

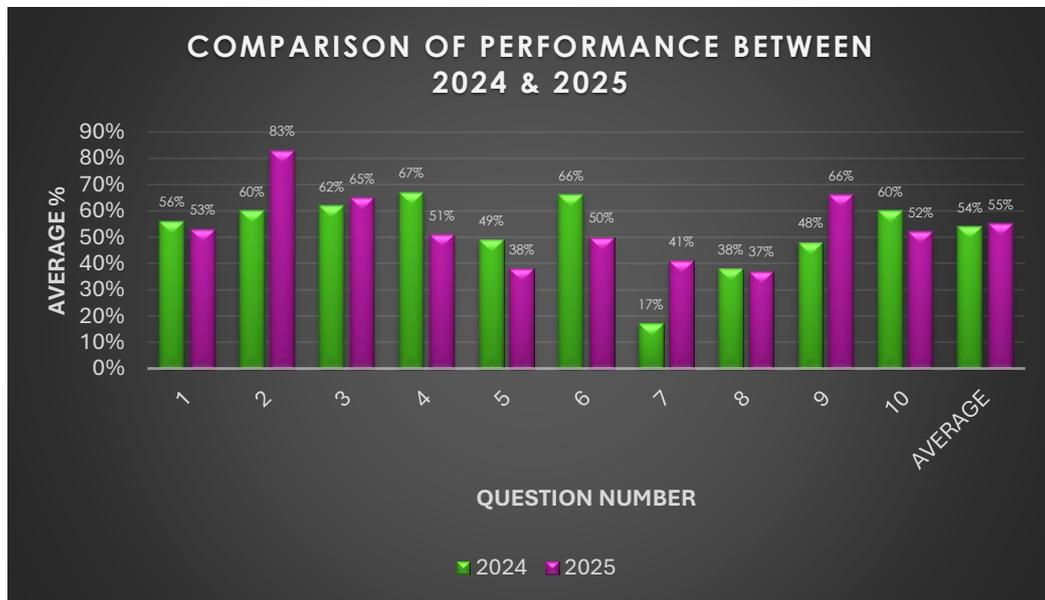


EXAMINATIONS AND ASSESSMENT CHIEF DIRECTORATE
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REPUBLIC OF SOUTH AFRICA, Website: www.ecdoe.gov.za

2025 NSC CHIEF MARKER'S REPORT

SUBJECT	TECHNICAL SCIENCES		
QUESTION PAPER	1	2	3
DURATION OF QUESTION PAPER	3 HOURS		
PROVINCE	EASTERN CAPE		
NAME OF THE INTERNAL MODERATOR	RICHARD MWELWA		
NAME OF THE CHIEF MARKER	NONTOMBI NGXABATYE		
DATES OF MARKING	28-11-2025 TO 13-11-2025		
HEAD OF EXAMINATION:	MR MABONA E M		

SECTION 1: (General overview of Learner Performance in the question paper as a whole)



The graph below, show the comparison of 2024 and 2025 performance of candidates from the sampled hundred (100) scripts. The sample show a very poor performance in three (3) questions. The most poorly performed in 2025 being questions **5,7** and **8** all performed below 50%. Most candidates made various errors which are discussed in detail in each question. However, the average performance for 2025 is at 55% better than the 2024 which was at 54%.

