimedes principle. (1mk)

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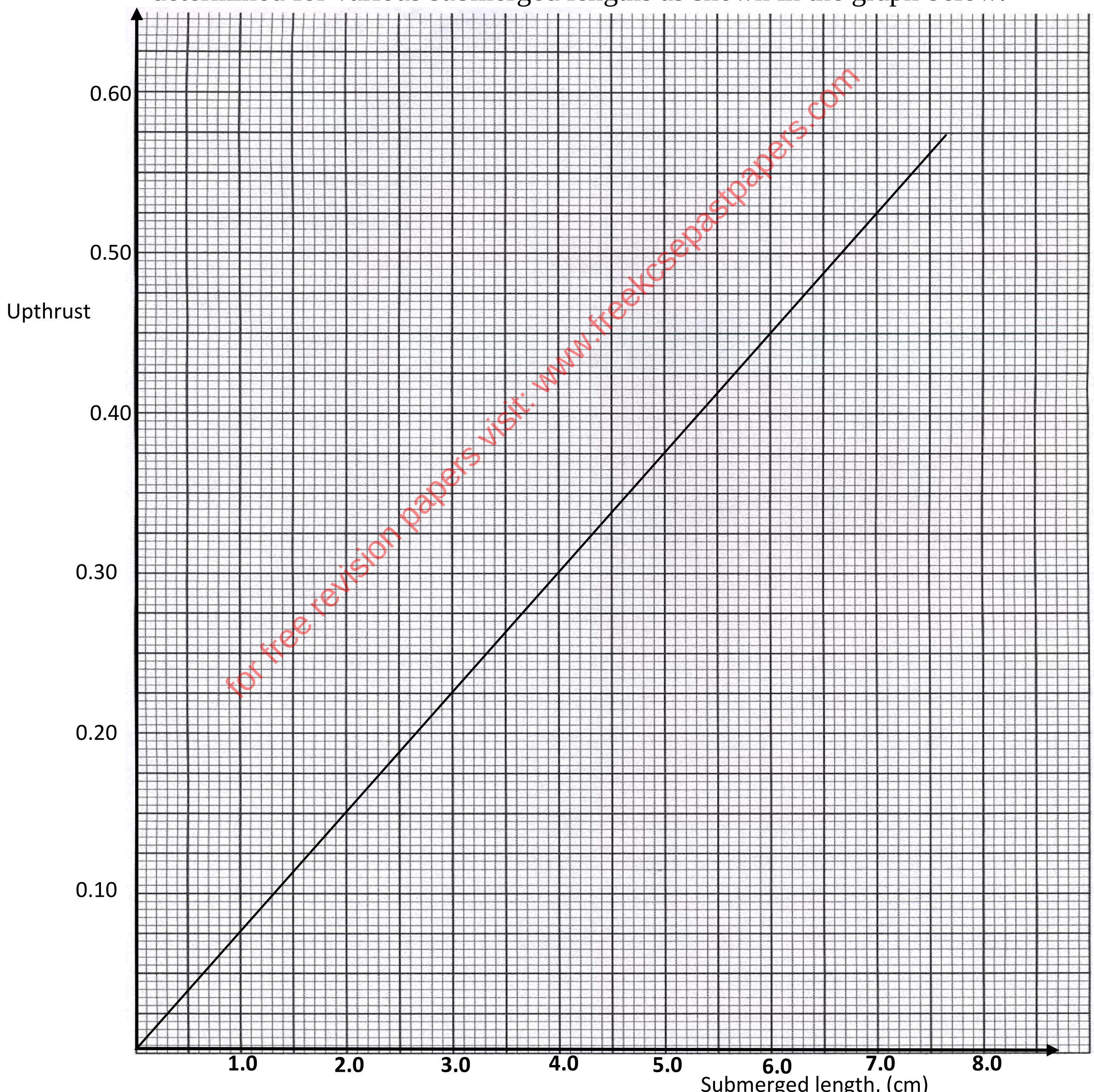
b) In an experiment to determine the density of a liquid, a uniform metal cylinder of cross section area 6.2cm^2 and length 4.5cm was hang from a spring balance and lowered gradually into the liquid. The up thrust was determined for various submerged lengths as shown in the graph below.



