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| **NATIONAL**  **SENIOR CERTIFICATE/**  ***NASIONALE SENIOR SERTIFIKAAT*** | | | | | |
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|  | | | **GRADE/*GRAAD* 10** |  | |
|  | | | | | |
| **NOVEMBER 2019** | | | | | |
|  | | | | | |
| **PHYSICAL SCIENCES (PHYSICS) P1/**  ***FISIESE WETENSKAPPE (FISIKA) V1***  **MARKING GUIDELINE/*NASIENRIGLYN***  **EXEMPLAR/*EKSEMPLAAR*** | | | | | |
|  | | | | | |
| **MARKS/*PUNTE*:** | **150** | | | | |
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|  |  | | | | |
|  | | | | | |
|  | | This marking guideline consists of 12 pages./  *Hierdie nasienriglyn bestaan uit 12 bladsye.* | | |  |

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| **QUESTION 1/*VRAAG* 1** | |  |
|  | |  |
| 1.1 | B ✓✓ | (2) |
|  |  |  |
| 1.2 | D ✓✓ | (2) |
|  |  |  |
| 1.3 | B ✓✓ | (2) |
|  |  |  |
| 1.4 | B ✓✓ | (2) |
|  |  |  |
| 1.5 | B ✓✓ | (2) |
|  |  |  |
| 1.6 | D ✓✓ | (2) |
|  |  |  |
| 1.7 | A ✓✓ | (2) |
|  |  |  |
| 1.8 | A ✓✓ | (2) |
|  |  |  |
| 1.9 | C ✓✓ | (2) |
|  |  |  |
| 1.10 | B ✓✓ | (2) |
|  |  | **[20]** |

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| **QUESTION 2/*VRAAG* 2** | | |  |
|  | | |  |
| 2.1 | A single vector having the same effect as two or more vectors acting together. ✓✓  *ŉ Enkele vektor wat dieselfde effek het as twee of meer vektore wat saamwerk.* | | (2) |
|  | 6 cm | |  |
| 2.2 | ✓ | |  |
|  | ✓ Displacement /*verplasing* 4 cm 2 cm ✓ | |  |
|  | Displacement/*Verplasing* = 4 20/1 =80 m ✓east ✓ | | (5) |
|  |  | |  |
| 2.3 | 2.3.1 | Total distance/*Totale afstand* = 160 m ✓✓ | (2) |
|  |  |  |  |
|  | 2.3.2 | **Positive marking from 2.2*/Positiewe nasien vanaf 2.2.***  Average speed/*gemiddelde spoed* = ✓  = ✓  v = 0,53 m·s-1 ✓ | (3) |
|  |  |  | **[12]** |

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| **QUESTION 3/*VRAAG* 3** | | |  |
|  | | |  |
| 3.1 | Acceleration is the rate of change of velocity. ✓✓  *Versnelling is die tempo van verandering in snelheid*. | | (2) |
|  |  | |  |
| 3.2 | 3.2.1 | v = 0 m·s-1 ✓ | (1) |
|  |  |  |  |
|  | 3.2.2 | SOUTH/*Suid*  ✓ | (1) |
|  |  |  |  |
|  | 3.2.3 | a = 0 ✓ | (1) |
|  |  |  |  |
| 3.3 | 3.3.1 | Acceleration/*versnelling* = gradient/*gradiënt* = ✓    ✓✓  a = 10 m·s-2  ✓ | (4) |
|  |  |  |  |
|  | 3.3.2 | Total displacement = total area under the graph  *Totale verplasing = totale area onder die grafiek*  ∆X = A1 + A2 + A3 + A4  ∆X = (1/2 b x h) + (l x b) + (1/2 b x h) + (1/2 b x h) ✓  ∆X = (1/2 x 3 x 30) ✓ + (4x30) ✓ + (1/2 x 2 x 30) ✓ + (1/2 x 1 x -20) ✓  ∆X = 45 + 120 + 30 – 10  ∆X = 185m ✓ (in the direction of motion/*in die rigting van beweging*) | (6) |
|  |  |  | **[15]** |