SECTION 2: Comment on candidates' performance in individual questions

QUESTION 1																								
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?																								
This question was not well answered as it performed at 53% . The most poorly answered was question 1.1, 1.2, 1.3, 1.7 and 1.8 all performed below 50% . Question 1.1 was the most poorly answered.																								
Sub-question	Topic	Ave. performance %																						
1.1	Friction	15%																						
1.2	Force and acceleration	33%																						
1.3	Momentum and impulse	43%																						
1.4	Power	74%																						
1.5	Gravitational potential energy	62%																						
1.6	Elasticity	95%																						
1.7	Hydraulic pressure	36%																						
1.8	Lenses	31%																						
1.9	SI units	86%																						
1.10	Generators	55%																						
TOTAL		53%																						
<p style="text-align: center;">QUESTION 1</p> <table border="1"> <caption>Data for QUESTION 1 Bar Chart</caption> <thead> <tr> <th>Sub-question</th> <th>Ave. performance %</th> </tr> </thead> <tbody> <tr><td>1.1</td><td>15%</td></tr> <tr><td>1.2</td><td>33%</td></tr> <tr><td>1.3</td><td>43%</td></tr> <tr><td>1.4</td><td>74%</td></tr> <tr><td>1.5</td><td>62%</td></tr> <tr><td>1.6</td><td>95%</td></tr> <tr><td>1.7</td><td>36%</td></tr> <tr><td>1.8</td><td>31%</td></tr> <tr><td>1.9</td><td>86%</td></tr> <tr><td>1.10</td><td>55%</td></tr> </tbody> </table>			Sub-question	Ave. performance %	1.1	15%	1.2	33%	1.3	43%	1.4	74%	1.5	62%	1.6	95%	1.7	36%	1.8	31%	1.9	86%	1.10	55%
Sub-question	Ave. performance %																							
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(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.																								
Candidates could not compare the coefficient of static friction and that of kinetic friction. Candidates fail to compare correctly the coefficients of static friction and kinetic friction due to common misconceptions and lack of understanding of the fundamental difference between the two types of friction.																								
(c) Provide suggestions for improvement in relation to Teaching and Learning.																								
Educators must explain the relationship between the coefficients of static and kinetic friction. For virtually all real materials, the coefficient of static friction is greater than the coefficient of kinetic friction. ($\mu_s > \mu_k$).																								

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

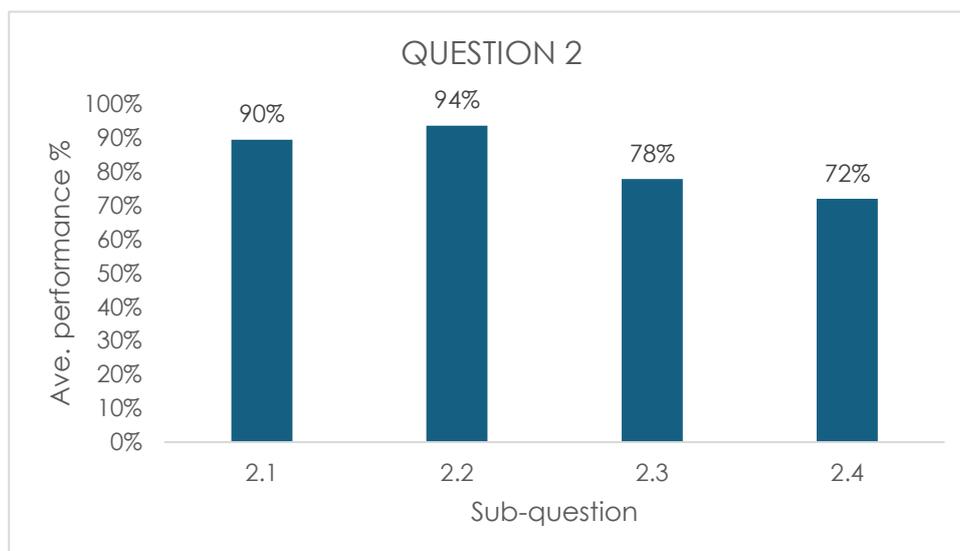
Many candidates responded that coefficient of kinetic friction is equal to or smaller than coefficient of static friction which is a misconception. Candidates may think that static friction is always equal to $\mu_s N$, forgetting that this is only the value just before an object starts to move. Educators must explain that learners must use coefficient of static friction only when the object is at rest relative to the surface or when determining the minimum force required to initiate motion. And they should use coefficient of kinetic friction only when the object is moving across the surface.

QUESTION 2

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

This question was well answered with the performance at **83%**. The lowest performed sub-question was **2.4**. The table and graph below shows the overall performance in the question.

Sub-question	Topic	Ave. Performance %
2.1	State Newton's 2nd Law	90%
2.2	Free-body diagram	94%
2.3	Newton's laws	78%
2.4	Normal force	72%
TOTAL		83%



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

Most candidates were leaving out the vertical component of the applied force in **2.3.1**. Many candidates do not know the relationship of the angle between the force and the normal force. Some candidates could not calculate the normal force, and a few candidates omitted the units. In **2.3.3** several candidates could not calculate the acceleration of the system as they struggled with the correct substitution of forces for both objects.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

The most prevalent misconception is the belief that the normal force is **always equal to the weight** ($w = mg$) of the object. This is only true in specific, simple cases where $F_N = mg$ (e.g., an object resting on a horizontal, non-accelerating surface with no other vertical forces).

