



SEPTEMBER 2016

ALEXANDER ROAD HIGH SCHOOL

1 HOUR

CO, KB, MH

PHYSICAL SCIENCE CONTROL TEST

TOTAL = 60

GRADE 10

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.
- Round off to two (2) decimal places where necessary.
- Formulas and a periodic table have been included at the end of the question paper

SECTION A

- Answer on the answer sheet -

QUESTION 1: Multiple choice

Four possible options are provided as answers to the following questions. Each question has only 1 correct answer. Choose the correct answer and write the letter (A – D) next to the relevant question number (1.1 – 1.6) on the answer sheet.

- 1.1 An object of mass $2m$ is dropped from a certain height and strikes the ground with kinetic energy, E .

An object of mass m is dropped from the same height and strikes the ground with kinetic energy equal to

- A $2E$
- B E
- C $\frac{1}{2} E$
- D $\frac{1}{4} E$

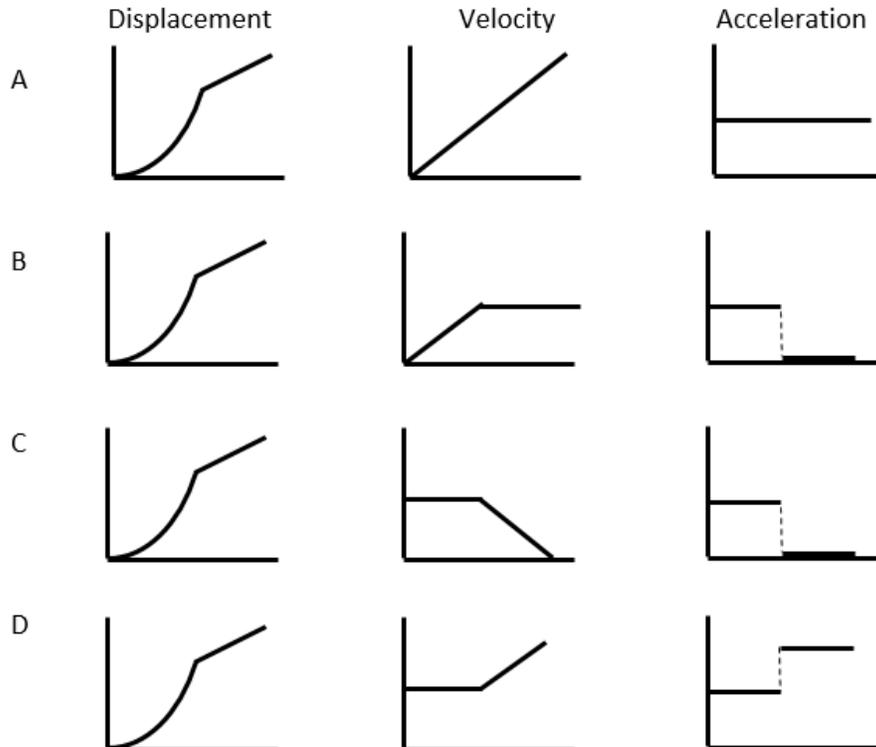
1.2 Which of the following can NOT be the resultant of two vectors with magnitude 12N and 25N respectively.

- A 25N
- B 12N
- C 13N
- D 37N

1.3 The frame of reference for a car moving from a traffic light towards a shop, which is around the corner from a Post office is:

- A the Post office
- B the traffic light
- C the shop
- D none of the above

1.4 The correct set of displacement/time, velocity/time and acceleration/time graphs is:



1.5 What is the percentage of C in K_2CO_3 ?

- A 12%
- B 8.70%
- C 16.15%
- D 18.75%

1.6 If a HCl solution had a concentration of $0,2 \text{ mol.dm}^{-3}$ and was made up to a volume of 375cm^3 , how many mol of HCl would be present in this solution?

