

Learners are still losing marks unnecessarily by not completing the following when answering the questions.

1. Starting the calculation with the correct equation.
2. Supplying the correct unit in the final answer.
3. Showing substitution into the correct equation.

A detailed analysis of the questions follows.

Question 1

Poorly answered.

Learners had difficulty interpreting the following questions.

- 1.12
- 1.14
- 1.15

Question 2

2.1 Poorly answered. In spite of the diagram, students still changed the order of the forces

Areas of concern:

- using a scale
- vectors drawn without arrows
- positioning of the resultant

2.2 Poorly answered

The concept of components needs to be emphasised.

Question 3

3.1 Equations of motion are used at will. The data provided could not be analysed even though they were provided with a sketch, which included the data.

NB: Instantaneous velocity – average velocity in the middle of the time interval if the acceleration is constant.

3.2 Poorly answered

3.3 Poorly answered

Question 4

- 4.1 Well answered – Learners are omitting u from the equation.
In the substitution u is omitted or v and u are switched.
- 4.2 Mechanical energy is the sum of $E_p + E_k$
Conservation of mechanical energy is therefore: $E_p + E_k = \text{constant}$
Many candidates simplify write $E_p \text{ top} = E_k \text{ bottom}$, instead of $(E_p + E_k)_{\text{top}} = (E_p + E_k)_{\text{bottom}}$
- 4.3 Please note $W = \Delta E_k$ and not $W = E_k$
 $\Delta E_k = \frac{1}{2} mv^2 - \frac{1}{2} mu^2$
- 4.4 Well answered – although many candidates calculated Δp

Question 5

Very poorly answered

- 5.1 Very poorly answered. The concept of inertia is not well understood.
- 5.2
- 5.3

Question 6

- 6.1 Well answered
- 6.2 Well answered
Some areas of concern are
- use of the wrong formula e.g. $F = \frac{kmM}{r^2}$ instead of $F = \frac{Gm_1m_2}{r^2}$
 - substitution into the formula
 - use of calculator
 - unit of F
- 6.3 Well answered

Question 7

- 7.1 Poorly answered. The sketching of electric fields needs attention
Learners were penalized for drawing field lines that were
- inside the sphere
 - not curved on the inside as well as the outside of the spheres
- 7.2 Well answered.
Some areas of concern are
- use of the wrong formula e.g. $F = \frac{kmM}{r^2}$ instead of $F = \frac{kQ_1Q_2}{r^2}$
 - substitution into the formula
 - converting to metres
 - use of calculator
 - unit of F

- 7.3 Poorly answered.
Many learners showed little understanding of the conservation of charge.
- 7.4 Poorly answered

Question 8

- 8.1 Learners had difficulty drawing the graph .Their skill in the use of appropriate scales is lacking and needs attention.
- 8.2 Many learners could not determine the gradient of the graph. The gradient of the graph represents a physical quantity and therefore the correct unit has to be given. When gradient is determined, the values on the graph must be used.

Question 9

- 9.1 Well answered, even though learners are still writing the equation as $R = \frac{1}{r_1} + \frac{1}{r_2}$
- 9.2 Well answered.