education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 10

PHYSICAL SCIENCES: PHYSICS (P1)

EXEMPLAR PAPER

MARKS: 150

TIME: 3 hours

This question paper consists of 14 pages, an information sheet, an answer sheet and graph paper.

156 1 E

INSTRUCTIONS AND INFORMATION

1. Write your examination number (and centre number if applicable) in the appropriate spaces on the ANSWER BOOK.

2. Answer ALL the questions.

3. Answer SECTION A on the ANSWER SHEET provided. Answer SECTION B in the ANSWER BOOK.

4. Non-programmable calculators may be used.

5. Appropriate mathematical instruments may be used.

6. Number the answers correctly according to the numbering system used in this question paper.

7. An information sheet is attached for your use.

8. Wherever motivation, discussion, et cetera is required, be brief.

SECTION A

Answer this section on the attached ANSWER SHEET.

QUESTION 1: ONE-WORD ANSWERS

Write only the word/term for each of the following descriptions next to the question number. In some questions, you may need to choose from the terms given in brackets.

1.1 Displacement per unit time (1)

1.2 Real depth and apparent depth can be explained in terms of this phenomenon (1)

1.3 When light passes from a more optically dense medium into a less optically dense medium it will bend (towards/away from) the normal. (1)

1.4 As the distance between two closely placed charged objects increases, the force (increases/decreases/remains the same). (1)

1.5 A voltmeter is usually connected in (series/parallel) in an electric circuit. (1)
[5]

QUESTION 2: MATCHING ITEMS

Match the information in COLUMN A with the information in COLUMN B by writing only the letter (A - I) next to the question number (2.1 - 2.5).

COLUMN A		COLUMN B	
2.1	Displacement	A	sum of the gravitational potential energy and kinetic energy
2.2	Conservation of energy	B	two pulses meet in phase
2.3	Constructive interference	C	change in position from starting point to ending point in a straight line
2.4	Specular reflection	D	allows electrons to pass through quite easily
2.5	Conductors	E	total path travelled
		F	two pulses meet out of phase
		G	energy cannot be created nor destroyed, it is merely converted from one form into another
		H	results in a sharp image
		I	does not allow electrons to pass through easily

[5]

QUESTION 3: TRUE OR FALSE

Indicate whether the following statements are TRUE or FALSE. Write only 'true' or 'false' next to the question number (3.1 - 3.5). If the statement is FALSE write down correct the statement.

3.1 As a ball rolls down a uniform slope, the ball's successive displacement increases in equal time intervals. (2)

3.2 The acceleration of an object moving along a straight line can be determined by calculating the area under a velocity versus time graph. (2)

3.3 The speed of a pulse in a spring depends on the pulse length, tension in the spring and the mass of the spring divided by the length of the spring. (2)

3.4 Migration of birds can be explained in terms of the magnetic field of the earth. (2)

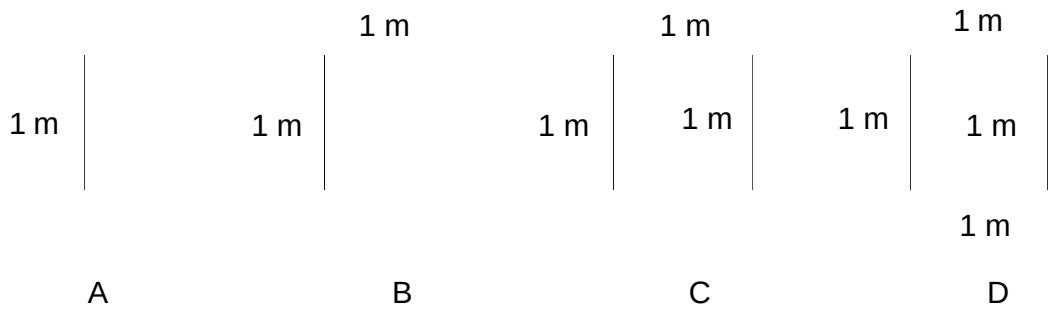
3.5 Electric current strength is defined as the quantity of charge that passes a given point in a conductor per minute. (2)

[10]

QUESTION 4: MULTIPLE-CHOICE QUESTIONS

Four possible options are provided as answers to the following questions. Each question has only ONE correct answer. Choose the answer, which in your opinion, is the correct or best one and mark the appropriate block on the answer sheet with a cross (X).