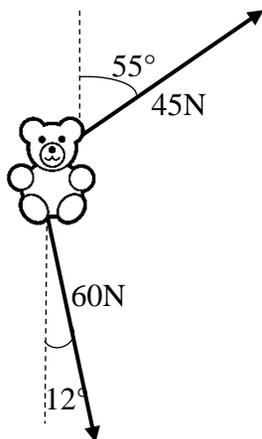
- A 75 mol
- B 0.0053 mol
- C 0.533 mol
- D 0.075 mol

[2 x 6 = 12]

SECTION B

QUESTION 2

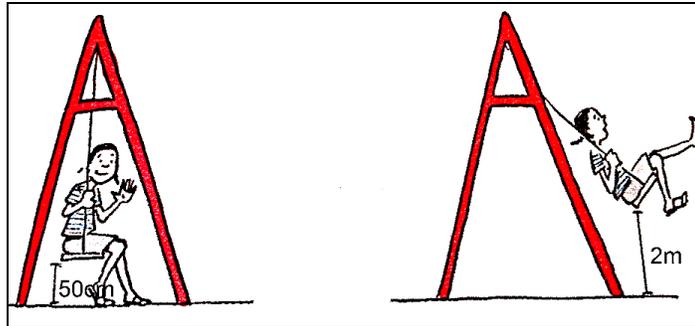
2.1 Two toddlers are fighting over a soft toy. They are pulling the toy with the forces shown in the diagram. Find the magnitude and the direction of the resultant force through construction. Scale $1\text{cm} : 10\text{N}$



[4]

QUESTION 3

A swing in the playground has a seat 50cm above the ground when it is hanging straight down. A child is swinging on the swing and she reaches a maximum height of 2m above the ground. When she reaches 2m, she sits still on the swing. Disregard friction and air resistance. The child has a mass of 25kg.

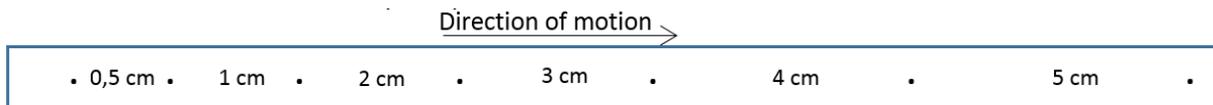


- 3.1 At which height from the ground will the girl’s gravitational potential energy be at a minimum? (1)
- 3.2 What is the girl’s speed at the maximum height? (1)
- 3.3 State the Law of Conservation of Mechanical Energy. (2)
- 3.4 Calculate the maximum gravitational potential energy of the girl during the motion. (Hint: The seat of the swing is installed 50cm above the ground.) (4)
- 3.5 Calculate the maximum speed that the girl will reach. (4)

[12]

QUESTION 4

4.1 Consider the given ticker tape that was pulled by a moving trolley, with measurements for each interval indicated. The frequency of the ticker timer was 50 Hz.



- 4.1.1 Calculate the average velocity for the interval that was ticked first. (4)
- 4.1.2 Calculate the average velocity for the fourth time interval. (2)
- 4.1.3 By using the answers above, calculate the acceleration of this trolley. (3)

- 4.2 An aeroplane needs to reach a velocity of 285 km/h before take-off (leaving the ground), when starting a flight.
- 4.2.1 Calculate the acceleration (in $\text{m}\cdot\text{s}^{-2}$) of an aeroplane that takes 10 seconds to move from a stationary position to take-off. (3)
- 4.2.2 A car tries to match the aeroplane's speed. Calculate the distance between the car and the plane the moment the plane takes off if the car also moves from a stationary position and accelerates at $5 \text{ m}\cdot\text{s}^{-2}$, next to the plane. (4)

[16]

QUESTION 5

- 5.1 What is meant by the term **Mole** in chemistry? (2)
- 5.2 A compound contains 74,2% Na and 25,8% O by mass. Calculate the empirical formula of the compound. (6)
- 5.3 Calculate the mass of potassium chloride (**KCl**) required to obtain 40g of oxygen in the following equation...
- $$2 \text{KClO}_3 \longrightarrow 2 \text{KCl} + 3 \text{O}_2$$
- (6)
- 5.4 Give the values for temperature and pressure, in standard temperature and pressure (STP). (2)

[16]

Formulas:

$v_f = v_i + a \Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$
$v_f^2 = v_i^2 + 2a \Delta x$	$\Delta x = \left(\frac{v_i + v_f}{2} \right) \Delta t$

$$E_k = \frac{1}{2} m v^2$$

$$E_p = mgh$$

$$n = \frac{m}{M}$$

$$n = \frac{N}{N_A}$$