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**REPORT FORMAT**

**SECTION 1**

**(General overview of Learner Performance in the question paper as a whole)**

* From the responses of the candidates, it clearly shows that candidates who were well prepared for this paper really enjoyed the paper.
* As the paper was set out in such a way that the distribution of the different cognitive levels was evenly spread through the topics, most of the candidates were able to attempt most if not all of the questions on every topic.
* Each question progressed from knowledge to application and the paper was therefore able to accurately discriminate candidates into different levels of achievement as after analysing and moderating learners scripts , it was evident that learners were able to achieve according to their different potentials.
* From the Graph on the provincial averages per question it is evident that the candidates performed well on most of the questions except question nine on Electric circuits.

**SECTION 2**

**(Comments on candidates’ performance in the five individual sub questions (a) – (e) will be provided below. Comments will be provided for each question on a separate sheet.)**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 1.1

* Some candidates still can not define or identify the definition of Acceleration.

SUGGESTIONS:

* Educators to teach learners how to define concepts from Equations.
* Grade 10 and Grade 11 concepts examined in G12 to be used as part of Informal and Formal assessment and revised with learners before Exams.

Q. 1.2

* Some candidates still can not define or identify the definition of Wavelength.

SUGGESTIONS:

* Basic Wave Concepts to be emphasised in Internal grades.
* Examinable concepts to be used as part of formal and informal assessment in G12.
* Basic Wave concepts taught in internal grades to be revised and linked to concepts taught in G12.

Q. 1.3

* Some candidates still can not differentiate between Electric Field and Electric Field Strength.

SUGGESTIONS:

* Educators to stress the difference between Electric Field and Electric Field Strength..
* Electrostatics Grade 10 and Grade 11 concepts examined in G12 to be used as part of Informal and Formal assessment and revised with learners before Exams.

Q. 1.4

* Some candidates still show a poor understanding of the Electromagnetic Spectrum..

SUGGESTIONS:

* Educators to emphasise key concepts that influence the order of electromagnetic waves in the Electromagnetic Spectrum e.g. Wavelength and frequency.

Q. 1.5

* Some candidates still confuse Threshold Frequency with Work function.

SUGGESTIONS:

* Educators to emphasise the difference between Threshold Frequency with Work function

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|  **(d) Other specific observations relating to responses of learners.** |

* Most of the candidates lost marks on this question as a result of memorizing concepts rather than understanding concepts. Educators to promote understanding of concepts rather than memorizing.

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| **(e) Any other comments useful to teachers, subject advisors, teacher development,etc.** |

* G10 and G11 Concepts examinable in G12 to be revised with Learners and included in both formal and Informal assessment in G12.
* Educators to teach learners how to define concepts from their Mathematical relations (Equations)

**QUESTION 2**

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

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| --- |
| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 2.3

* Some candidates responded to the question by only considering the diagram and missed that the word moving in the statement above the diagram.
* Some candidates responses demonstrated a poor understanding of the concept of a Net Force

SUGGESTIONS:

* Educators to motivate learners to read statements accompanying diagrams before responding to questions.
* Educators to Emphasise the concept of a Net Force.

Q. 2.6

* Some Candidates responses demonstrated a lack of understanding the impact of inserting a dielectric such as paper between the plates of a capacitor on its Electric Field and the charge it can store.

SUGGESTIONS:

* Educators to emphasise the effect on the charge of a Capacitor when inserting a dielectric such as paper or mica.

Q. 2.7

* Some Candidates responses demonstrated a lack of graphical interpretation skills and poor understanding of how Ohmic conductor behave.

SUGGESTIONS:

* Educators to emphasise Ohmic Conductors behaviour and also develop learners graph interpretation skills.

Q. 2.9

* Some Candidates responses demonstrated poor understanding of basic Electromagnetism basic concepts.

SUGGESTIONS:

* Electromagnetism concepts learned in lower grades e.g. the Left Hand Rule to be incorporated when teaching Electrical Machines in G12 .

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|  **(d) Other specific observations relating to responses of learners.** |

* Some of the responses given by Candidates clearly shows that they were not trained on how to answer Multiple Choice Questions .

