



ALEXANDER ROAD HIGH SCHOOL

MARCH 2011

1 HOUR

PHYSICAL SCIENCE CONTROL TEST

IC, MA, CO

TOTAL = 60

GRADE 11

Instructions

- The question paper consists of 5 questions.
- Answer all the questions.
- Answer section A on the answer sheet provided AND section B on folio sheets.
- Rule off after each question in Section B.
- A non-programmable calculator may be used.
- Number the answers correctly according to the numbering system
- A data sheet is provided for your use.
- Round off to two (2) decimal places where necessary.
- LO 2,3 AS 1,2, 3

SECTION A

- Answer on the answer sheet -

QUESTION 1: One-word questions

- 1.1 Newtons first Law of motion is also known as the Law of... (1)
- 1.2 An eye defect that often occurs in older people and results from the loss of optimum muscle control in the eye. (1)
- 1.3 The type of field that exists between charged objects. (1)
- [3]**

QUESTION 2: Multiple choice

2.1 Which of the following is incorrect when referring to Newton's third Law of motion?

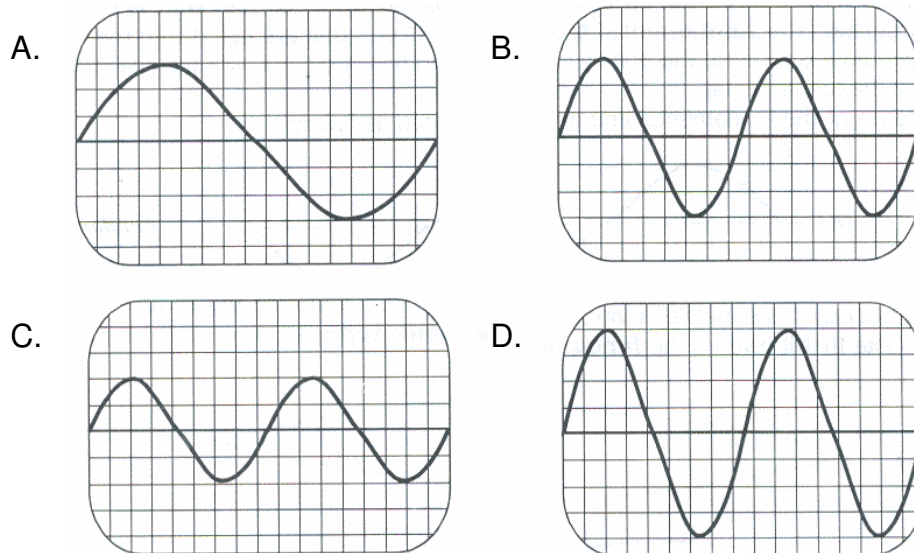
- i) *the pairs of forces are action- reaction pairs;*
- ii) *they have same magnitudes;*
- iii) *they act in the same direction;*
- iv) *they act on same objects;*
- v) *they act simultaneously.*

- A. All are incorrect
- B. i, iii , iv incorrect
- C. i, ii,iii incorrect
- D. iii, iv, v incorrect

2.2 In Newtons Second Law ...

- A. an object will remain at rest or continue with uniform motion unless acted on by a non-zero net force.
- B. mass is directly proportional to acceleration.
- C. force is inversely proportional to acceleration.
- D. acceleration is inversely proportional to mass.

2.3 Identify which of the signals below indicates a soft note with a high frequency...



2.4 What is the correct order for the speed of sound, from slowest to fastest, in oxygen, copper and water at room temperature?

- A. Oxygen Copper Water
- B. Copper Oxygen Water
- C. Oxygen Water Copper
- D. Copper Water Oxygen

- 2.5 The best way for testing whether an electric field is uniform is to:
- A. use a positive test charge between 2 charges in-between another electric field
 - B. put a negative test charge between 2 parallel plates and observe its movement.
 - C. two charges will repel each other if the field is uniform.
 - D. a positive test charge will accelerate uniformly towards the negative plate in a parallel plate setup.