Educators must explain that the normal force is *not* a fixed value like weight. It is a dynamic force that provides exactly the amount of support needed to prevent the object from penetrating the surface.

When an external force is applied at an angle, its vertical component either helps support the weight or pushes the object further into the surface, thereby changing the required normal force. All final numeric values must be rounded off to two decimal places and SI units where necessary. Learners must be exposed to two-body system calculations using past examination question papers.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

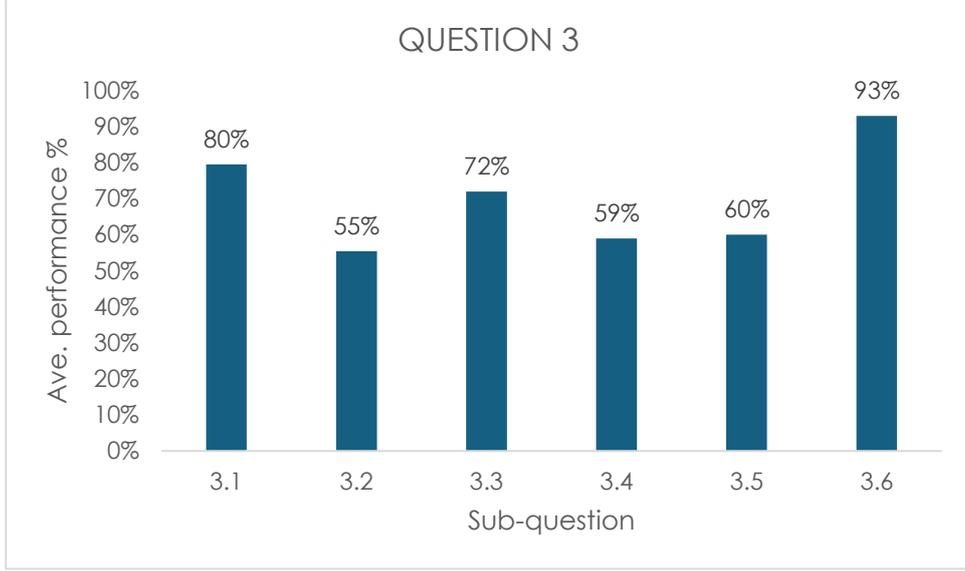
In calculating the acceleration of the system in **2.3.3**, candidates did not isolate the objects when using Newton's second law. Objects must be isolated when calculating the acceleration since they move with the same acceleration. Simultaneous equations must be derived from both objects.

QUESTION 3

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The performance in this question was above average of the paper at **65%**. A few candidates left out key words the definition. However, the most poorly answered questions are **3.2, 3.4** and **3.5**.

Sub-question	Topic	Ave. Performance %
3.1	Principle of conservation of linear momentum	80%
3.2	Momentum and impulse	55%
3.3	Elastic and inelastic collisions	72%
3.4	Forces	59%
3.5	Newton's 3rd Law	60%
3.6	Safety features in cars	93%
TOTAL		65%



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

In **3.1** Candidates omitted key words such as "total linear", "magnitude and direction".

In **3.2** many candidates could not write the correct formula or expression for the principle of conservation of linear momentum. They left out subscripts to represent car A and or car B. In substituting in the formula many candidates did not indicate the direction. Candidates also failed to interpret the graph correctly to identify the velocity and the time from the graph and hence were unable to calculate the net force (F_{net}) in **3.2.2**.

In **3.3** many candidates start the calculation using the expression $\sum Ek_i = \sum Ek_f$.

In **3.4** candidates could not recognise that the magnitude asked was the same value as that calculated in **3.2.2**

In **3.5** many candidates could not relate that Newton's 3rd Law could be asked in this question.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

Examination guidelines must be used by learners for all the definitions and concepts. Educators should emphasize the importance of writing subscripts in all the equations that require them. Educators must use graphs in their daily assessments to prepare learners in questions based on graphs.