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| **QUESTION 4/*VRAAG* 4** | | | |  |
|  | | | |  |
| 4.1.1 | Vf = vi + a∆t ✓  Vf = 0 + (2)(10) ✓  Vf = 20m·s-1 ✓ | | | (3) |
|  |  | | |  |
| 4.1.2 | **Option 1/*Opsie 1***  **∆**x = vi∆t + ½ a∆t2 ✓  ∆x = (0)(10) + ½ (2)(10)2 ✓  ∆x = 0 + 100  ∆x = 100m ✓ | **Option 2/*Opsie 2***  **Positive marking from 4.1*/Positiewe nasien vanaf 4.1***  vf2 = vi2 + 2a∆x✓  202 =02 + 2(2)∆x✓  ∆x = 100 m✓ | **Option 3/*Opsie 3***  **Positive marking from 4.1*/Positiewe nasien vanaf 4.1***  ∆x = ( )∆t✓  ∆x = ( )10✓  ∆x = 100 m✓ | (3) |
|  |  | | |  |
| 4.2 | V2f = v2f + 2a∆x ✓  (2vi)2 ✓ = v2i + 2(5)(3500) ✓  4v2i = v2i + 35 000  3v2i = 35 000  V2i = 11 666.67  Vi = 108,01 m·s-1 | | |  |
|  |  | | |  |
|  | Vf = vi + a∆t  216,02 ✓ = 108,01 + (5)∆t ✓  5∆t = 108,01  ∆t = 21,60 s ✓ | | | (6) |
|  |  | | | **[12]** |

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| **QUESTION 5/*VRAAG* 5** | | |  |
|  | | |  |
| 5.1 | Mechanical energy/*Meganiese energie* ✓ | | (1) |
|  |  | |  |
| 5.2 | Em (A) = Ek(A) + Ep(A)  = ½ mv2 + mgh ✓  = ½ (2)(10)2 ✓ + (2(9,8)(30) ✓  = 149,6 J ✓ | | (4) |
|  |  | |  |
| 5.3 | Em (A) = Em (B)  (½ mv2 + mgh)A = (½ mv2 + mgh)B  ✓  149,6 ✓ = ½ (2)v2 + (2)(9,8)(0) ✓  v = 12,23 m·s-1 ✓ | | (4) |
|  |  | |  |
| 5.4 | The principle of conservation of mechanical energy ✓ states that the total mechanical energy in an isolated system remains constant. ✓✓  *Die beginsel van die behoud van meganiese energie* stel dat die totale meganiese energie in ŉ geïsoleerde stelsel konstant bly | | (3) |
|  |  | |  |
| 5.5 | **Marking guide/*Nasienriglyn***  Correct shape (STRAIGHT LINE)/*Korrekte vorm (REGUIT LYN)* ✓  All points plotted correctly/*Al die punte korrek aangedui* ✓✓  If at least 2 points plotted correctly/*As ten minste 2 punte korrek aangedui is* 1/2 | |  |
|  |  |  |  |
|  | **Graph of height vs Kinetic energy/**  ***Grafiek van hoogte vs Kinetiese energie***  300  200  100  Kinetic Energy/ *Kinetiese energie*  (J)  Height/*Hoogte* (m)  10  30  20 | | (3) |
|  |  | | **[15]** |

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| **QUESTION 6/*VRAAG* 6** | | | | |  |
|  | | | | |  |
| 6.1 | Pulse is a single disturbance in a medium ✓✓ /  *Pols is ŉ enkele steuring in ŉ medium*. | | | | (2) |
|  |  | | | |  |
| 6.2 | Up/*Af* ✓ | | | | (1) |
|  |  | | | |  |
| 6.3 | 6.3.1 | T = 1/f ✓  = 1/30 ✓  = 0,033  ∆t = 0,033 x 3 ✓  ∆t = 0,10 s ✓ | | | (4) |
|  |  |  | | |  |
|  | 6.3.2 | Wavelength/*Golflengte*(m) = 12/3 ✓  = 4 m ✓ | | | (2) |
|  |  |  | | |  |
|  | 6.3.3 | **Option 1/*Opsie 1***  **Positive marking from 6.3.2*/Positiewe nasien vanaf 6.3.2***  v = fλ ✓  = (30)(4) ✓  V = 120 m·s-1 ✓ | **Option 2/*Opsie 2***  ∆x = v∆t ✓  12 = v(0.10) ✓  V = 120 m·s-1 ✓ | **Option 3/*Opsie 3***  **Positive marking from 6.3.1 and 6.3.2/ *Positiewe nasien vanaf 6.3.1 en 6.3.2***  V=✓  V=✓  V=121, 21 m·s-1✓ | (3) |
|  |  |  | | | **[12]** |