From the graph, determine;

i) The value of the up thrust when the cylinder is fully submerged. (1mk)

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ii) The density of the liquid. (3mks)

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c) You are provided with the following

- Overflow can
- Metal block
- Beaker
- Water
- Spring balance
- String

i) Describe an experiment to verify Archimedes principle. (4mks)

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ii) A block of wood whose weight is 2.0 N is held under water by a string attached to the bottom of a container. The tension in the string is 0.5N Determine the density of wood. (2mks)

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11.a) State one difference between linear and angular velocity. (1mk)

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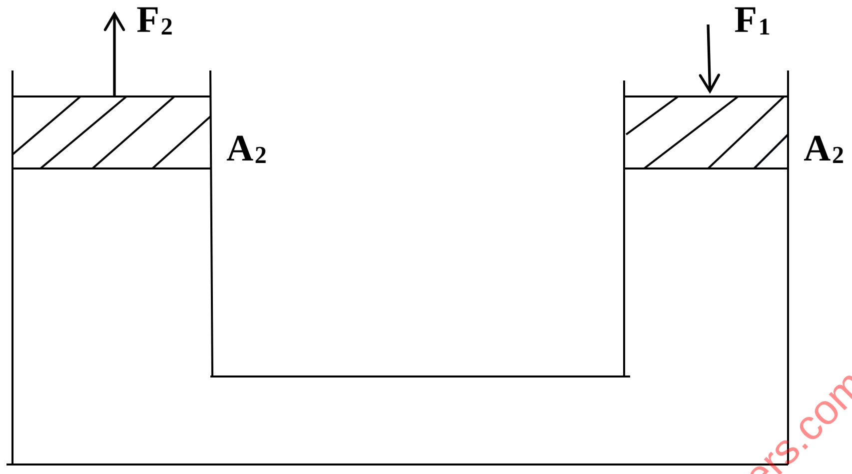
b) The figure below shows a hydraulic jack .The ratio of cross sectional area of **A$_1$** to **A$_2$** is 25:1. **F$_1$** is a force applied while **F$_2$** is the load.



Write the expression for pressure exerted on the liquid by effort piston. (1mk)

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c) A mechanic applies a force of 100N on the effort piston to raise part of a car. Determine the maximum load that can be raised. (3mks)

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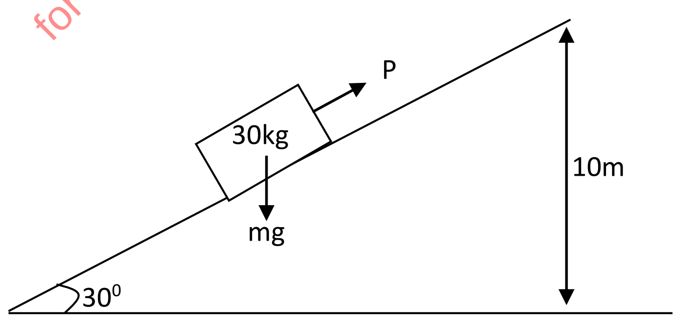
12. The figure below shows a block of mass 30kg being pushed up a slope by a force **p** at a constant speed. The frictional force on the block is 20N.



Determine;

i) The value of **P**. (2mks)

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ii) The work done in moving the 30kg mass up the inclined plane. (2mks)

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iii) On reaching the top of the slope, the block is left to run freely down the slope. Which one of the forces previously acting on the block would then act in the opposite direction. (1mk)

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iv) Determine the acceleration of the block down the slope. (2mks)

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v) State two factors that affect its final velocity at the bottom of the inclined. (2mks)

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vi) Determine the efficiency of the inclined plane. (3mks)

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13. a) A bullet is fired horizontally with a velocity of 45m/s from the top of a vertical tower 50m high. Determine;

i) Time taken by the bullet to reach the bottom of the ground. (3mks)

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ii) The maximum horizontal distance covered by the bullet. (2mks)

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iii) A car is brought to rest from a speed of 20m/s in a time of 2seconds. Determine the average deceleration. (2mks)

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iv) If the driver's reaction time is 0.2seconds, determine the shortest stopping distance. (2mks)

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14.a) Define latent heat? (1mk)