2.6 Which one of the following gives the correct unit of electric field strength:

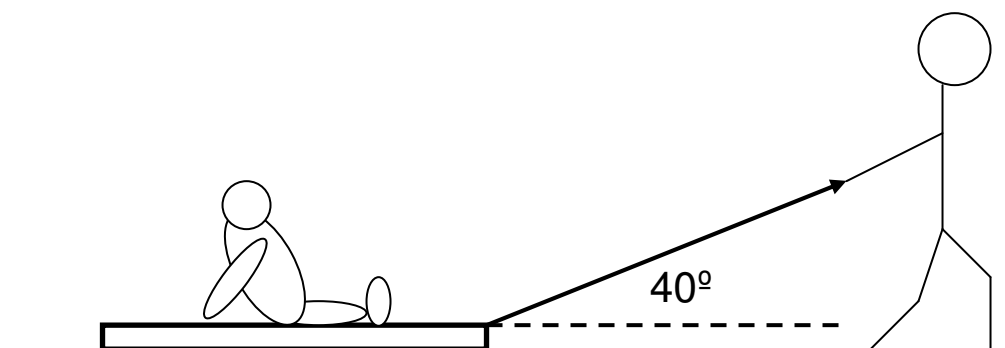
- A. $\text{N} \cdot \text{m}^{-1}$
- B. $\text{N} \cdot \text{C}$
- C. $\text{C} \cdot \text{N}^{-1}$
- D. $\text{V} \cdot \text{m}^{-1}$

[6 x 2 = 12]
SUB – TOTAL: 15

SECTION B

QUESTION 3

3. Jemma, mass 17kg is sitting on a piece of hardboard, mass 800g, on the ground. Her dad fastens a rope to the hardboard and starts to pull it with a force of 50N at an angle of 40° to the horizontal.



The board moves over the grass with a frictional force of 9N acting between the grass and the board.

- 3.1 Draw a free body diagram of all the forces acting on the board. (4)

- 3.2 Calculate the magnitude of the horizontal component of the applied force. (3)
- 3.3 Calculate the magnitude of the acceleration of the board. (5)
- 3.4 Using one of Newton's Laws of motion briefly explain what will happen to Jemma if her dad suddenly stops pulling. (3)

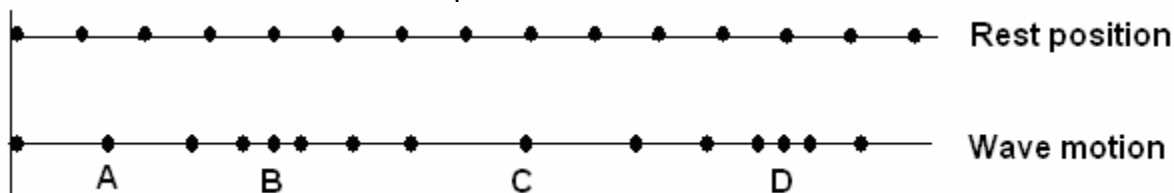
[15]

QUESTION 4

4.1 JJ the "ant enthusiast" and "not-so-brilliant" scientist chooses to view a South American giant red ant of height 6cm through a hand lens placed 8cm from the ant. The image he sees is upright and magnified 0.35 times.

- 4.1.1 Name the type of lens found in the hand lens. (1)
- 4.1.2 Determine the height of the image, as well as its distance from the lens. (2)
- 4.1.3 Draw an accurate ray diagram showing the formation of the image formed by the lens. (4)
- 4.1.4 Determine the focal length of the lens. (1)

4.2 Consider the wave motion depicted below.



- 4.2.1 What type of wave is being depicted above? (1)
- 4.2.2 Which two particles are in phase with each other? (2)
- 4.2.3a If the frequency of the waves is 20000Hz (ie. Ultra sound) and the speed of the wave is $340\text{m}\cdot\text{s}^{-1}$, calculate the wavelength of the waves. (3)
- 4.2.3b State one medical use of these waves. (1)

[15]

QUESTION 5

- 5.1 Two charged spheres, A and B, are placed 5 cm apart on insulated stands and the respective charges on the spheres are 10nC on A and -5nC on B.
- 5.1.1 Calculate the force between the two spheres. (3)
- 5.1.2 The spheres touch each other and are moved back to their original positions. Calculate the new charge on one of the spheres. (2)
- 5.1.3 How many electrons were transferred? (2)
- 5.1.4 From which sphere did the electrons move (only write **A to B** or **B to A**) (1)
- 5.2 Two charged spheres, C and D, are placed 55 mm apart on insulated stands and the respective charges on the spheres are -10nC on C and -5nC on D.
- 5.2.1 Calculate the energy of the system of charges. (3)
- 5.2.2 Calculate the net electric field at a point 15 mm from D, between the charges. (4)

[15]

TOTAL 60 MARKS