Educators must prepare and explain to learners that some topics and concepts can be integrated and assessed in one question.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

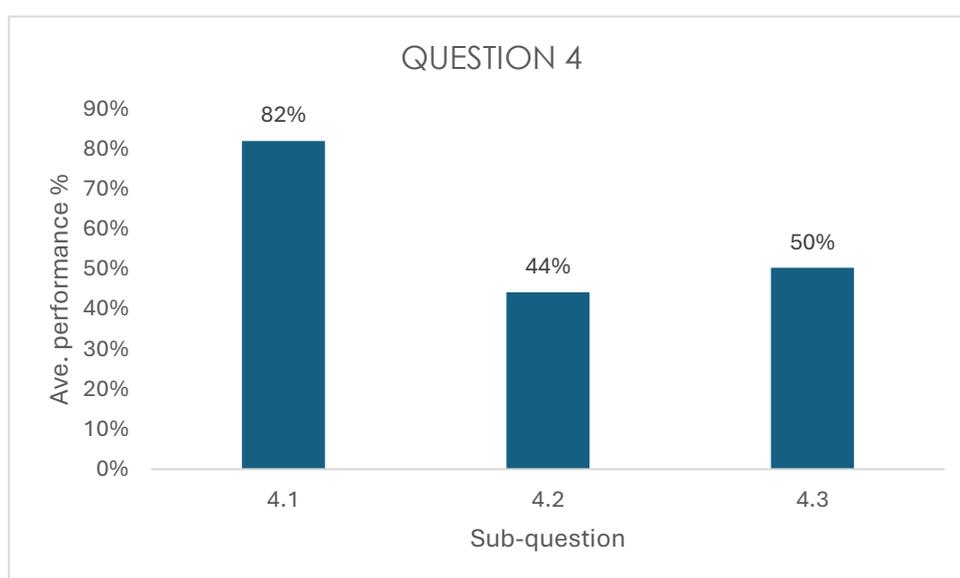
Educators should teach learners that when determining whether the collision is elastic or inelastic learners must calculate the total kinetic energy before and after separately. Candidates seem not to understand Newton's 2nd Law in terms of momentum and apply it to different scenarios. Educators should use this integration of topics and assess learners through class tests. Educators must incorporate the use of graphs and interpretation in daily assessments.

QUESTION 4

(a) **General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?**

The question performed poorly below average at **51%**. The table and graph below shows the overall performance.

Sub-question	Topic	Ave. Performance %
4.1	Define isolated system	82%
4.2	Work done	44%
4.3	Conservation of mechanical energy	50%
TOTAL		51%



(b) **Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

In **4.1** candidates left out key words such as '**net force**' in the definition.

In **4.2.2** Many candidates mistakenly used $\cos \theta$ as the angle between the applied force 640N and the **vertical** (y-axis) or the surface. They lost the marks by wrongly substituting 40° in the formula **$W = F\Delta \times \cos \theta$** .

In **4.3.2** and **4.3.3** many candidates omitted the subscripts in the formulae,

$EP_{(A)} + EK_{(A)} = EP_{(B)} + EK_{(B)}$ and **$ME_{(C)} = ME_{(B)}$** which resulted in losing the mark for the formula.

(c) **Provide suggestions for improvement in relation to Teaching and Learning.**

Examination guidelines must be used by both educators and learners for all the definitions and concepts.

Educators must explain that the purpose of $\cos \theta$ is to mathematically find the **component of the force** that is acting in the **direction of the displacement**.

Educators must emphasize the importance of using correct formulae from the data sheet including subscripts where necessary.

Learners must correctly substitute from the formula.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