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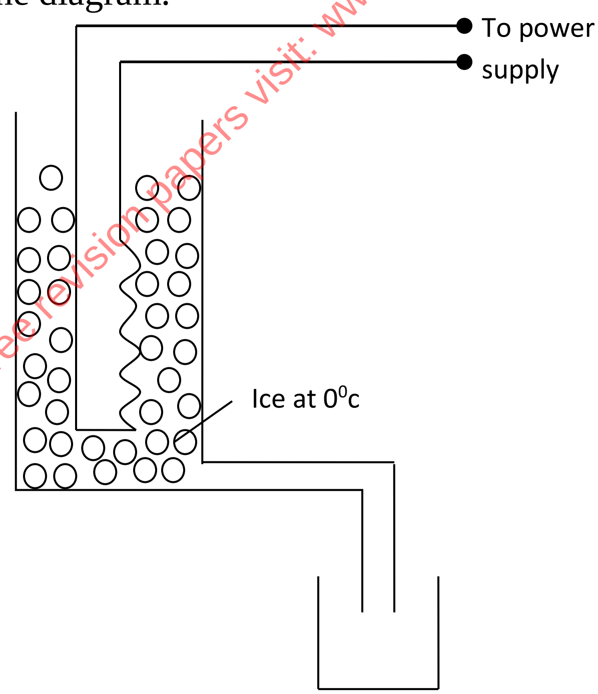
b) In an experiment to determine the power of an electric heater, melting ice was placed in a copper calorimeter with an outlet and heater placed in the ice as shown in the diagram.



i) Other than current and voltage, state the measurement that would be taken to determine the quantity of heat absorbed by the melted ice. (1mk)

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ii) If the latent heat of fusion of ice is **L**, show how the measurement in (i) above would be used to determine the power **P** of the heater. (2mks)

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iii) It is found that the power determined in this experiment is lower than the manufacturers value indicated on the heater. Give a reason. (1mk)

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c) In the same experiment to determine the specific latent heat of vaporization of water, steam at 100°C was passed into 50kg of water contained in 25kg well lagged copper calorimeter at 20°C.The final temperature was 60°C.

Determine the latent heat of vaporization.

(Take specific heat capacity of copper as 390J/kg K and specific heat capacity of water as 4200 J/kg K) (3mks)

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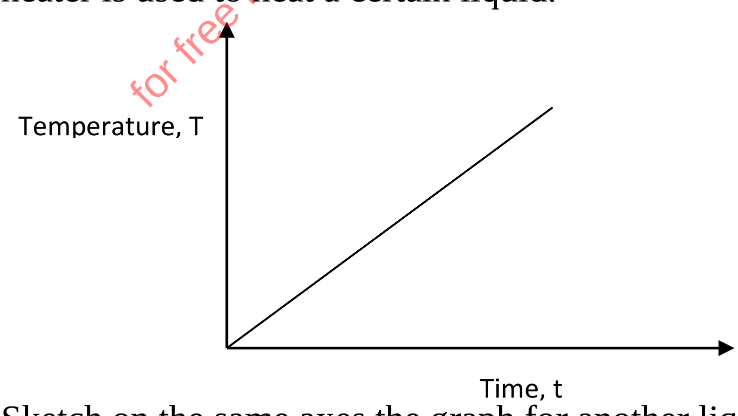
d) The graph below shows the variation of temperature **T** with time **t** when a heater is used to heat a certain liquid.



Sketch on the same axes the graph for another liquid of the same mass but higher specific heat capacity when heated from the same temperature. (1mk)

15.a) Define the term angular velocity. (1mk)

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b) A body moving with uniform angular velocity is found to have covered an angular distance of 170 radians in **t** seconds. Thirteen seconds later it is found to have covered a total angular distance of 300 radians. Determine the value of **t.** (3mks)

