

SA-STUDENT

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<https://sa-student.com/>

If it's your job to eat a frog, it's best
to do it first thing in the morning.
And If it's your job to eat two frogs,
it's best to eat the biggest one first.

Mark Twain



QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 B ✓✓ (accept Q/aanvaar Q) (2)
- 1.3 D ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 D ✓✓ (2)
- 1.6 B **OR/OF** D ✓✓ (2)
- 1.7 B ✓✓ (2)
- 1.8 A ✓✓ (2)
- 1.9 A ✓✓ (2)
- 1.10 D ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 B ✓✓ (2)
- 1.2 D ✓✓ (2)
- 1.3 A ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 C ✓✓ (2)
- 1.7 C ✓✓ (2)
- 1.8 A ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 D ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 B ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 B ✓✓ (2)
- 1.4 A ✓✓ (2)
- 1.5 D ✓✓ (2)
- 1.6 C ✓✓ (2)
- 1.7 D ✓✓ (2)
- 1.8 D ✓✓ (2)
- 1.9 A ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 B ✓✓ (2)
- 1.5 C ✓✓ (2)
- 1.6 D ✓✓ (2)
- 1.7 B or/of F ✓✓ (2)
- 1.8 A or/of V_1 ✓✓ (2)
- 1.9 D ✓✓ (2)
- 1.10 D ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- | | | |
|------|------|-------------|
| 1.1 | C ✓✓ | (2) |
| 1.2 | A ✓✓ | (2) |
| 1.3 | D ✓✓ | (2) |
| 1.4 | D ✓✓ | (2) |
| 1.5 | B ✓✓ | (2) |
| 1.6 | B ✓✓ | (2) |
| 1.7 | A ✓✓ | (2) |
| 1.8 | C ✓✓ | (2) |
| 1.9 | C ✓✓ | (2) |
| 1.10 | C ✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- | | | |
|------|------|-------------|
| 1.1 | B ✓✓ | (2) |
| 1.2 | D ✓✓ | (2) |
| 1.3 | C ✓✓ | (2) |
| 1.4 | C ✓✓ | (2) |
| 1.5 | C ✓✓ | (2) |
| 1.6 | A ✓✓ | (2) |
| 1.7 | A ✓✓ | (2) |
| 1.8 | D ✓✓ | (2) |
| 1.9 | A ✓✓ | (2) |
| 1.10 | B ✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- 1.1 C ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 A ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 D ✓✓ (2)
- 1.7 A ✓✓ (2)
- 1.8 B ✓✓ (2)
- 1.9 D ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 B ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 C ✓✓ (2)
- 1.6 C ✓✓ (2)
- 1.7 D ✓✓ (2)
- 1.8 D ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 A ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

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

QUESTION 1/VRAAG 1

- | | | |
|------|-----|-------------|
| 1.1 | A✓✓ | (2) |
| 1.2 | B✓✓ | (2) |
| 1.3 | C✓✓ | (2) |
| 1.4 | B✓✓ | (2) |
| 1.5 | A✓✓ | (2) |
| 1.6 | B✓✓ | (2) |
| 1.7 | C✓✓ | (2) |
| 1.8 | C✓✓ | (2) |
| 1.9 | D✓✓ | (2) |
| 1.10 | B✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- | | | |
|------|-----|-------------|
| 1.1 | C✓✓ | (2) |
| 1.2 | A✓✓ | (2) |
| 1.3 | D✓✓ | (2) |
| 1.4 | A✓✓ | (2) |
| 1.5 | C✓✓ | (2) |
| 1.6 | A✓✓ | (2) |
| 1.7 | B✓✓ | (2) |
| 1.8 | B✓✓ | (2) |
| 1.9 | D✓✓ | (2) |
| 1.10 | A✓✓ | (2) |
| | | [20] |

QUESTION 1 / VRAAG 1

- | | | |
|------|------|-------------|
| 1.1 | B ✓✓ | (2) |
| 1.2 | D ✓✓ | (2) |
| 1.3 | A ✓✓ | (2) |
| 1.4 | C ✓✓ | (2) |
| 1.5 | B ✓✓ | (2) |
| 1.6 | A ✓✓ | (2) |
| 1.7 | D ✓✓ | (2) |
| 1.8 | B ✓✓ | (2) |
| 1.9 | C ✓✓ | (2) |
| 1.10 | D ✓✓ | (2) |
| | | [20] |