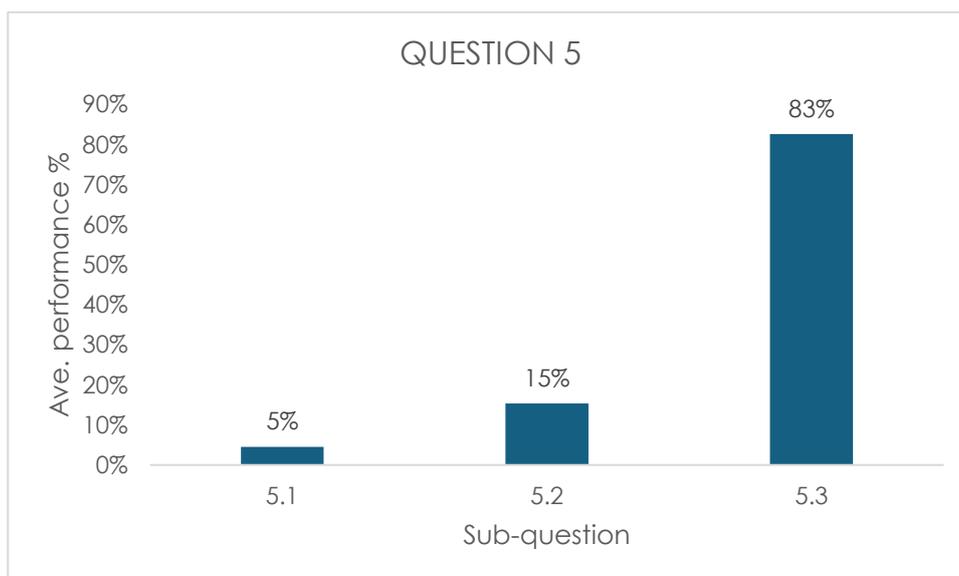
When applying the principle of mechanical energy in calculations, educators must emphasize that learners must specify **positions** of an object by including specific subscripts.

QUESTION 5

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The performance of the question is at 38% second lowest performance in the question paper. The table and graph below shows the overall performance in the sub-questions.

Sub-question	Topic	Ave. Performance %
5.1	Define Young's modulus of elasticity	5%
5.2	Application of Young's modulus of elasticity	15%
5.3	Calculation of Young's modulus of elasticity	83%
TOTAL		38%



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

In **5.1** candidates were defining elasticity instead of young's modulus of elasticity. In **5.2.1** many candidates were guessing the answer as a good number of them in **5.2.2** could not motivate the answer they gave in **5.2.1**. Many candidates did not understand the question in **5.2.2** and the meaning of young's modulus of elasticity. The use of wrong or incomplete formula. In **5.3** candidates were either omitting or writing an incorrect SI unit.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

The use of examination guidelines must be encouraged for both educators and learners. The key concepts in teaching **Young's Modulus of Elasticity** are establishing it as

an inherent material property that quantifies stiffness, defining its constituent terms (stress and strain), and relating the concept to Hooke's Law and the stress-strain curve (Elastic limit). Educators must also thoroughly show learners which formula to use for each of the concepts in this topic and correct SI units where necessary.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

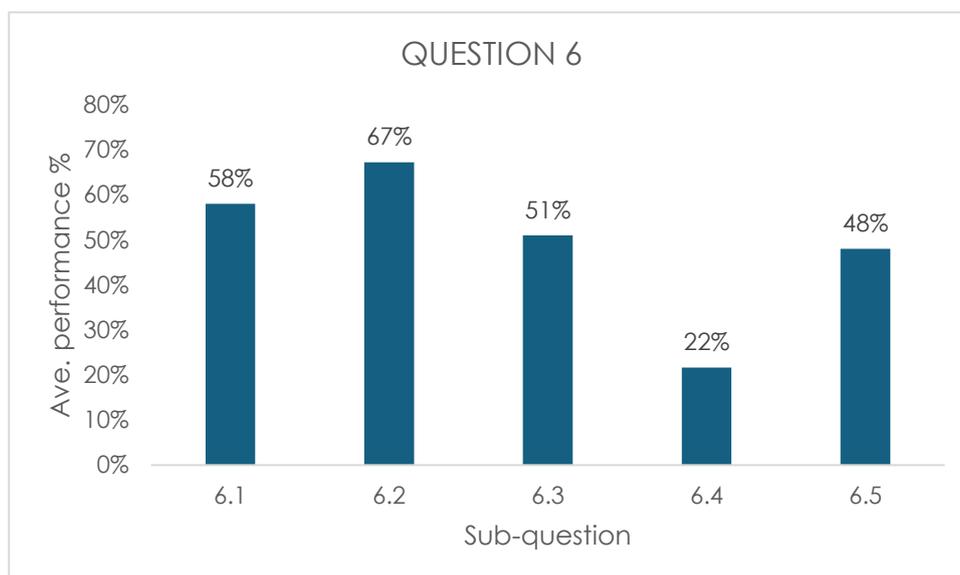
Learners must be guided on the use of the data sheet on how to identify the correct formula and write it correctly especially formulae with special symbol characters. It seems that some candidates were randomly picking up any formula under the topic. Teachers must also expose learners to narrative questions.