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| **QUESTION 7/*VRAAG*  7** | | |  |
|  |  | |  |
| 7.1 | 7.1.1 | ∆x = v∆t ✓  85 = v(0,25) ✓  v = 340 m·s-1 ✓  **OR / *OF***  ∆x = v∆t ✓  170 = v(0,5) ✓  V = 340 m·s-1 ✓ | (3) |
|  |  |  |  |
|  | 7.1.2 | **Positive marking from 7.1.1/ *Positiewe nasien vanaf 7.1.1.***  ✓  340 = (100) ✓  = 3,40 m ✓ | (3) |
|  |  |  |  |
| 7.2 | 7.2.1 | Ultrasound refers to sound with a frequency of 20 kHz to 100 kHz ✓✓/  *Ultraklank verwys na klank met 'n frekwensie van 20 kHz tot 100 kHz* | (2) |
|  |  |  |  |
|  | 7.2.2 | * Detecting invisible cracks in the wings of aircraft ✓ * *Opsporing van onsigbare krake in die vlerke van vliegtuie.*   **OR */ OF***   * Determining the thickness of metals/plastic ✓ * *Bepaal die dikte van metale/plastiek*   **OR */ OF***   * Cleaning delicate mechanisms of old-fashioned clocks ✓ * *Om delikate meganismes van outydse horlosies skoon te maak* | (1) |
|  |  |  |  |
|  | 7.2.3 | Ultrasound does not damage the soft tissue of human organs. ✓✓*/*  *Ultraklank beskadig nie die sagte weefsel van menslike organe nie.* | (2) |
|  |  |  | **[11]** |

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| **QUESTION 8/*VRAAG*  8** | | | |  |
|  | | | |  |
| 8.1 | 8.1.1 | Infra-red/*infrarooi* ✓ | | (1) |
|  |  |  | |  |
|  | 8.1.2 | Sun/*Son* ✓  **OR/*OF***  Gas discharge tube/*Gasafvoerbuis* ✓ | | (1) |
|  |  | | |  |
| 8.2 | ✓  ✓✓  E = ✓ | | | (5) |
|  |  | | |  |
| 8.3 | 8.3.1 | **B**, ✓  ***B****,* | * **B** has a highest energy/frequency than ultraviolet ✓✓/ * ***B*** *het die hoogste energie/frekwensie as ultraviolet* | (3) |
|  |  |  | |  |
|  | 8.3.2 | Type of (electromagnetic) radiation ✓  *Tipe (elektromagnetiese) straling*  **OR*/OF***  Frequency (of electromagnetic radiation) ✓  *Frekwensie (van elektromagnetiese straling* | | (1) |
|  |  |  | |  |
|  | 8.3.3 | Fair test ✓✓ **OR** fair investigation **OR** to have one independent variable/  *Billike toets* ***OF*** *billike ondersoek* ***OF*** *om een onafhanklike veranderlike te hê.* | | (2) |
|  |  | | | **[13]** |
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| **QUESTION 9/*VRAAG* 9** | | |  |
|  | | |  |
| 9.1 | C:\Users\Bambelo\Documents\magnetic-fields-around-magnet.PNG   |  |  | | --- | --- | | Poles are correctly labelled/*Pole is korrect* | ✓ | | Field lines with arrows/*Veldlyne met pyle* | ✓ | | Correct pattern/*Korrekte patroon* | ✓ | | | (3) |
|  |  | |  |
| 9.2 | ATTRACTION/*AANTREKKINGKRAG* ✓ | | (1) |
|  |  | |  |
|  | 9.3.1 | YES/*JA* ✓ | (1) |
|  |  |  |  |
|  | 9.3.2 | NO, ✓ They repel each other or same poles of magnet ✓/  *NEE*, *hulle stoot mekaar of dieselfde magneetpole.* | (2) |
|  |  | |  |
| 9.4 | Earth’s magnetic field deflects charged particles ✓ which would harm the ozone layer./  *Die Aarde se magnetiese veld reflekteer gelaaide deeltjies af wat die osoonlaag kan benadeel.*  Ozone layer protects Earth from ultraviolet strays. ✓/  *Osoonlaag beskerm die Aarde teen ultravioletstrale.* | | (2) |
|  |  | | **[9]** |

