education

Department of Education
FREE STATE PROVINCE

PRACTICAL TASK

GRADE 11

PHYSICAL SCIENCES

MARCH 2018

MARKS: 15

TIME: 30 MINUTES

This paper consists of FOUR pages.

Name of learner: ..... Grade: .....

INSTRUCTIONS AND INFORMATION

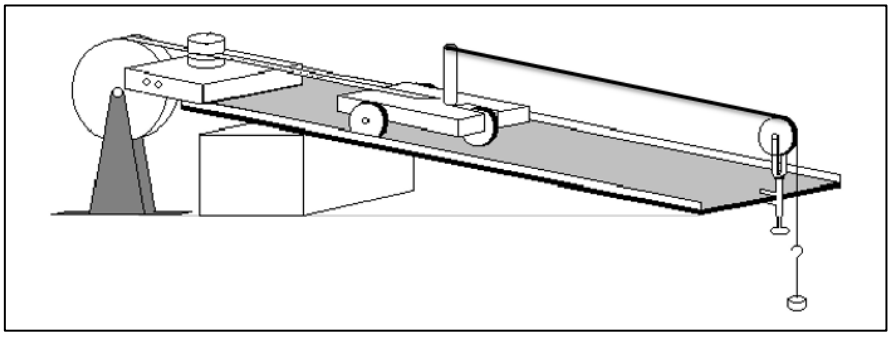
1. Write your name and grade in the appropriate spaces on the FRONT PAGE of this question paper.
2. Answer ALL questions in the spaces provided in THIS QUESTION PAPER.
3. You may use a non-programmable pocket calculator.
4. You may use appropriate mathematical instruments.
5. Show ALL the formulae and substitutions in ALL calculations.
6. Round off your FINAL numerical answers to a minimum of TWO decimal places where applicable.
7. Give brief motivations, discussions, et cetera where required.
8. Write neatly and legibly.
9. Formulae you might need: $F_{net} = ma$ $T = \frac{1}{f}$ $w = mg$

QUESTION 1

A group of learners verifies the relationship between the net (resultant) force and acceleration of a trolley. The apparatus available for the experiment are listed below:

- Trolley
- Trolley track, pulley and G-clamp to attach the pulley
- Ticker-timer
- Ticker-tape
- Hanger with identical mass pieces
- Hook and cotton thread

The apparatus are put together as shown below; note that the trolley track is tilted slightly:



1.1 Why did the learners tilt the trolley track slightly? (1)

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The first trial of the experiment is done with some mass pieces on the hanger and other mass pieces on the trolley. For subsequent trials, mass pieces are transferred from the trolley to the hanger to increase the force that accelerates the trolley.

1.2 Identify the following variables for this experiment:

Independent _____ (1)

Dependent _____ (1)

Controlled _____ (1)

1.3 The frequency of the ticker-timer is 40 Hz. Calculate its period. (2)

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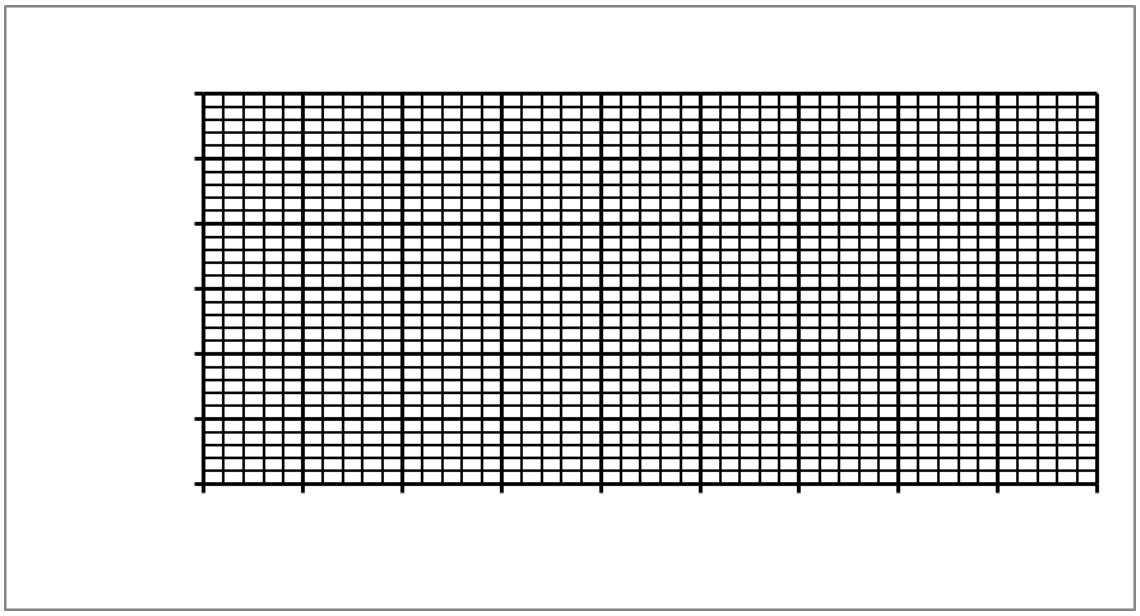
1.4 After the learners analysed the ticker-tape for each trial, they have recorded the following results:

Ticker-tape	Net force (force-units)	Acceleration ($m.s^{-2}$)	$\frac{F_{net}}{a}$
1	2	0,7	**X**
2	4	1,4	
3	6	2,1	
4	8	2,8	

1.4.1 What is the value of **X** (ignore unit)? _____ (1)

1.4.2 Use the values in the table above to draw an accurate graph of acceleration versus net force. Use the graph paper below, show all your labels and ensure the dependent variable is on the y-axis. (5)



1.5 What mathematical relationship is represented by the gradient of your graph? (1)

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1.6 Suppose you have used the real weight, in newton, of the mass pieces. Substitute basic SI units into the ratio $\frac{F_{net}}{a}$, simplify it and obtain a final unit that represent mass. (2)

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GRAND TOTAL: 15