QUESTION 6

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The performance in this question is below average at 50%. Below is the graph to represent the overall performance in sub-questions.

Sub-question	Topic	Ave. Performance %
6.1	State Pascal's law	58%
6.2	Calculation of force	67%
6.3	Forces	51%
6.4	Viscosity	22%
6.5	Viscosity	48%
TOTAL		50



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

In **6.1** candidates omitted the key words in the definition. In **6.2** candidates used wrong formula of stress instead of pressure. In **6.4** many candidates did not know the relationship between oil with lower viscosity and temperature of the environment.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

To master the definitions, learners and educators must use the examination guidelines and identify key words in the definitions. Learners must master the data sheet and

identify relevant formulae for each topic. Educators must teach viscosity using real time examples in industry and technology. Educators and learners must not limit their research to text books only but use the internet as well.

(d) **Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.**

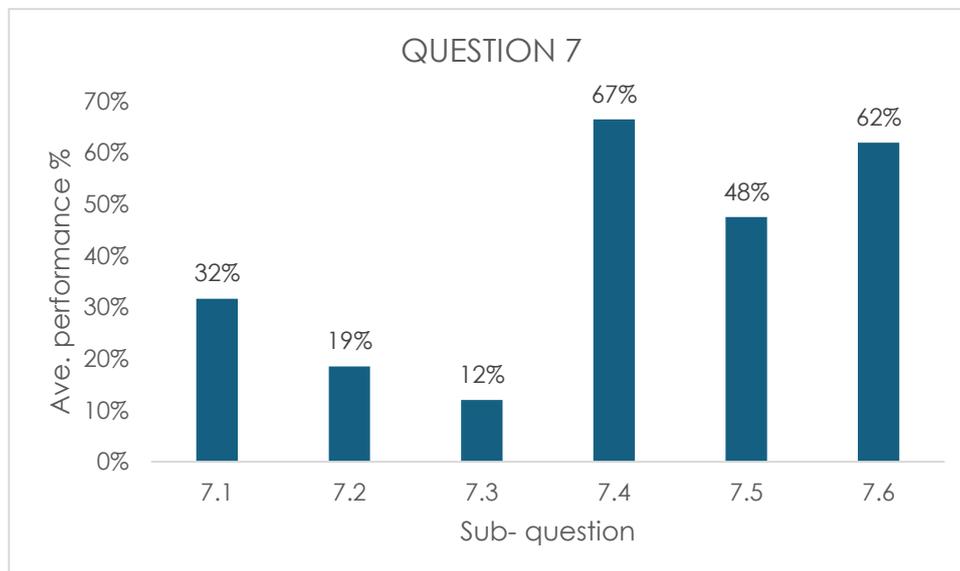
Educators must explain that, the relationship between oil viscosity and the temperature of the environment is **inversely proportional**: as the temperature increases, the oil's viscosity (its resistance to flow, or its "thickness") decreases, and vice versa.

QUESTION 7

(a) **General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?**

The performance of the question is below average at **41%**. The most poorly performed in this question is **7.1, 7.2, and 7.3**. The table and graph below shows the overall performance in this question.

Sub-question	Topic	Ave. Performance %
7.1	WSL (Reflection)	32%
7.2	WSL(Critical angle and total internal reflection)	19%
7.3	WSL (Electromagnetic waves)	12%
7.4	WSL (Electromagnetic radiation)	67%
7.5	WSL (Electromagnetic radiation)	48%
7.6	WSL (Waves and light)	62%
TOTAL		41



(b) **Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.**

In **7.1** many candidates could not define reflection, could not describe how the image would appear in the mirror and describe its characteristics. In **7.2** candidates could not define critical angle and apply total internal reflection in **7.2.2**. In **7.3** only 12% of the

sampled scripts could explain how electromagnetic waves are generated. In **7.4** many candidates could not define a photon and correctly calculate the frequency of the photon. For those who managed to calculate some candidates did not round off the final answer correctly.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

The use of examination guidelines must be encouraged for both educators and learners to master definitions. When teaching this topic, educators are encouraged to use demonstrations/experiments and or simulations. When applying calculations in this topic learners must first analyse the data and identify the variable that is not given before deciding which formula to use.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

