

NAME: STREAM:

END OF TERM II EXAMINATIONS

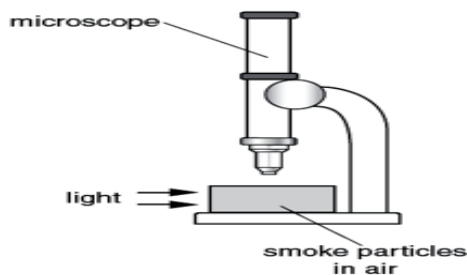
S.2 PHYSICS

1 Hour 45 Minutes

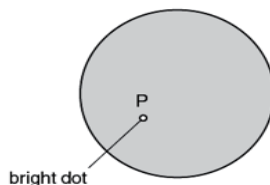
INSTRUCTIONS

- Answer all the questions in this paper.
- Use only the spaces provided to answer the questions.
- Where necessary, assume $g = 10\text{ms}^{-2}$.

1. (a) The figure below shows the setup of an experiment to observe the motion of smoke particles in air.



- (i) The view of one smoke particle, labelled P, through the microscope is as shown below.



Draw 3 joined lines to show the movement of the particles. (02 marks)

- (ii) Explain what makes the smoke particles to move the way they do.

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(02 marks)

- (iii) The air cell containing the smoke particles becomes warmer. Explain how this changes the motion of the smoke particles.

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(02 marks)

- (b) A lump of ice was left in air. After sometime the ice turned to liquid water.

- (i) What name is given to the change above?

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(01 marks)

- (ii) Compare the arrangement and motion of the molecules in ice and liquid water.

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(02 marks)

- (iii) State one practical application of the change in state above.

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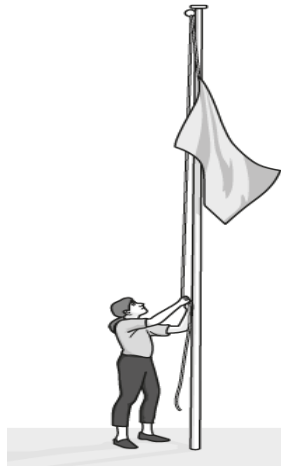
(01 marks)

2. (a) Whenever a force moves its point of application work is done. What is meant by work?

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(01 marks)

- (b) The figure below shows a woman raising a flag by pulling the downwards on a rope.



- (i) Identify the machine being used to raise the flag.

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(01 marks)

- (ii) State one other application of the machine you have identified.

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(01 marks)

- (iii) Determine the increase in the gravitational potential energy of the flag when it is raised through a height of $6.0m$.

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(02 marks)

- (iv) Explain why the work done on the rope is larger than the value in b(i) above.

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(01 marks)

- (v) Suggest one way of increasing the work done on the rope.

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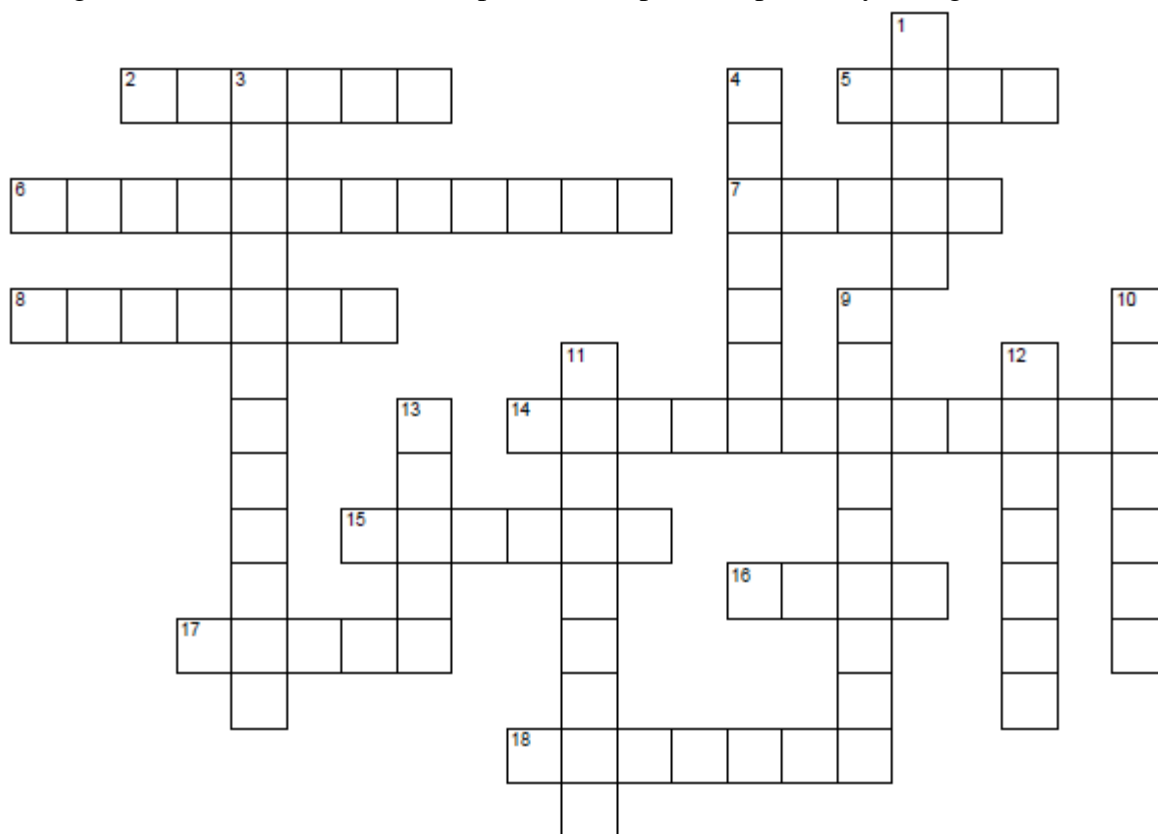
(01 marks)