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| **QUESTION 10/*VRAAG* 10** | | |  |
|  | | |  |
| 10.1 | **A** ✓ | | (1) |
|  |  | |  |
| 10.2 | ELECTRIC/*ELEKTRIES* ✓ | | (1) |
|  |  | |  |
| 10.3 | To prevent charge leakage/*Om ladinglek te voorkom* ✓✓ | | (2) |
|  |  | |  |
| 10.4 | 10.4.1 | States that the net charge of an isolated system remains constant during any physical process. ✓✓/  *Stel dat die netto lading van ŉ geïsoleerde stelsel gedurende enige fisiese proses konstant bly*. | (2) |
|  |  |  |  |
|  | 10.4.2 | **B** ✓ | (1) |
|  |  |  |  |
|  | 10.4.3 | ✓  Q = +1.2 x10-9 C  ✓  ✓✓ OR = ✓✓  n = 2x1010 electrons/*elektrone* ✓ | (5) |
|  |  |  | **[12]** |

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| **QUESTION 11/*VRAAG* 11** | | | |  |
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| 11.1 | Electric current is the rate of flow of charges ✓✓/  *Eletriesestroom is die tempo waarteen lading vloei*  ***Accept*/Aanvaar**  Electric current is the amount of charge passing a point per unit time. ✓✓/  *Elektriesestroom is die hoeveelheid lading wat deur ŉ punt gaan per eenheidstyd* | | | (2) |
|  |  | | |  |
| 11.2 | 11.2.1 | Potential difference/*Potensiaalverskil* ✓ | | (1) |
|  |  |  | |  |
|  | 11.2.2 | Electric current/*Elektriesestroom* ✓ | | (1) |
|  |  |  | |  |
| 11.3 | 11.3.1 | ✓  = ✓  = 4 Ω ✓  **OR/OF** 1/Rp = 1/R1 + 1/R2  = 1/6 +1/12  Rp = 4 Ω | | (3) |
|  |  |  | |  |
|  | 11.3.2 | **Positive marking from 11.3.1/*Positiewe nasien vanaf 11.3.1.***  Rll = Rs + Rll  = 18 + 4  = 22 Ω ✓✓ | | (2) |
|  |  |  | |  |
|  | 11.3.3 | **Option 1/*Opsie 1***  V = IR  V = (1)(6) ✓  V = 6 V  I =  I =✓  I =1,5 A  I = Q /Δt ✓  1,5 = Q/5 ✓  Q = 7,5 C ✓ | **Option 2/*Opsie 2***  I12 Ω  = 0,5 A✓  I A2 = 1 + 0,5  = 1,5 A✓  I = Q /Δt✓  1,5 = Q/5 ✓  Q = 7,5 C ✓ | (5) |

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| 11.4 | EQUAL TO ✓ /*GELYK AAN* |  |
|  | Resistors in parallel work under the same potential difference ✓✓/  *Weerstande in parallel werk onder dieselfde potensiële verskil.* | (3) |
|  |  |  |
| 11.5 | INCREASE/*TOENEEM* ✓✓ | (2) |
|  |  | **[19]** |
|  |  |  |
|  | **TOTAL/*TOTAAL*:** | **150** |