4.1 Which ONE of the following displacement-vector diagrams will produce the greatest resultant?



(3)

4.2 Two metal objects, having different masses, are dropped from the same height above the ground. Ignore the effects of air resistance. When they are 0,8 m above the ground, they will both have the same ...

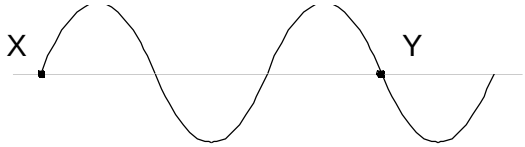
A acceleration.

B weight.

C kinetic energy.

D gravitational potential energy. (3)

4.3 The diagram below shows two points X and Y on a wave train.



How many wavelengths separate point X and point Y?

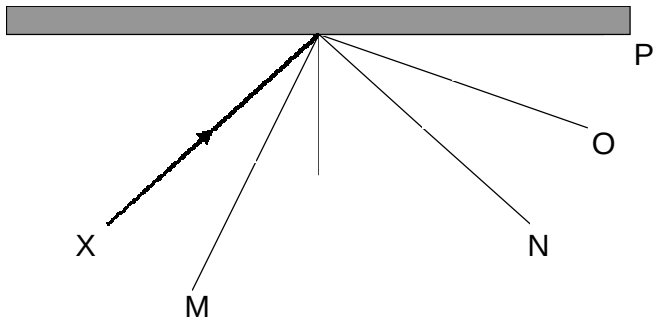
A $\frac{3}{4}$

B 1

C $1\frac{1}{2}$

D 3 (3)

4.4 The diagram shows the path of a light ray, X, directed at a plane mirror.



The correct reflected ray is ...

A M

B N

C O

D P (3)

4.5 Consider the following statements concerning magnetic fields:

(i) The direction of magnetic field lines is from north to south.
(ii) The strength of the magnetic field is indicated by the closeness of the field lines.
(iii) The magnetic field of a bar magnet is weaker near its poles.

Which of the above statements are CORRECT?

A (i), (ii) and (iii)

B (i) and (ii)

C (i) and (iii)

D (ii) and (iii) (3)

[15]

TOTAL SECTION A: 35

SECTION B

INSTRUCTIONS

1. Answer this section in the ANSWER BOOK.

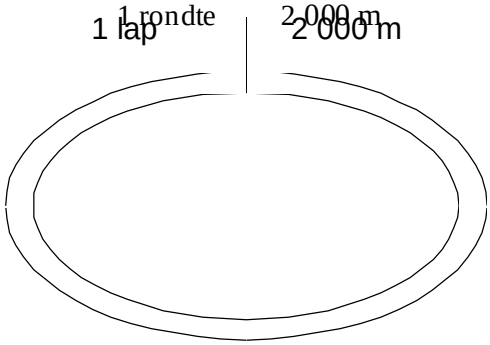
2. In ALL calculations, formulae and substitution must be shown.

3. Round off your answers to TWO decimal places.

QUESTION 5

Car racing is very popular in South Africa. Many young people want to test the speed of their cars and meet regularly at racetracks.

An oval racetrack has a lap distance of 2 000 m. A car has to complete five laps.



5.1 What distance will the car have covered at the end of five laps? (2)

5.2 What will the displacement of the car be from the starting point after completing five laps? (2)

In one of the races a car has a running start. The timekeeper starts the stopwatch as the car passes the starting point. The results are shown in the table below.