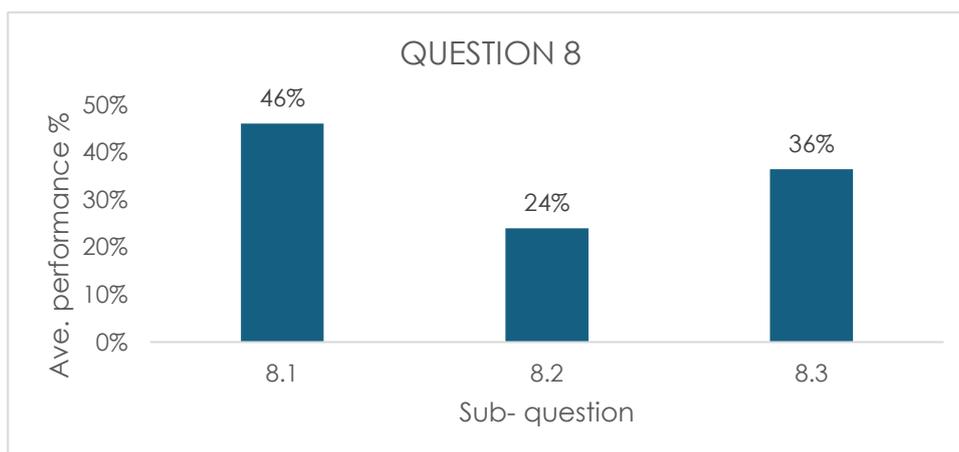
Some candidates did not know the relationship between the wavelength and frequency. Educators need to use the wave speed equation to teach the concepts.

QUESTION 8

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

This is the most poorly performed question in the whole paper at 37%. The table and graph below shows the overall performance in the sub-questions.

Sub-question	Topic	Ave. Performance %
8.1	Electrostatics (Define capacitance)	46%
8.2	Electrostatics (Capacitors)	24%
8.3	Electrostatics (Capacitors and capacitance)	36%
TOTAL		37%



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

In **8.1** most candidates lost marks as they defined the capacitance as a device that stores **energy** instead of **charge**. Majority of candidates were unable to name the components of a capacitor. Candidates could not calculate the voltage in **8.3.1**. In **8.3.2** most learners were unable to explain the effect of any of the factors affecting

capacitance of a capacitor.
(c) Provide suggestions for improvement in relation to Teaching and Learning.
<p>Examination guidelines must be used by learners for all the definitions and concepts and highlight the key words. Whenever teaching electrical devices teachers must identify and describe all the components of such devices where possible.</p> <p>Learners must be taught how to collect data before deciding on the formula. Educators must also explain ways in which the capacitance of a capacitor can be changed.</p>
(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.
<p>Educators must thoroughly discuss the following:</p> <ul style="list-style-type: none"> how the capacitance of a capacitor can be changed; examples of capacitors used in technology; calculation of capacitance, charge and voltage between plates.

QUESTION 9												
(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?												
<p>The performance of the learners in the question is at 66% above the average, however, question 9.1 performed very poorly at 28%. The table and graph below show the overall performance in the question.</p>												
<table border="1"> <thead> <tr> <th>Sub-question</th> <th>Topic</th> <th>Ave. Performance %</th> </tr> </thead> <tbody> <tr> <td>9.1</td> <td>Electric circuits (Resistance)</td> <td>28%</td> </tr> <tr> <td>9.2</td> <td>Power and Energy</td> <td>71%</td> </tr> <tr> <td>TOTAL</td> <td></td> <td>66%</td> </tr> </tbody> </table>	Sub-question	Topic	Ave. Performance %	9.1	Electric circuits (Resistance)	28%	9.2	Power and Energy	71%	TOTAL		66%
Sub-question	Topic	Ave. Performance %										
9.1	Electric circuits (Resistance)	28%										
9.2	Power and Energy	71%										
TOTAL		66%										
<p>The bar chart displays the average performance percentages for two sub-questions. Sub-question 9.1 has an average performance of 28%, while sub-question 9.2 has an average performance of 71%. The y-axis represents the average performance percentage, ranging from 0% to 80% in 10% increments. The x-axis lists the sub-questions 9.1 and 9.2.</p>												
(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.												
<p>In 9.1 majority of candidates could not state factors affecting the resistance of a conductor. Most candidates could not identify that the voltage they were required to calculate was for parallel connection only. In 9.2.2. Candidates started by calculating the total resistance of the circuit instead of the total resistance of the parallel</p>												

connection as required. Some of the candidates lost 1 mark in **9.2.1** as they did not know the correct SI unit for power.