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators to instill a skill on eliminating detractors and remaining with the correct answer when answering Multiple Choice Questions.

**QUESTION 3**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 3.3.2

* Some candidates could not correctly identify initial and final velocities from the graph.
* Incorrect signs for value of final velocity was used in some instance.
* Poor graph interpretation skills.

SUGGESTIONS:

* Educators to give Learner more vertical projectiles graph problems to practice.
* Sign conventions which still proves to be a problem to be emphasised by Educators when teaching this concept.
* Educators to develop learners graph interpretation skills.
* Educators not to restrict learners to taking certain direction as positive or negative ie (Rote Learning) but rather emphasise the understanding and implications of doing so.

Q. 3.3.3

* Some candidates failed to identify the final velocity of the ball for upward motion as zero from the graph.
* Some candidates calculated the displacement of the ball for the whole motion.
* Some candidates never attempted the question.

SUGGESTIONS:

* Educators to develop learners graph interpretation skills.
* Educators to clearly indicate on graph for learners, Upward and Downwards motion and their respective quantity values while treating vertical projectiles graph questions with learners.

Q. 3.4

* Some Candidates did not attempt the question while some of those who did could not correctly implement the given instruction of taking the floor as a zero position.

SUGGESTIONS:

* Educators to develop learners graph interpretation skills.
* Educators not to restrict learners to taking certain direction as positive or negative i.e. (Rote Learning) but rather emphasise the understanding and implications of doing so.

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates did not carry out instructions as indicated in the question and ended up losing marks.

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators to stress the importance of following instructions when answering questions.

**QUESTION 4**

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

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| **) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 4.2

* Some candidates could not relate the situation described in the question to Newtons Third Law and therefore could not state it.

SUGGESTIONS:

* Educators to emphasise the role of Newton’s Third Law in Momentum Questions as in most of the momentum questions there will be collisions between two objects which therefore imply that there will be action reaction pairs which are related to Newtons Third Law.
* Educators should expose Learners to these type of Momentum questions e.g. a fired gun etc.

Q. 4.4.1

* Some candidates failed to see this as a momentum question and therefore failed to apply the law of conservation of momentum to answer the question.

SUGGESTIONS:

* Educators should expose Learners to these type of questions Momentum questions eg a fired gun etc.

Q. 4.4.2

* Some candidates failed to see this as a momentum question and therefore failed to apply the law of conservation of momentum to answer the question.
* Educators should expose Learners to these type of Momentum questions eg a fired gun etc.

SUGGESTIONS:

* Educators should develop learners skills of arguing their points using correct Scientific concepts.
* Learners should not just be taught Laws through rote learning but should also be taught how to apply them in relevant situations

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| --- |
|  **(d) Other specific observations relating to responses of learners.** |

* Some Candidates could not use relevant Scientific concepts to argue their points and lost marks.

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Momentum as a G12 examinable topic taught in G11 should be thoroughly revised in G12.
* Educators should develop learners skills of arguing their points using correct Scientific concepts.
* Learners should not just be taught Laws through rote learning but should also be taught how to apply them in relevant situations.

**QUESTION 5**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 5.5

* Some Candidates used other methods rather than the WORK - ENERGY THEOREM as indicated in the question and lost marks.
* As in previous years Candidates still have a challenge in properly using the WORK - ENERGY THEOREM to do calculations.
* Some Candidates showed a poor Mathematical background as they could not calculate the Angle.
* Some candidates still confuse the two angles i.e. the angle on the inclination and the angle between the forces as both are called Ѳ.