Number of laps	Time (s)
1	55
2	110
3	165
4	275
5	385

5.3 On the graph paper attached to your answer sheet, draw a graph of the number of laps (on the dependent, y-axis) versus time (on the independent, x-axis) for the car's run. Plot the points and connect them with straight lines. Also supply a suitable heading. (7)

5.4 Use your graph to determine how long the car took to complete 2,2 laps. Indicate on your graph how you obtained this value. (3)

5.5 Calculate the car's average speed (in $m \cdot s^{-1}$) for the five laps. (4)

5.6 How does the motion of the car during the first three laps compare with its motion during the last two laps? (2)

5.7 There is a public outcry about car-racing on community roads. List FOUR concerns that the public has. (4)
[24]

QUESTION 6

A player kicks a ball vertically upwards into the air. The mass of the ball is 0,44 kg. The ball reaches a maximum height of 20 m.

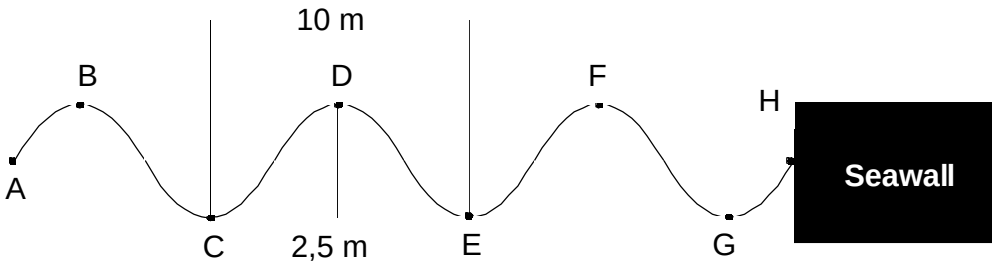
6.1 Calculate the force that the earth exerts on the ball. (4)

6.2 Calculate the gravitational potential energy gained by the ball at its highest point. (4)

6.3 The player catches the ball at the same height from which it was kicked. Calculate the speed of the ball just before it it is caught. (4)
[12]

QUESTION 7

Water waves crash against a seawall around the harbour. Six waves hit the seawall in 4 s. The distance between successive troughs is 10 m. The height of the wave from trough to crest is 2,5 m.



7.1 What type of waves are water waves? (2)

7.2 Write down the letters that indicate any TWO points that are:

7.2.1 In phase (2)
7.2.2 Out of phase (2)
7.2.3 Represent ONE wavelength (2)

7.3 Calculate the amplitude of the wave. (2)

7.4 Show that the period of the wave is 0,67 s. (2)

7.5 Calculate the frequency of the waves. (3)

7.6 Calculate the velocity of the waves. (3)
[18]

QUESTION 8

In a rope, a pulse of amplitude +15 mm is travelling to the right and a pulse of amplitude –10 mm is travelling to the left.

8.1 Make a labelled sketch to represent these two pulses. (2)

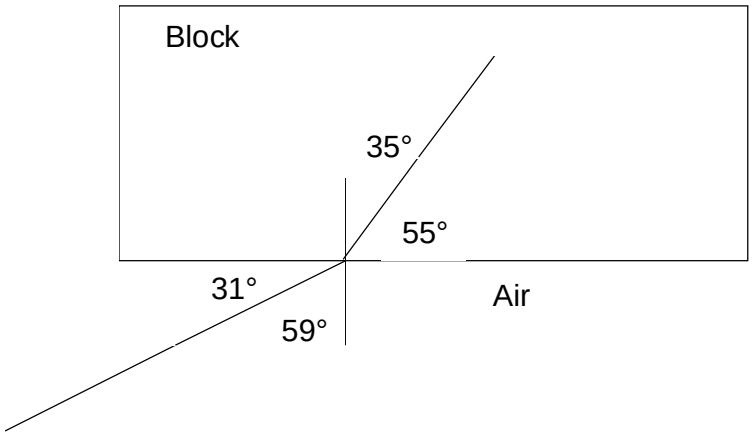
8.2 What type of interference will take place when these two pulses meet? (2)

8.3 Make a labelled sketch to represent the resulting pulse:

8.3.1 When they cross each other (2)
8.3.2 After they have crossed each other (2)
[8]

QUESTION 9

Light travels from air into a transparent rectangular block as shown below.