(c) Provide suggestions for improvement in relation to Teaching and Learning.

Factors affecting the resistance must be thoroughly taught in Grade10 and continue to be formally and informally assessed in Grade 11. Educators must expose learners on different examples showing the different types of connections when teaching electric circuits. Learners must be exposed to different calculations for different types of connections from Grade10.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

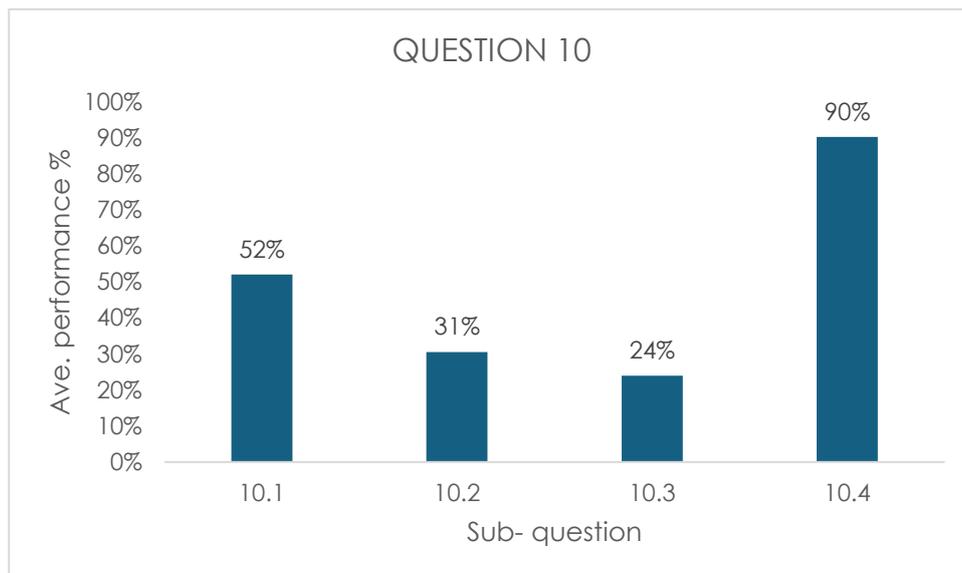
Teaching basic concepts must be retrospective to previous grades' work. More activities of different types of electric circuits must be given to learners. The concept of SI units must be thoroughly revised in Grade12.

QUESTION 10

(a) General comment on the performance of learners in the specific question. Was the question well answered or poorly answered?

The question was not well answered especially **10.2** and **10.3**. The overall performance is at 52% below the average. The table and graph below represent the overall performance of the question.

Sub-question	Topic	Ave. Performance %
10.1	Electromagnetism (Lenz's Law)	52%
10.2	Application of Lenz's law in technology	31%
10.3	Magnetic field patterns	24%
10.4	Transformers	90%
TOTAL		52%



(b) Why was the question poorly answered? Also provide specific examples, indicate common errors committed by learners in this question, and any misconceptions.

When stating Lenz's law in **10.1**, candidates were omitting key terms like, "**direction of/induced emf/effect that produces**". Candidates struggled to give examples of applications of Lenz's law in **10.2**. In **10.3.2** candidates could not draw at all the magnetic field pattern around the coil.

In **10.4** some candidates were trying to manipulate the formula for calculating the voltage in the primary coil but could not get it correct

(c) Provide suggestions for improvement in relation to Teaching and Learning.

Educators must teach learners to state the laws as stated in the *CAPS* and *Examination Guidelines*. Learners must be provided by their teachers with a list of examples of Lenz's law in technology. Learners must be taught to determine and draw the magnetic field around the current carrying loop or straight wire using the right- hand rule.

(d) Describe any other specific observations relating to responses of learners and comments that are useful to teachers, subject advisors, teacher development etc.

Educators must give full attention to the topic as learners usually get fair marks in the question. Educators must teach all the prescribed content, not only the content that had been assessed in previous years. Internet can also be used to supplement the information on applications of Lenz's law. Educators must also emphasize the method of substituting the original formula instead of trying to manipulate it and end up making mistakes.