SUGGESTIONS:

* Educators should stress the importance of abiding by instructions in paper.
* Subject Advisors to include the WORK - ENERGY THEOREM as one of the topics that they discuss with their Educators during their content workshops.
* To avoid confusion amongst learners Educators to use different symbols to represent the different angles involved when using WORK - ENERGY THEOREM and the object is on an incline plane

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates confuse the Principle of the conservation of Mechanical Energy with the Work Energy Theorem.(5.1)
* Some candidates omitted Key words when stating (or writing the Equation for) the Principle of the conservation of Mechanical Energy like “Total”.(5.1 and 5.2)) i.e. an error of Principle
* Some candidates indicated gravity as one of the Forces. Some indicated vertical and horizontal components as Forces (5.3)
* Some candidates could not associate the decrease in velocity from Y To Z decrease with deceleration and therefore incorrectly gave the direction of the Net Force as Y to Z rather than Z to Y(5.4)
* Some candidates could not use the correct Scientific principles to figure out the correct answer.(5.6)

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators to stress difference between Principle of the conservation of Mechanical Energy and the Work Energy Theorem.
* Educators to stress importance of keywords when stating Principles.
* Educators to stress that gravity is not a force.

**QUESTION 6**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 6.1

* Most of the candidates could not name the medical instrument that make use of the Doppler Effect.

SUGGESTIONS:

* Educators to put more emphasis on the names of apparatus that uses the Doppler Effect not only their uses.

Q. 6.4

* Some candidates could not use the correct Scientific Equation i.e. ( v= f × λ) to predict the answer using proportionality.

SUGGESTIONS:

* Educators to emphasise the Mathematical relations of variables in their respective Equations and how Equations can be used to predict the correct answer.

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|  **(d) Other specific observations relating to responses of learners.** |

* Some Candidates know the velocity of sound as 340m/s and just wrote it a an answer.(6.2)
* Some candidates could not write the correct formula and this can be as a result of their poor Mathematical background.(6.2)
* Some Candidates did not round off their answers to two decimal places as per instructions in the paper and lost marks as a result of that.(Instruction no 9)

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators should stress the importance of abiding by instructions in the paper.
* Schools to be requested to always pair Physical Sciences with Mathematics so as to develop learners Mathematical Skills which are applied in Physical Sciences.
* As Educators talk about the relation of f and λ they should also indicate that it is as a result of this relation that the speed of sound (v) is also constant.

**QUESTION 7**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 7.5

* The fact that most candidates did not respond well to this question clearly shows that Educators are not clearly differentiating on the patterns formed by a single and a double slit.

SUGGESTIONS:

* Diffraction which leads to Interference in both the Double and Single slit to be clearly explained by Educators to learners and the pattern formed in both cases to be thoroughly explained.
* In Schools with Light Kits these different pattern formation to be demonstrated for Learners.

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates struggled to identify dependent variable.(7.3.1)
* Some candidates could not correctly state the investigative question(7.3.2).
* Some candidates still have difficulty in converting nanometers to meters.(7.4)
* Some Candidates described the process not the pattern as the question suggests.(7.5)

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators to do more practical work with Learners and give them more LO 1 questions from previous question where they have to identify variables.
* Educators to emphasize that both variables (dependent and independent) should be stated in the investigative question.
* Educators to develop learners conversion skills.

**QUESTION 8**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 8.5

* Most of the candidates really struggled with this question. Some candidates did not even attempt the question.
* Only few candidates could formulate an Equation that could help them to find the charge of B i.e. ( Enet = EA + EB)
* Some candidates did not use the correct Electric Field Strength Equation.

SUGGESTIONS:

* Educators to emphasize the vector nature of Electric field strength and do more question of this nature with learners

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates are still struggling with basic Electrostatics concepts e.g. pattern of Field Lines around charges.(8.1 and 8.2)
* Some candidates really struggled as this topic is taught in G11.
* Some candidates did not realize that since Electric field strength is defined as a force that act on a unit charge it can also be treated as a vector.
* Some candidates failed to realize that Enet can only have a west direction if charge B is positive.(8.4)
* Some candidates still struggle with conversions

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* The topic to be revised in G12 and learners to be given questions on the topic both as formal and informal assessment.

**QUESTION 9**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

* Most of the candidates performed poorly in this question as compared to other questions.

Q. 9.1

* Most candidates could not accurately define EMF.

SUGGESTIONS:

* Educators to clearly explain the definition of EMF to learners in terms of the amount of energy given to each Coulomb of charge.