9.1 Write down the value of the angle of incidence. (1)

9.2 Write down the value of the angle of refraction. (1)

9.3 Calculate the refractive index of the block. (4)

9.4 Redraw and complete the above diagram (NOT to scale) to show the ray leaving the block at the second surface. Label the rays of light at the second surface. Include the angles and the normal at this surface. (4)

9.5 A light ray enters another block having a higher refractive index than the one above. How does the angle of refraction in this block compare with the one above. Answer only LARGER, SMALLER or REMAINS THE SAME. (2)

[12]

QUESTION 10

One of the suggested development targets in South Africa is that all communities in the country should gain access to electricity.

10.1 Suggest TWO ways in which provision of electricity would help the social and/or economic development of a community. (4)

10.2 In South Africa, most electricity is generated in coal-fired power stations. Give TWO reasons why coal is not the preferred source to generate electricity. (4)

10.3 State ONE sustainable source of electricity in South Africa. Briefly explain how it can be used. (4)

100 units of energy are used in an electric bulb per hour. Of this 98 units are lost in the form of heat while only 2 units are converted to light.

10.4 Calculate the efficiency of these bulbs. (3)

10.5 In an attempt to save electricity some municipalities decided to replace all household tungsten filament bulbs (incandescent bulbs) with compact fluorescent bulbs (energy-saving bulbs). These bulbs are 20% efficient. If the energy-saving bulbs are used instead of the old bulbs, determine the percentage of electricity saved. (2)
[17]

QUESTION 11

Nazli and Leila perform an experiment to determine the nature of the charge on a metallic sphere. They proceed as follows:

(i) They attach an inflated (blown up) balloon to one end of a wooden stick
(ii) They charge the balloon negatively by rubbing it with a woollen cloth
(iii) They obtain a metallic sphere mounted on an insulated stand. The sphere is earthed. (FIGURE A)

11.1 Why must the sphere in FIGURE A be earthed?

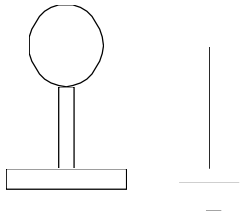


Fig. (a)
FIGURE A

(2)

11.2 In FIGURE B the earth is removed. The negatively charged balloon is then brought close to the sphere. How will the charge be distributed on the sphere?

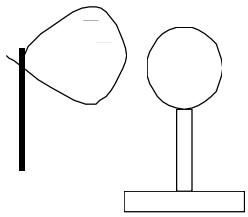


FIGURE B
Fig (b)

(2)

11.3 In FIGURE C the connection to the far end of the sphere is earthed. Do the negative charges move from the sphere to earth or from earth to the sphere?

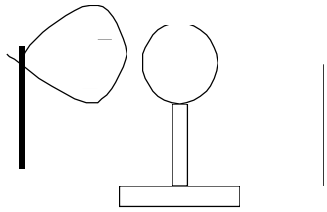


FIGURE C

(2)

11.4 In FIGURE D the connection on earth is once again removed.

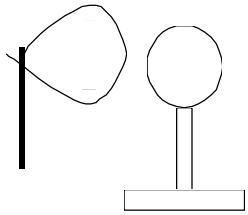


FIGURE D

(2)

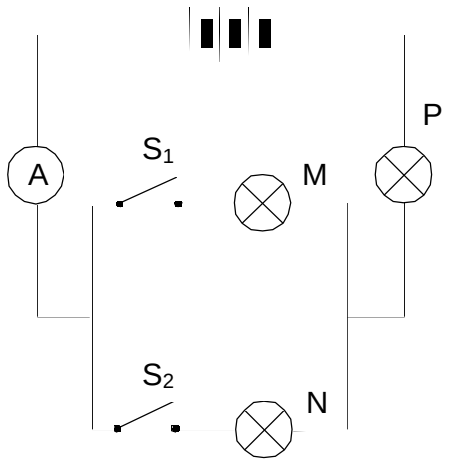
11.4.1 What will be the nature of the charge of the sphere now? (2)

11.4.2 State whether the balloon is attracted or repelled by the sphere. (2)

[10]

QUESTION 12

In the circuit diagram below, three identical bulbs are connected as shown. The ammeter, connecting wires and battery have negligible resistance. Study the diagram and then answer the questions that follow.