QUESTION/VRAAG 1

- | | | |
|------|------|-------------|
| 1.1 | D ✓✓ | (2) |
| 1.2 | B ✓✓ | (2) |
| 1.3 | D ✓✓ | (2) |
| 1.4 | C ✓✓ | (2) |
| 1.5 | D ✓✓ | (2) |
| 1.6 | B ✓✓ | (2) |
| 1.7 | C ✓✓ | (2) |
| 1.8 | C ✓✓ | (2) |
| 1.9 | B ✓✓ | (2) |
| 1.10 | B ✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- | | | |
|------|-----|-------------|
| 1.1 | D✓✓ | (2) |
| 1.2 | C✓✓ | (2) |
| 1.3 | A✓✓ | (2) |
| 1.4 | D✓✓ | (2) |
| 1.5 | B✓✓ | (2) |
| 1.6 | C✓✓ | (2) |
| 1.7 | B✓✓ | (2) |
| 1.8 | A✓✓ | (2) |
| 1.9 | D✓✓ | (2) |
| 1.10 | B✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 C ✓✓ (2)
- 1.3 C ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 A ✓✓ (2)
- 1.7 C ✓✓ (2)
- 1.8 A ✓✓ (2)
- 1.9 B ✓✓ (2)
- 1.10 B ✓✓ (2)
- [20]**

QUESTION 2/VRAAG 2

- 2.1 When a resultant/net force acts on an object, the object will accelerate in the (direction of the net/resultant force). The acceleration is directly proportional to the net force ✓ and inversely proportional to the mass ✓ of the object.
Wanneer 'n netto krag op 'n voorwerp inwerk, versnel die voorwerp in die rigting van die netto krag teen 'n versnelling direk eweredig aan die krag en omgekeerd eweredig aan die massa van die voorwerp.

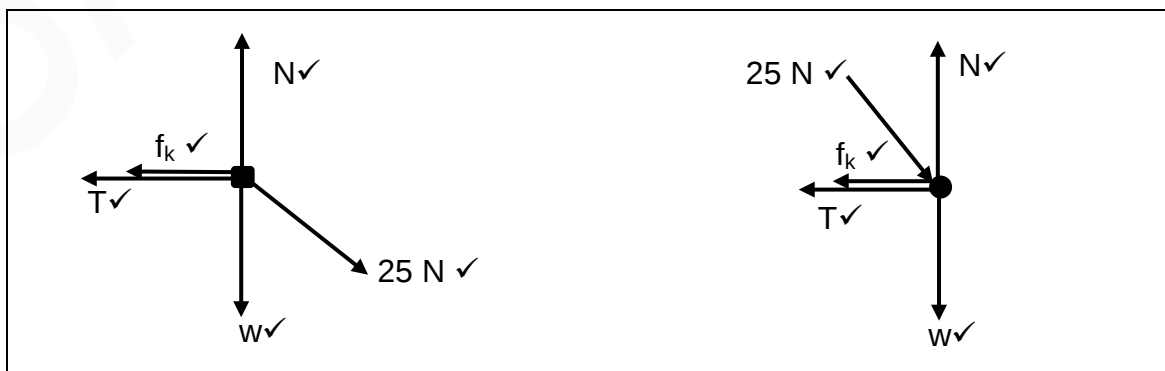
OR/OF

The resultant/net force acting on the object is equal (is directly proportional to) to the rate of change of momentum of an object (in the direction of the force). ✓✓

Die resulterende/netto krag wat op 'n voorwerp inwerk, is gelyk aan (is direk eweredig aan) die tempo van verandering van momentum van die voorwerp (in die rigting van die netto krag).

- 2.2 $f_k = \mu_k N = \mu_k mg$
 $= (0,15)(3)(9,8)$ ✓
 $= 4,41 \text{ N}$ ✓ (3)

2.3



QUESTION 1/VRAAG 1

- 1.1 B ✓✓ (2)
- 1.2 D ✓✓ (2)
- 1.3 B ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 A ✓✓ (2)
- 1.6 C ✓✓ (2)
- 1.7 B ✓✓ (2)
- 1.8 B ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 A ✓✓ (2)
- [20]**

QUESTION/VRAAG 1

- | | | |
|------|-----|-------------|
| 1.1 | A✓✓ | (2) |
| 1.2 | B✓✓ | (2) |
| 1.3 | D✓✓ | (2) |
| 1.4 | C✓✓ | (2) |
| 1.5 | B✓✓ | (2) |
| 1.6 | B✓✓ | (2) |
| 1.7 | A✓✓ | (2) |
| 1.8 | D✓✓ | (2) |
| 1.9 | C✓✓ | (2) |
| 1.10 | D✓✓ | (2) |
| | | [20] |