Q. 9,2

* Candidates could not use the Power equation to calculate the current.

SUGGESTIONS:

* Educators to teach learners to firstly write down the data so as to be in a position of selecting the correct Equation.

Q. 9.3

* Most candidates failed to realise that for them to be in a position of calculating Rx, they should firstly calculate resistance on the external circuit then the resistance of the parallel combination in terms of Rx then finally calculate Rx using the Equation

R ext= R series+ R parallel

SUGGESTIONS:

* Educators to give learners more challenging circuits question of this nature for practice purpose

Q. 9,4

* Most Candidates could not use the Power Equation to argue their point of a decrease in Power.

SUGGESTIONS:

* Educators to develop in learners the skill of using Equations to argue their points.
* Educators to clearly show learners the difference between these two concepts ie Power and Current.
* Some candidates still could not differentiate between power and current.

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|  **(d) Other specific observations relating to responses of learners.** |

* Most candidates demonstrated poor understanding of the topic of Electric circuits..

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* A good foundation on electric circuits should be laid by G10 and G11 Educators if Learners are to perform well in this topic in G12.
* G12 Educators should not leave the responsibility of developing these basic concepts to the internal grade Educators but should also play their role by revising these concepts in G12 and ensuring that learners have a good foundation.

**QUESTION 10**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 10.2

* Most of the candidates did not know the function of the Carbon brushes

SUGGESTIONS:

* Educators not to only emphasize the name of the components but also their functions.

Q. 10.4

* Most candidates could not interpret the graph and therefore gave incorrect answers.

SUGGESTIONS:

* Coil rotation to be explained to learners using the graph if learners are to clearly understand the rotation of a coil in a Magnetic Field.

Q. 10.5

* Most candidates demonstrated poor understanding of the concept of Period(T) and could therefore not use information from graph i.e. Period is the time taken for one complete wave to pass a point.

SUGGESTIONS:

Wave concepts to be clearly explained to learners by Educators using diagrams for better understanding.

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates still cannot differentiate between split rings and slip rings(10.1.1)
* Some candidates are still writing Equations without subscripts.(10.7)

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Difference between these two concept to be emphasized by Educator when teaching Electrical Machines.
* Educators to Emphasize the Importance of Subscripts in these Equations.

**QUESTION 11**

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

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| **(b) Reasons why the question was poorly answered. Specific examples, common errors and misconceptions are indicated.****(c) Suggestions for improvement in relation to teaching and learning.** |

Q. 11.1.4

* Some candidates still show poor understanding of how increasing intensity of the incident light affect the ejected electrons.

SUGGESTIONS:

* Educators to clearly explain to learners the impact of increasing the intensity of the incident light i.e. increasing Intensity does not increase the kinetic energy of the ejected electrons but rather increase the number of the ejected electrons.

Q. 11.1.2

* Some candidates demonstrated a poor understanding of different frequencies and wavelength associated with different colours as explained in the white light spectrum.

SUGGESTIONS:

* Educators to emphasize this concept in internal grades and G12 Educators to revise it when treating Optical Phenomena in G12 as this concepts form a basis of what learners are expected to learn under this topic in G12.

Q. 11.3

* Most candidates showed a poor understanding of the concepts of Emission and Absorption Spectra.

SUGGESTIONS:

These concepts to be clearly explained by Educators to learners in G12. Absorption and Emission of Energy by electrons as they move from one energy level to another to be used by Educators for proper understanding of the two concepts.

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|  **(d) Other specific observations relating to responses of learners.** |

* Some candidates still confuse photo electrons with photo electric effect.(11.1.1)
* Some candidates could not calculate the maximum speed at which an electron is emitted but ended up calculating the kinetic Energy of the ejected electron or ended up using the incorrect equations or substituting incorrect values for Planck’s constant and wrong conversions of the wavelength value in the correct Equation.(11.1.2)
* Some candidates still show poor understanding of how increasing The frequency of the incident light affect the ejected electrons.(11.1.3)

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| **(e) Any other comments useful to teachers, subject advisors, teacher development, etc.** |