12.1 *Switches S_1 and S_2 are open*. Which bulbs, if any, will light up? (2)

12.2 *Switch S_1 is closed and S_2 is open*. Compare the brightness of bulbs M, N and P. (3)

12.3 *Switches S_1 and S_2 are closed*. Compare the potential differences across bulbs M, N and P. (3)

For QUESTIONS 12.4 and 12.5 choose the answer from those in the brackets.

12.4 Adding bulbs in parallel causes the:

12.4.1 Resistance of the circuit to (increase/decrease/remain the same) (2)

12.4.2 Potential difference across the battery to (increase/decrease/ remain the same) (2)

12.5 Parallel circuits can be regarded as (current/potential) dividers. (2)
[14]

TOTAL SECTION B: 115

GRAND TOTAL: 150

NATIONAL SENIOR CERTIFICATE EXAMINATION
NASIONALE SENIOR SERTIFIKAAT-EKSAMEN

DATA FOR PHYSICAL SCIENCES GRADE 10
PAPER 1 (PHYSICS)

GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 10
VRAESTEL 1 (FISIKA)

TABLE 1: PHYSICAL CONSTANTS / *TABEL 1: FISIESE KONSTANTES*

NAME / *NAAM*	SYMBOL / *SIMBOOL*	VALUE / *WAARDE*
Accelaration due to gravity *Swaartekragversnelling*	*g*	9,8 $m \cdot s^{-2}$
Speed of light in a vacuum *Spoed van lig in a vacuum*	c	3,0 x 10^8 $m \cdot s^{-1}$

TABLE 2: FORMULAE / *TABEL 2: FORMULES*

MOTION / *BEWEGING*

$v_f = v_i + a\Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$
$v_f{}^2 = v_i{}^2 + 2a\Delta x$	$\Delta x = \left(\frac{v_f + v_i}{2} \right) \Delta t$

WEIGHT AND MECHANICAL ENERGY / *GEWIG EN MEGANIESE ENERGIE*

$F_g = mg$	$U = E_p = mgh$
$K = E_k = \frac{1}{2} mv^2$	

WAVES, LIGHT AND SOUND / *GOLWE, LIG EN KLANK*

$v = f\lambda$ or $v = \nu\lambda$	$T = \frac{1}{f}$ or $T = \frac{1}{\nu}$
$n_i \sin\theta_i = n_r \sin\theta_r$	$n = \frac{c}{v}$

ELECTRICITY AND MAGNETISM / *ELEKTRISITEIT EN MAGNETISME*

$I = \frac{Q}{\Delta t}$	$V = \frac{W}{Q}$

PHYSICAL SCIENCES GRADE 10 ANSWER SHEET
FISIESE WETENSKAPPE GRAAD 10 ANTWOORDBLAD

QUESTION 1 / *VRAAG 1*

1.1 _____ (1)

1.2 _____ (1)

1.3 _____ (1)

1.4 _____ (1)

1.5 _____ (1)

[5]

QUESTION 2 / *VRAAG 2*

2.1 _____ (1)

2.2 _____ (1)

2.3 _____ (1)

2.4 _____ (1)

2.5 _____ (1)

[5]

QUESTION 3 / *VRAAG 3*

3.1 _____ (2)

3.2 _____ (2)

3.3 _____ (2)

3.4 _____ (2)

3.5 _____ (2)

[10]