QUESTION 1/VRAAG 1

- 1.1 B✓✓ (2)
- 1.2 D✓✓ (2)
- 1.3 C✓✓ (2)
- 1.4 D✓✓ (2)
- 1.5 A✓✓ (2)
- 1.6 A✓✓ (2)
- 1.7 A✓✓ (2)
- 1.8 D✓✓ (2)
- 1.9 C✓✓ (2)
- 1.10 B✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 C ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 B ✓✓ (2)
- 1.5 D ✓✓ (2)
- 1.6 A ✓✓ (2)
- 1.7 A ✓✓ (2)
- 1.8 C ✓✓ (2)
- 1.9 A ✓✓ (2)
- 1.10 B ✓✓ (2)
- [20]**

QUESTION 1/VRAAG 1

- 1.1 A ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 D ✓✓ (2)
- 1.4 C ✓✓ (2)
- 1.5 B ✓✓ (2)
- 1.6 C ✓✓ (Accept/ Aanvaar R) (2)
- 1.7 A ✓✓ (2)
- 1.8 D ✓✓ (2)
- 1.9 A ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

QUESTION 2/VRAAG 2

- 2.1 When a resultant (net) force acts on an object, the object will accelerate in the direction of the force. This acceleration is directly proportional to the force✓ and inversely proportional to the mass of the object.✓

Wanneer 'n resulterende (netto) krag op 'n voorwerp inwerk, sal die voorwerp in die rigting van die krag versnel. Hierdie versnelling is direk eweredig aan die krag en omgekeerd eweredig aan die massa van die voorwerp.

OR/OF

The net force acting on an object is equal to the rate of change of momentum ✓✓ of the object (in the direction of the force). (2 or 0)

Die netto krag wat op 'n voorwerp inwerk is gelyk aan die tempo van verandering in momentum van die voorwerp (in die rigting van die krag).(2 of 0) (2)

SECTION A / AFDELING A**QUESTION 1 / VRAAG 1**

- 1.1 Mechanical energy / *Meganiese energie* ✓ (1)
- 1.2 Newton's first law / *Newton se eerste wet* ✓ (1)
- 1.3 (Electrical) potential energy / *(Elektriese) potensiële energie* ✓ (1)
- 1.4 Diffraction / *Diffraksie* ✓ (1)
- 1.5 Work function / *Arbeidsfunksie (Werkfunksie)* ✓ (1)
- [5]**

QUESTION 2 / VRAAG 2

- 2.1 D ✓✓ (2)
- 2.2 A ✓✓ (2)
- 2.3 D ✓✓ (2)
- 2.4 D ✓✓ (2)
- 2.5 C ✓✓ (2)
- 2.6 C ✓✓ (2)
- 2.7 D ✓✓ (2)
- 2.8 B ✓✓ (2)
- 2.9 B ✓✓ (2)
- 2.10 A ✓✓ (2)
- [20]**

TOTAL SECTION A / TOTAAL AFDELING A: 25

QUESTION 1/VRAAG 1

- 1.1 B ✓✓ (2)
- 1.2 A ✓✓ (2)
- 1.3 A ✓✓ (2)
- 1.4 D ✓✓ (2)
- 1.5 C ✓✓ (2)
- 1.6 D ✓✓ (2)
- 1.7 A ✓✓ (2)
- 1.8 B ✓✓ (2)
- 1.9 C ✓✓ (2)
- 1.10 C ✓✓ (2)
- [20]**

SECTION A**QUESTION 1/VRAAG 1**

- 1.1 Acceleration / *Versnelling* ✓ (1)
- 1.2 Wavelength / *Golflengte* ✓ (1)
- 1.3 Electric field / *Elektriese veld* ✓ (1)
- 1.4 Gamma / γ (rays) / *Gamma / γ (strale)* ✓ (1)
- 1.5 Threshold (frequency) / *Drumpel(frekwensie)* ✓ (1)
- [5]**

QUESTION 2/VRAAG 2

- 2.1 B ✓✓ (2)
- 2.2 B ✓✓ (2)
- 2.3 C ✓✓ (2)
- 2.4 D ✓✓ (2)
- 2.5 C ✓✓ (2)
- 2.6 C ✓✓ (2)
- 2.7 D ✓✓ (2)
- 2.8 B ✓✓ (2)
- 2.9 D ✓✓ (2)
- 2.10 B ✓✓ (2)
- [20]**