* Educators to clearly explain the difference between the two concepts.
* Educators to train Learners on the usage of the provided data sheet in order to select correct equations and also how to substitute and convert quantities to the correct units.
* Educators to clearly explain to learners the impact of increasing the frequency of the incident light i.e. frequency does not increase the number of the ejected electrons but rather increase the kinetic energy of the ejected electrons.
* The paper was of an appropriate standard for the grade 12 as it covered all the topics as outlined in the NCS and the grade 12 Examination guideline. It is also fair as all the knowledge areas has been covered and their weightings as indicated in the SAG has been observed.
* The different cognitive levels as Outlined in the SAG has also been observed and distributed evenly throughout the questions and topics.
* An effort was made by the Examiners to stick to the mark distribution per LO as stipulated in the SAG. LO2 was allocated 62% of the marks instead of the approximated (45 – 55 %) of the marks while LO3 as in the previous 2 years was only allocated 2% of the marks instead of the approximated (5 to 15%). Each question progressed from knowledge to application and thus the challenge also increases. The language used in the paper is also of an acceptable standard as the correct scientific language was used. Most of the learners managed to attempt all questions which is an indication of the fact that the paper was of the correct length. As most candidates were familiar with questions in the question paper, all the questions were fair. We therefore feel that this paper fair as it affords every Candidate theopportunity to display his/her potential.
* The paper complied with Mark allocation as per SAG as indicated in the Knowledge area table below:

|  |  |  |
| --- | --- | --- |
|  | **Approximated %** | **2013 Approximates** |
| Mechanics | ±33%(±50Marks) | 36%(54 Marks) |
| Waves, Sound & Light | ±17%(±25 Marks) | 18%(27 Marks) |
| Electricity & Magnetism | ±37%(±55Marks) | 36%(54 Marks) |
| Matter & Material | ±13%(±20 Marks) | 10%(15 Marks) |

