Candidate Name:……..

St Swithun's
WINCHESTER

Physics

Sixth Form Academic Assessment

Sample paper

Time allowed: 1 hour

Instructions to Candidates

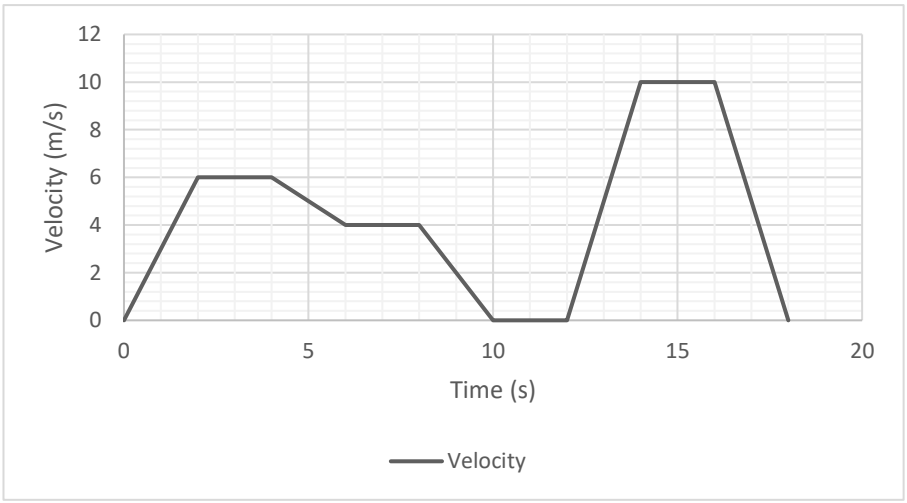
Candidates should answer <u>all</u> questions

<u>Further Information</u>

- Total marks available: 60
- Calculators are allowed
- Write with a black or blue pen. Diagrams may be drawn in pencil.
- Answer in the spaces provided

Question 1 (10 marks)

Consider the following graph showing a journey



a) Describe the journey in words.

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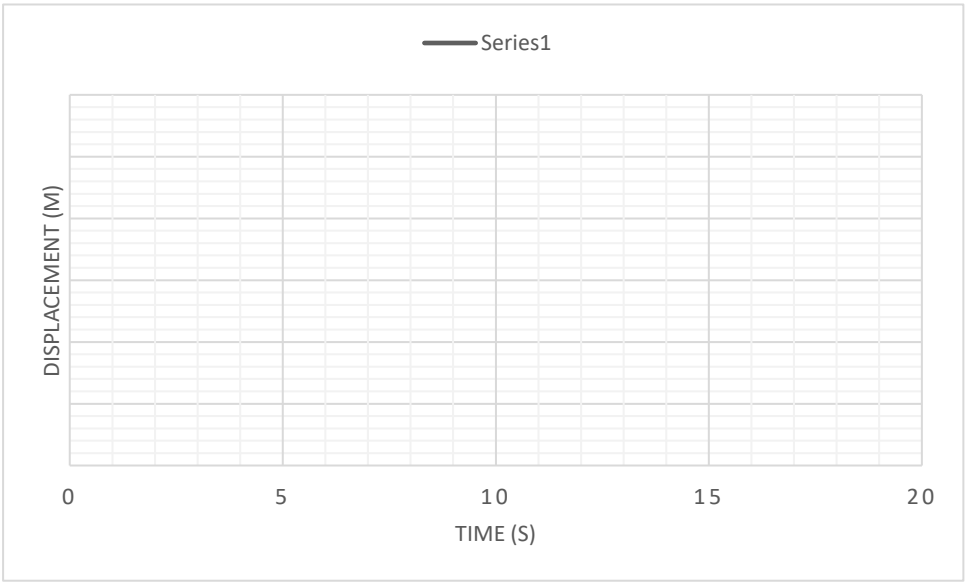
.....

.....

[3]

B) Draw the corresponding displacement – time graph [3]



C) Calculate the distance travelled over the 20 seconds

[2]

D) Calculate the average velocity of the object over the first 10 seconds.