TOTAL SECTION A/TOTAAL AFDELING A: 25

SECTION A**QUESTION 1/VRAAG 1**

- | | | |
|-----|--|------------|
| 1.1 | X-rays/X-strale✓ | (1) |
| 1.2 | Momentum ✓ | (1) |
| 1.3 | Huygens (principle)/Huygens (se beginsel)✓ | (1) |
| 1.4 | ampere/ampère ✓ | (1) |
| 1.5 | Isolated/closed ✓
Geïsoleerde/geslote | (1)
[5] |

QUESTION 2/VRAAG 2

- | | | |
|------|------|------|
| 2.1 | B ✓✓ | (2) |
| 2.2 | A ✓✓ | (2) |
| 2.3 | A ✓✓ | (2) |
| 2.4 | D ✓✓ | (2) |
| 2.5 | A ✓✓ | (2) |
| 2.6 | D ✓✓ | (2) |
| 2.7 | B ✓✓ | (2) |
| 2.8 | A ✓✓ | (2) |
| 2.9 | B ✓✓ | (2) |
| 2.10 | C ✓✓ | (2) |
| | | [20] |

TOTAL SECTION A/TOTAAL AFDELING A: 25

SECTION A**QUESTION 1/VRAAG 1**

- | | | |
|-----|--|------------|
| 1.1 | Frequency/Frekwensie ✓ | (1) |
| 1.2 | Capacitor/Kapasitor ✓ | (1) |
| 1.3 | Split ring commutator ✓
Splitringkommutator | (1) |
| 1.4 | Photons/Fotone ✓ | (1) |
| 1.5 | <u>Relative velocity/Relatiewe snelheid</u> ✓ | (1) |
| | | [5] |

QUESTION 2/VRAAG 2

- | | | |
|------|------|-------------|
| 2.1 | D ✓✓ | (2) |
| 2.2 | C ✓✓ | (2) |
| 2.3 | D ✓✓ | (2) |
| 2.4 | D ✓✓ | (2) |
| 2.5 | A ✓✓ | (2) |
| 2.6 | A ✓✓ | (2) |
| 2.7 | D ✓✓ | (2) |
| 2.8 | C ✓✓ | (2) |
| 2.9 | C ✓✓ | (2) |
| 2.10 | A ✓✓ | (2) |
| | | [20] |

TOTAL SECTION A/TOTAAL AFDELING A:	25
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SECTION A / AFDELING A**QUESTION 1 / VRAAG 1**

- 1.1 Kinetic energy/*Kinetiese energie* ✓ (1)
- 1.2 Interference/*Interferensie* ✓ (1)
- 1.3 Ohm ✓ (1)
- 1.4 Electromagnetic induction/*Elektromagnetiese induksie* ✓
OR/OF
Faraday's law/*Faraday se wet* (1)
- 1.5 (Line) emission (spectrum) ✓ (1)
(*Lyn*)emissie(spektrum) [5]

QUESTION 2 / VRAAG 2

- 2.1 B ✓✓ (2)
- 2.2 B ✓✓ (2)
- 2.3 C ✓✓ (2)
- 2.4 B ✓✓ (2)
- 2.5 C ✓✓ (2)
- 2.6 A ✓✓ (2)
- 2.7 D ✓✓ (2)
- 2.8 D ✓✓ (2)
- 2.9 C ✓✓ (2)
- 2.10 A ✓✓ (2)

[20]**TOTAL SECTION A / TOTAAL AFDELING A: 25**

SECTION A**QUESTION 1 / VRAAG 1**

- 1.1 Power ✓
Drywing / Arbeidstempo ✓ (1)
- 1.2 Coherent / Koherent ✓ (1)
- 1.3 Dielectric / Diëlektrikum ✓ (1)
- 1.4 Alternating (current) / AC / ac ✓
Wissel(stroom) / WS / ws ✓ (1)
- 1.5 $\text{N} \cdot \text{C}^{-1}$ / $\text{V} \cdot \text{m}^{-1}$ / newton per coulomb / volt per meter ✓ (1)
- [5]**

QUESTION 2 / VRAAG 2

- 2.1 C ✓✓ (2)
- 2.2 D ✓✓ (2)
- 2.3 D ✓✓ (2)
- 2.4 C ✓✓ (2)
- 2.5 B ✓✓ (2)
- 2.6 A ✓✓ (2)
- 2.7 C ✓✓ (2)
- 2.8 C ✓✓ (2)
- 2.9 D ✓✓ (2)
- 2.10 B ✓✓ (2)
- [20]**