* The paper complied with Mark allocation as per SAG as indicated in the Learning Outcomes and assessment standards below as in table below:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **QUESTION** | **TOPIC** | **LO** | **MARKS** | **QUESTION** | **TOPIC** | **LO** | **MARKS** |
| 2.3 | Forces and Newtons Laws | 1 | 2 | 7.1 | 2D & 3D wavefronts | 2 | 2 |
| 2.4 | Doppler Effect | 1 | 2 | 7.4 | 2D & 3D wavefronts | 2 | 5 |
| 2.7 | Electric Circuits | 1 | 2 | 7.5 | 2D & 3D wavefronts | 2 | 2 |
| 2.10 | Optical Phenomena | 1 | 2 | 8.1 | Electrostatics | 2 | 2 |
| 3.1 | Vertical Projectiles | 1 | 1 | 8.2 | Electrostatics | 2 | 1 |
| 3.2 | Vertical Projectiles | 1 | 3 | 8.3 | Electrostatics | 2 | 5 |
| 3.3.3 | Vertical Projectiles | 1 | 4 | 9.1 | Electric Circuits | 2 | 2 |
| 3.4 | Vertical Projectiles | 1 | 4 | 9.2 | Electric Circuits | 2 | 3 |
| 6.4 | Doppler Effect | 1 | 2 | 10.1.1 | Electrical Machines | 2 | 1 |
| 7.2 | 2D & 3D wavefronts | 1 | 1 | 10.1.2 | Electrical Machines | 2 | 1 |
| 7.3.1 | 2D & 3D wavefronts | 1 | 1 | 10.2 | Electrical Machines | 2 | 1 |
| 7.3.2 | 2D & 3D wavefronts | 1 | 2 | 10.3 | Electrical Machines | 2 | 1 |
| 8.4 | Electrostatics | 1 | 1 | 10.5 | Electrical Machines | 2 | 3 |
| 8.5 | Electrostatics | 1 | 5 | 10.6 | Electrical Machines | 2 | 1 |
| 9.3 | Electric Circuits | 1 | 7 | 11.1.1 | Optical Phenomena | 2 | 1 |
| 9.4 | Electric Circuits | 1 | 4 | 11.1.3 | Optical Phenomena | 2 | 1 |
| 10.4 | Electrical Machines | 1 | 1 | 11.1.4 | Optical Phenomena | 2 | 2 |
| 10.7 | Electrical Machines | 1 | 5 |  | **(TOTAL : LO 2)** |  | **93** |
| 11.1.2 | Optical Phenomena | 1 | 5 | 11.2 | Optical Phenomena | 3 | 2 |
|  | **(TOTAL :LO 1)** |  | **54** | **11.3** | Optical Phenomena | 3 | 1 |
| 1.1 | Forces and Newton’s Laws | 2 | 1 |  | **(TOTAL :LO3)** |  | **3** |
| 1.2 | 2D & 3D wavefronts | 2 | 1 |  |  |  |  |
| 1.3 | Electrostatics | 2 | 1 |  |  |  |  |
| 1.4 | Electromagnetic Spectrum | 2 | 1 |  |  |  |  |
| 1.5 | Optical Phenomena | 2 | 1 |  |  |  |  |
| 2.1 | Work, Energy & Power | 2 | 2 |  |  |  |  |
| 2.2 | 2D & 3D wavefronts | 2 | 2 |  |  |  |  |
| 2.5 | 2D & 3D wavefronts | 2 | 2 |  |  |  |  |
| 2.6 | Electrostatics | 2 | 2 |  |  |  |  |
| 2.8 | Electromagnetic Spectrum | 2 | 2 |  |  |  |  |
| 2.9 | Electrical Machines | 2 | 2 |  |  |  |  |
| 3.3.1 | Vertical Projectiles | 2 | 4 |  |  |  |  |
| 3.3.2 | Vertical Projectiles | 2 | 3 |  |  |  |  |
| 4.1 | Momentum | 2 | 1 |  |  |  |  |
| 4.2 | Momentum | 2 | 3 |  |  |  |  |
| 4.3 | Momentum | 2 | 5 |  |  |  |  |
| 4.4.1 | Momentum | 2 | 1 |  |  |  |  |
| 4.4.2 | Momentum | 2 | 3 |  |  |  |  |
| 5.1 | Work, Energy & Power | 2 | 2 |  |  |  |  |
| 5.2 | Work, Energy & Power | 2 | 4 |  |  |  |  |
| 5.3 | Work ,Energy & Power | 2 | 2 |  |  |  |  |
| 5.4 | Work, Energy & Power | 2 | 1 |  |  |  |  |
| 5.5 | Work, Energy & Power | 2 | 5 |  |  |  |  |
| 5.6 | Work, Energy & Power | 2 | 1 |  |  |  |  |
| 6.1 | Doppler Effect | 2 | 1 |  |  |  |  |
| 6.2 | Doppler Effect | 2 | 5 |  |  |  |  |
| 6.3 | Doppler Effect | 2 | 1 |  |  |  |  |