QUESTION 4 / *VRAAG 4*

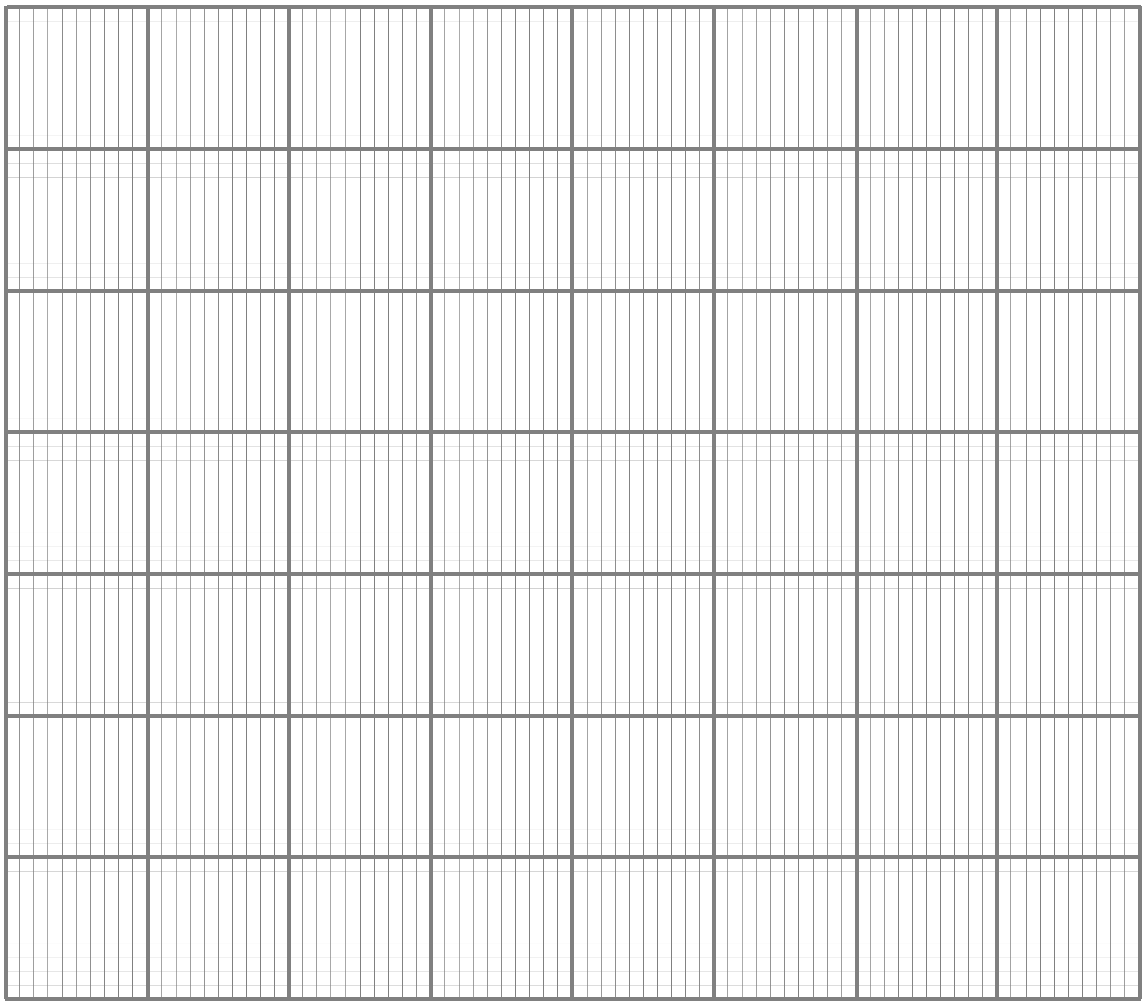
4.1	A	B	C	D
4.2	A	B	C	D
4.3	A	B	C	D
4.4	A	B	C	D
4.5	A	B	C	D

(5 x 3) [15]

TOTAL SECTION A / *TOTAL SECTION A: 35*

EXAMINATION NUMBER:

QUESTION 5.3



education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NASIONALE SENIOR SERTIFIKAAT

GRAAD 10

FISIESE WETENSKAPPE: FISIKA (V1)

MODELVRAESTEL

PUNTE: 150

TYD: 3 uur

Hierdie vraestel bestaan uit 14 bladsye, 'n inligtingsblad, 'n antwoordblad en grafiekpapier.