TOTAL SECTION A / TOTAAL AFDELING A: 25

SECTION A / AFDELING A**QUESTION 1 / VRAAG 1**

- 1.1 (gravitational) potential (energy) ✓
(gravitasionele) potensiële (energie) [12.2.1] (1)
- 1.2 watt / W ✓ [12.2.1] (1)
- 1.3 Coherent / coherence ✓
Koherent [12.2.1] (1)
- 1.4 gamma rays / *γ*-strale ✓
OR/OF
γ rays / *γ*-strale [12.2.1] (1)
- 1.5 Photons / fotone ✓
OR/OF
Quanta / kwanta [12.2.1] (1)
[5]

QUESTION 2 / VRAAG 2

- 2.1 ... is $9,8 \text{ m} \cdot \text{s}^{-2}$ at its maximum height. ✓✓
... is $9,8 \text{ m} \cdot \text{s}^{-2}$ by sy maksimum hoogte.
OR/OF
... the velocity is zero at its maximum height./... die snelheid is nul by sy maksimum hoogte. [12.2.1] (2)
- 2.2 ... the **magnitude of the MOMENTUM** of the bullet is equal (opposite in direction) to the magnitude of the momentum of the gun. ✓✓
... die **grootte van die MOMENTUM** van die koeël is gelyk (teenoorgestel in rigting) aan die grootte van die momentum van die geweer.
OR/OF
...the **MOMENTUM** of the bullet is **opposite in direction** to the momentum of the gun
... die **MOMENTUM** van die koeël is **teenoorgestel in rigting** aan die momentum van die geweer
OR/OF
... the **MOMENTUM** of the bullet is equal to, but opposite in direction to the momentum of the gun.
... die **MOMENTUM** van die koeël is gelyk aan, maar teenoorgestel in rigting aan die momentum van die geweer.

OR/OF

.... the **CHANGE in MOMENTUM (impulse)** of the bullet is equal in magnitude (opposite in direction) to the change in momentum of the gun.

... die *verandering in MOMENTUM* van die koeël is gelyk in grootte (teenoorgesteld in rigting) aan die verandering in momentum van die geweer.

OR/OF

.... the **CHANGE in MOMENTUM (impulse)** of the bullet is equal to, but opposite in direction to the change in momentum of the gun.

... die **VERANDERING in MOMENTUM (impuls)** van die koeël is gelyk aan, maar teenoorgesteld in rigting aan die verandering in momentum van die geweer.

OR/OF

... the **magnitude of the FORCE** that the bullet exerts on the gun is **equal** (opposite in direction) to the force that the gun exerts on the bullet.

... die **grootte van die KRAG** wat die koeël op die geweer uitoefen is **gelyk** (teenoorgesteld in rigting) aan die krag wat die geweer op die koeël uitoefen.

OR/OF

... the **FORCE** that the bullet exerts on the gun is **equal to, but opposite in direction** to the force that the gun exerts on the bullet.

... die **KRAG** wat die koeël op die geweer uitoefen is **gelyk aan, maar teenoorgesteld in rigting**, aan die krag wat die geweer op die koeël uitoefen.

[12.2.3] (2)

- 2.3 ... result of diffraction / interference ✓✓
... gevolg van diffraksie / interferensie

OR/OF

... by a triangular prism ...

... deur 'n driehoekige prisma ...

[12.2.3] (2)

- 2.4 ... different potential differences ... ✓✓
... verskillende potensiaalverskille ...

OR/OF

Identical resistors ...

Identiese resistors ...

OR/OF

Identical resistors ...connected in parallel

Identiese resistors ...in parallel geskakel

OR/OF

Non-identical resistorsin paralleldifferent current

Nie identiese resistors ... in parallel ... verskillende stroom

[12.2.2] (2)

- 2.5 A line absorption spectrum ... ✓✓
'n Lynabsorpsiespektrum ...

OR/OF

... when electrons move from higher to lower energy levels.

... wanneer elektrone van hoër na laer energievlakke beweeg.

[12.2.1] (2)
[10]

QUESTION 3/VRAAG 3

- 3.1 C ✓✓ [12.1.2] (2)
- 3.2 A ✓✓ [12.2.3] (2)
- 3.3 B ✓✓ [12.1.2] (2)
- 3.4 C ✓✓ [12.2.3] (2)
- 3.5 A ✓✓ [12.2.1] (2)
[10]

TOTAL SECTION A/TOTAAL AFDELING A: 25