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| --- | --- | --- | --- | --- | --- |
| QUESTION | MARKS/LO | LEVEL | QUESTION | MARKS/LO | LEVEL |
| 1.1 | 1(12.2.1) | 1 | 7.1 | 2(12.2.1) | 1 |
| 1.2 | 1(12.2.1) | 1 | 7.2 | 1(12.1.4) | 2 |
| 1.3 | 1(12.2.1) | 1 | 7.3.1 | 1(12.1.1) | 2 |
| 1.4 | 1(12.2.1) | 1 | 7.3.2 | 2(12.1.1) | 2 |
| 1.5 | 1(12.2.1) | 1 | 7.4 | 5(12.2.3) | 3 |
| TOTAL | 5 |  | 7.5 | 2(12.2.3) | 3 |
| 2.1 | 2(12.2.1) | 1 | TOTAL | 13 |  |
| 2.2 | 2(12.2.1) | 1 | 8.1 | 2(12.2.2) | 2 |
| 2.3 | 2(12.1.4) | 2 | 8.2 | 1(12.2.1) | 2 |
| 2.4 | 2(12.1.4) | 2 | 8.3 | 5(12.2.3) | 3 |
| 2.5 | 2(12.2.1) | 1 | 8.4 | 1(12.1.4) | 2 |
| 2.6 | 2(11.2.2) | 2 | 8.5 | 5(12.1.3) | 3 |
| 2.7 | 2(12.1.2) | 2 | TOTAL | 14 |  |
| 2.8 | 2(12.2.1) | 1 | 9.1 | 2(12.2.2) | 3 |
| 2.9 | 2(12.2.3) | 2 | 9.2 | 3(12.2.3) | 3 |
| 2.10 | 2(12.1.4) | 2 | 9.3 | 7(12.1.3) | 3 |
| TOTAL | 20 |  | 9.4 | 4(12.1.4) | 4 |
| 3.1 | 1(12.1.2) | 2 | TOTAL | 16 |  |
| 3.2 | 3(12.1.2) | 2 | 10.1.1 | 1(12.2.1) | 1 |
| 3.3.1 | 4(12.2.3) | 3 | 10.1.2 | 1(12.2.1) | 1 |
| 3.3.2 | 3(12.2.3) | 3 | 10.2 | 1(12.2.1) | 2 |
| 3.3.3 | 4(12.2.3) | 3 | 10.3 | 1(12.2.1) | 2 |
| 3.4 | 4(12.1.2) | 3 | 10.4 | 1(12.1.2) | 2 |
| TOTAL | 19 |  | 10.5 | 3(12.2.3) | 3 |
| 4.1 | 1(12.2.3) | 2 | 10.6 | 1(12.2.3) | 2 |
| 4.2 | 3(12.2.1) | 2 | 10.7 | 5(12.1.3) | 3 |
| 4.3 | 5(12.2.3) | 3 | TOTAL | 14 |  |
| 4.4.1 | 1(12.2.2) | 4 | 11.1.1 | 1(12.2.1) | 1 |
| 4.4.2 | 3(12.2.2) | 4 | 11.1.2 | 5(12.1.3) | 3 |
| TOTAL | 13 |  | 11.1.3 | 1(12.2.3) | 3 |
| 5.1 | 2 | 1 | 11.1.4 | 2(12.2.3) | 3 |
| 5.2 | 4 | 3 | 11.2 | 2(12.3.3) | 2 |
| 5.3 | 2 | 2 | 11.3 | 1(12.3.3) | 2 |
| 5.4 | 1 | 2 | TOTAL | 12 |  |
| 5.5 | 5 | 3 |  |  |  |
| 5.6 | 1 |  | MARKS | DEC 2013 | REQ |
| TOTAL | 15 | COGNATIVE LEVELS |  |  |  |  |
| 6.1 | 1(12.2.1)1 | Recall | 21 | 14% | 15%(±22Marks) |
| 6.2 | 5(12.2.3)3 | Comprehension | 43 | 28.6% | 30%(±45Marks) |
| 6.3 | 1(12.2.2)4 | Application/Analysis | 71 | 47.3 | 45%(±68Marks) |
| 6.4 | 2(12.1.4)4 | Synthesis/Evaluation | 15 | 10% | 10%(±15Marks) |
| TOTAL | 9 |  |  |  |  |
|  |  |  |  |  |  |