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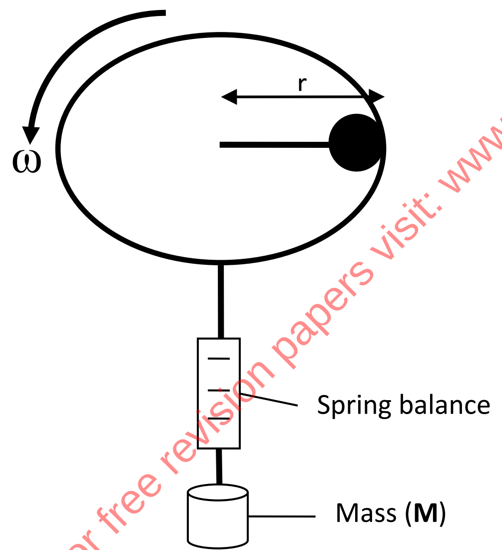
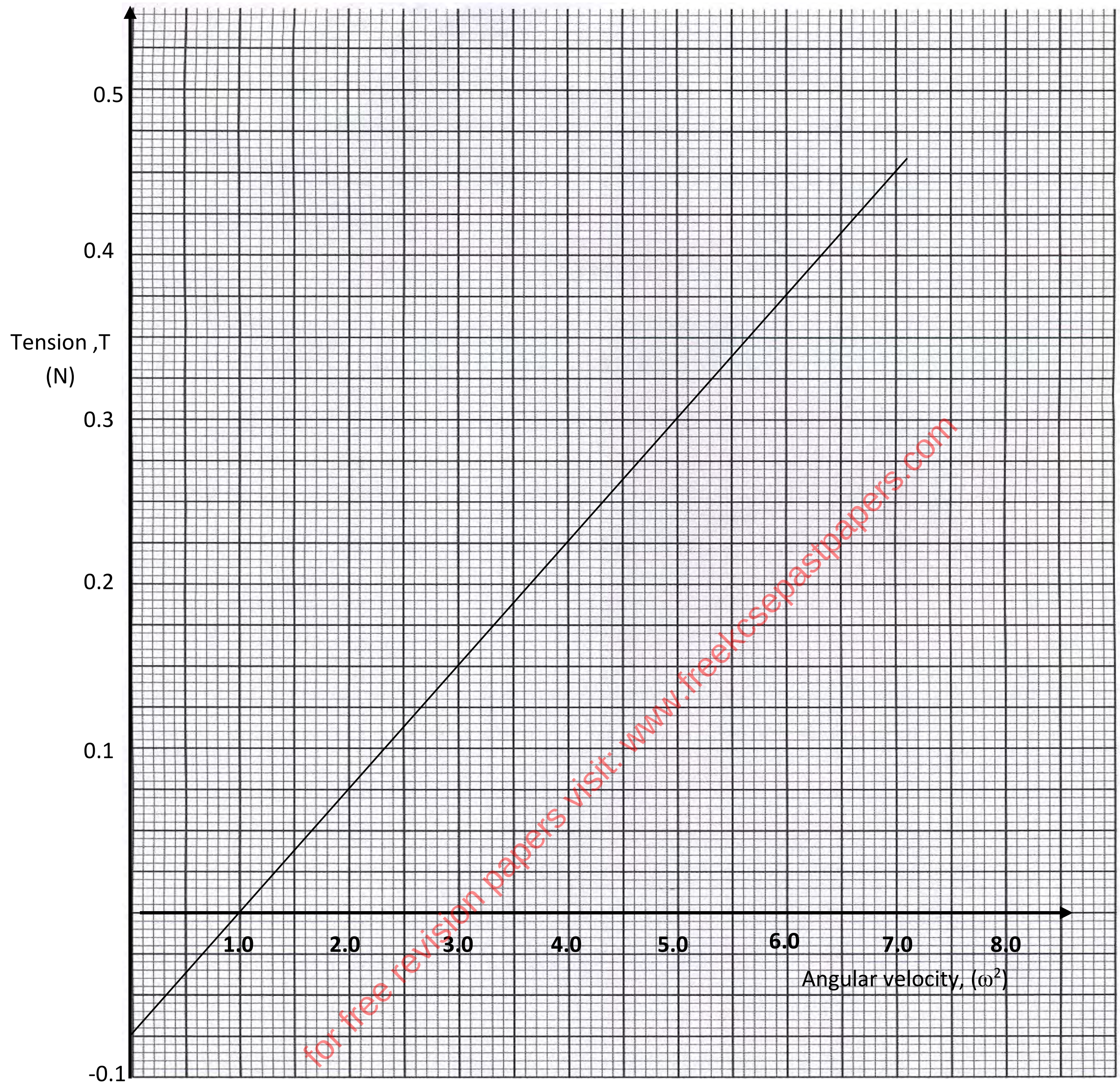
c) The figure below shows a mass **M** attached to the centre of a rotating string whose tension can be measured.



The tension **t** on the string was measured for various values of angular velocity. The distance **r** of the body from the Centre was maintained at 30 cm. A graph of tension against ω^2 was plotted as shown.



i) From the graph, determine the mass m of the body given that

T = **mω^2 - C** where **C is** a constant. (3mks)

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ii) Determine the constant **C.** (1mk)

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iii) What is the significance of C? (1mk)

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