[2]

Question 2 (6 marks)

Radiation from the Sun falling on a photoelectric cell enables the cell to provide 11mW of power to type radio-transmitter of a spacecraft. The active area of the cell is 2.2cm^2. The intensity of the radiant energy is 0.05 W/cm^2.

a) Calculate the energy incident on the cell per second

[3]

B) Calculate the efficiency of the cell

[2]

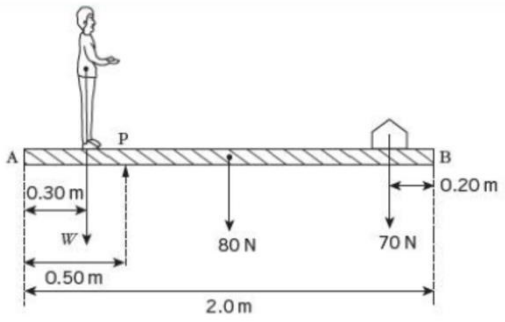
C) state the energy transfer in the cell when sunlight falls on it

[1]

Question 3 (6 marks)

Select three types of wave from the electromagnetic spectrum and describe the uses and dangers of each

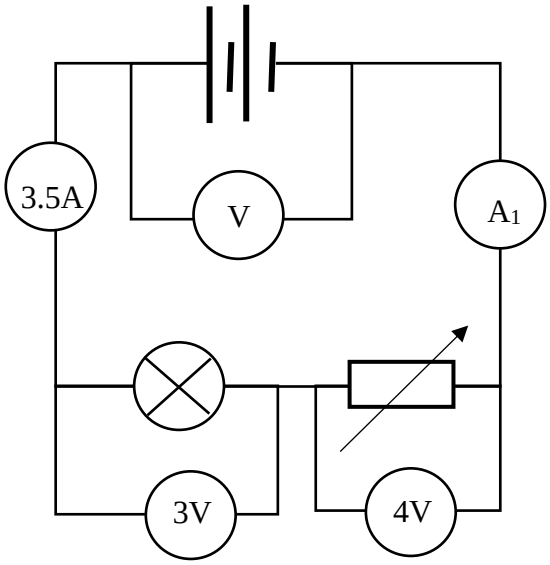
Question 4 (5 marks)



A student is being weighed. The student, of weight (W), stands 0.30m from end A of a uniform plank AB. The plank has a weight of 80N and length 2.0m. A pivot P supports the plank and is 0.50m from end A. A weight of 70N is moved to balance the weight of the student. The plank is in equilibrium in the diagram.

Determine the weight of the student

Question 5 (6 marks)



a) What is the current at A_1?

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[1]

b) What is the potential difference across the battery?

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[1]

c) What is the resistance of the variable resister?

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[1]

d) What is the power of the lightbulb?

.....

.....

[1]

f) The circuit runs for 5 minutes, how many electrons flow through the lightbulbs? (Charge on one electron 1.9×10^{-19}C)

.....

.....

[1]

g) State and explain what happens to the lightbulb as the resistance of the resister changes.

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.....

.....

Question 6 (3 marks)

On a sunny day at the beach. Explain why the sand gets hotter than the sea.

[3]

Question 7 (7 marks)

A ball of mass 0.8kg is thrown vertically upwards with an initial velocity of 7m/s and is caught when it returns to its original position. Ignore resistive forces and take g as 10m/s, determine :-

a) The time taken for the ball to reach its highest point

[2]

b) The maximum height the ball reaches

[2]

c) The acceleration of the ball at its highest point

[1]

d) Do heavier objects fall faster than lighter objects?

[2]

Question 8 (5 marks)

Show that there are approximately 80,000 grains of sand in a handful of sand.

Detail all assumptions and working out.

Question 9 (6 marks)

What is a black hole?

[4]

Explain whether or not our sun will ever become a black hole

[2]

Question 10 (6 marks)

Give some details about a branch of physics that you are interested in or have read about recently.

This could be quantum mechanics, particle physics, astronomy, a discovery or an invention that has revolutionised the world.