- (b) In a gear system, a wheel of 40 teeth is driven by a wheel of 10 teeth. The system requires an effort of $100N$ in order to lift a load of $400N$. Calculate the efficiency of the system.

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(02 marks)

3. The figure below shows a cross word puzzle. Complete the puzzle by filling in a suitable word.



ACROSS

- 2 In physics and other sciences, _____ is defined as a work one system does (or can do) on another system
- 5 Mechanical _____ is the amount of energy transferred by a force.
- 6 A _____ force is a force that does zero net work on a particle that travels along any closed path in an isolated system.
- 7 A _____ is a rigid object that is used with an appropriate fulcrum or pivot point to multiply the mechanical force that can be applied to another object.
- 8 The _____ energy is the energy which causes or is released by the physical distortion of a solid or a fluid.
- 14 The _____ of energy states that the total amount of energy in an isolated system remains constant, although it may change forms.
- 15 A _____ is a wheel with a groove along its edge for holding a rope or cable or belt.
- 16 The _____ is the SI derived unit of power, equal to one joule per second.
- 17 The inclined _____ is a flat surface whose endpoints are at different heights.
- 18 A simple _____ is any device that only requires the application of a single force to work.

DOWN

- 1 _____ is the rate at which work is performed or energy is transmitted. It is the amount of energy required or expended for a given unit of time.
- 3 The _____ is a unit of energy often used also in theoretical physics as a unit of mass. It is the amount of kinetic energy gained by a single unbound electron when it passes through an electrostatic potential difference of one volt, in vacuo.
- 4 A _____ is a unit of measurement for energy equal to the amount of heat required to raise a gram of water one degree celsius. In most fields, it has been replaced by the joule.
- 9 Mechanical _____ is the factor by which a mechanism multiplies the force put into it.
- 10 The _____ energy of an object is the extra energy which it possesses due to its motion, defined as the work needed to accelerate the body from rest to its current speed.
- 11 _____ energy is energy stored within a physical system.
- 12 The gravitational _____ energy of an object consisting of loose material, held together by gravity alone, is the amount of energy required to pull all of the material apart, to infinity.
- 13 The _____ is the SI unit of energy.

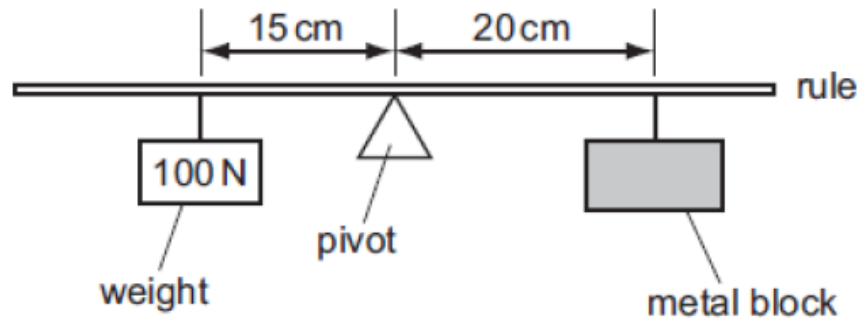
(10 marks)

4. (a) What do you understand by the term moment of a force.

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(01 marks)

- (b) In order to determine the weight of a metal block using a standard weight of 100N and a metre rule, Afuwa pivoted a metre rule at its mid-point and suspended the standard weight at a distance of 15cm from the pivot. To keep the metre rule in equilibrium, she had to adjust the distance of the metal block to 20cm from the pivot as shown in the figure below.



- (i) What principle must she use in order to calculate the weight of the block.

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(01 marks)

- (ii) State the assumptions she should make before using the principle in b(i) above.

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(02 marks)

- (iv) Determine the weight of the metal block.

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(03 marks)

- (c) The centre of gravity of a uniform rectangular lamina is located at the point of intersection of the diagonals of the lamina.

- (i) What is meant by the term centre of gravity?

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(01 marks)

- (ii) Draw a diagram to show the lamina and indicate the position of the centre of gravity as G.

(01 mark)

- (iii) Identify one practical application of the knowledge of centre of gravity.

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(01 marks)

*** END ***