 **(TABLE)**

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **QUESTION** | **TOPIC** | **LO** | **MARKS** | **QUESTION** | **TOPIC** | **LO** | **MARKS** |
| 2.3 | Forces and Newton’s Laws | 1 | 2 | 7.1 | 2D & 3D wavefronts | 2 | 2 |
| 2.4 | Doppler Effect | 1 | 2 | 7.4 | 2D & 3D wavefronts | 2 | 5 |
| 2.7 | Electric Circuits | 1 | 2 | 7.5 | 2D & 3D wavefronts | 2 | 2 |
| 2.10 | Optical Phenomena | 1 | 2 | 8.1 | Electrostatics | 2 | 2 |
| 3.1 | Vertical Projectiles | 1 | 1 | 8.2 | Electrostatics | 2 | 1 |
| 3.2 | Vertical Projectiles | 1 | 3 | 8.3 | Electrostatics | 2 | 5 |
| 3.3.3 | Vertical Projectiles | 1 | 4 | 9.1 | Electric Circuits | 2 | 2 |
| 3.4 | Vertical Projectiles | 1 | 4 | 9.2 | Electric Circuits | 2 | 3 |
| 6.4 | Doppler Effect | 1 | 2 | 10.1.1 | Electrical Machines | 2 | 1 |
| 7.2 | 2D & 3D wavefronts | 1 | 1 | 10.1.2 | Electrical Machines | 2 | 1 |
| 7.3.1 | 2D & 3D wavefronts | 1 | 1 | 10.2 | Electrical Machines | 2 | 1 |
| 7.3.2 | 2D & 3D wavefronts | 1 | 2 | 10.3 | Electrical Machines | 2 | 1 |
| 8.4 | Electrostatics | 1 | 1 | 10.5 | Electrical Machines | 2 | 3 |
| 8.5 | Electrostatics | 1 | 5 | 10.6 | Electrical Machines | 2 | 1 |
| 9.3 | Electric Circuits | 1 | 7 | 11.1.1 | Optical Phenomena | 2 | 1 |
| 9.4 | Electric Circuits | 1 | 4 | 11.1.3 | Optical Phenomena | 2 | 1 |
| 10.4 | Electrical Machines | 1 | 1 | 11.1.4 | Optical Phenomena | 2 | 2 |
| 10.7 | Electrical Machines | 1 | 5 |  | **(TOTAL : LO 2)** |  | **93** |
| 11.1.2 | Optical Phenomena | 1 | 5 | 11.2 | Optical Phenomena | 3 | 2 |
|  | **(TOTAL :LO 1)** |  | **54** | **11.3** | Optical Phenomena | 3 | 1 |
| 1.1 | Forces and Newton’s Laws | 2 | 1 |  | **(TOTAL :LO3)** |  | **3** |
| 1.2 | 2D & 3D wavefronts | 2 | 1 |  |  |  |  |
| 1.3 | Electrostatics | 2 | 1 |  |  |  |  |
| 1.4 | Electromagnetic Spectrum | 2 | 1 |  |  |  |  |
| 1.5 | Optical Phenomena | 2 | 1 |  |  |  |  |
| 2.1 | Work, Energy & Power | 2 | 2 |  |  |  |  |
| 2.2 | 2D & 3D wavefronts | 2 | 2 |  |  |  |  |
| 2.5 | 2D & 3D wavefronts | 2 | 2 |  |  |  |  |
| 2.6 | Electrostatics | 2 | 2 |  |  |  |  |
| 2.8 | Electromagnetic Spectrum | 2 | 2 |  |  |  |  |
| 2.9 | Electrical Machines | 2 | 2 |  |  |  |  |
| 3.3.1 | Vertical Projectiles | 2 | 4 |  |  |  |  |
| 3.3.2 | Vertical Projectiles | 2 | 3 |  |  |  |  |
| 4.1 | Momentum | 2 | 1 |  |  |  |  |
| 4.2 | Momentum | 2 | 3 |  |  |  |  |
| 4.3 | Momentum | 2 | 5 |  |  |  |  |
| 4.4.1 | Momentum | 2 | 1 |  |  |  |  |
| 4.4.2 | Momentum | 2 | 3 |  |  |  |  |
| 5.1 | Work, Energy & Power | 2 | 2 |  |  |  |  |
| 5.2 | Work, Energy & Power | 2 | 4 |  |  |  |  |
| 5.3 | Work ,Energy & Power | 2 | 2 |  |  |  |  |
| 5.4 | Work, Energy & Power | 2 | 1 |  |  |  |  |
| 5.5 | Work, Energy & Power | 2 | 5 |  |  |  |  |
| 5.6 | Work, Energy & Power | 2 | 1 |  |  |  |  |
| 6.1 | Doppler Effect | 2 | 1 |  |  |  |  |
| 6.2 | Doppler Effect | 2 | 5 |  |  |  |  |
| 6.3 | Doppler Effect | 2 | 1 |  |  |  |  |