156 1 A

INSTRUKSIES EN INLIGTING

1. Skryf jou eksamennommer (en sentrumnommer indien van toepassing) in die toepaslike spasies op jou antwoordeboek neer.

2. Beantwoord AL die vrae.

3. Beantwoord AFDELING A op die ANTWOORDBLAD voorsien. Beantwoord AFDELING B in die ANTWOORDEBOEK.

4. Nie-programmeerbare sakrekenaars mag gebruik word.

5. Toepaslike wiskundige instrumente mag gebruik word.

6. Nommer die antwoorde korrek volgens die nommeringstelsel wat in hierdie vraestel gebruik is.

7. 'n Inligtingsblad is vir jou gebruik aangeheg.

8. Wees kortliks in vrae waar 'n motivering, bespreking, ensovoorts, verlang word.

AFDELING A

Beantwoord hierdie afdeling op die aangehegte ANTWOORDBLAD.

VRAAG 1: EENWOORD-ANTWOORDE

Skryf slegs die woord/term vir elk van die volgende beskrywings langs die vraagnommer neer. By sommige vrae moet jy tussen die terme tussen hakies kies.

1.1 Verplasing per eenheid tyd (1)

1.2 Ware diepte en waarskynlike diepte kan in terme van hierdie verskynsel verklaar word (1)

1.3 As lig vanaf 'n meer digte optiese medium na 'n minder digte optiese medium beweeg, sal dit (na/weg van) die normaal buig. (1)

1.4 As die afstand tussen twee nabygeleë geplaasde gelaaide voorwerpe toeneem, sal die krag tussen hulle (toeneem/afneem/dieselfde bly). (1)

1.5 'n Voltmeter is gewoonlik in (serie/parallel) in 'n elektriese stroombaan geskakel. (1)
[5]

VRAAG 2: PASITEMS

Pas die inligting in KOLOM A by die inligting in KOLOM B deur slegs die letter (A - I) langs die vraagnommer (2.1 - 2.5) neer te skryf.

KOLOM A		KOLOM B	
2.1	Verplasing	A	som van die gravitasie-potensiële energie en kinetiese energie
2.2	Behoud van energie	B	twee pulse ontmoet mekaar in fase
2.3	Konstruktiewe interferensie	C	verandering in posisie vanaf beginpunt tot eindpunt in 'n reguitlyn
2.4	Spieëlweerskaatsing	D	laat elektrone geredelik deur
2.5	Geleiers	E	totale padlengte afgelê
		F	twee pulse ontmoet mekaar uit fase
		G	energie kan nie geskep of vernietig word nie, dit word slegs van een vorm na 'n ander omgesit
		H	veroorsaak 'n skerp beeld
		I	laat nie elektrone geredelik deur nie

[5]

VRAAG 3: WAAR OF ONWAAR

Dui aan of die volgende stellings WAAR of ONWAAR is. Skryf slegs 'waar' of 'onwaar' langs die vraagnommer (3.1 - 3.5) neer. Indien die stelling ONWAAR is, skryf die korrekte stelling neer.

3.1 Soos 'n bal teen 'n helling afrol, neem die bal se agtereenvolgende verplasings in gelyke tydintervalle toe. (2)

3.2 Die versnelling van 'n voorwerp wat langs 'n reguitlyn beweeg, kan deur die oppervlakte onder 'n snelheid-tydgrafiek bepaal word. (2)

3.3 Die spoed van 'n puls in 'n veer hang van die pulslengte, die spanning in die veer en die massa van die veer gedeel deur die lengte van die veer af. (2)

3.4 Migrasie van voëls kan in terme van die magneetveld van die aarde verduidelik word. (2)

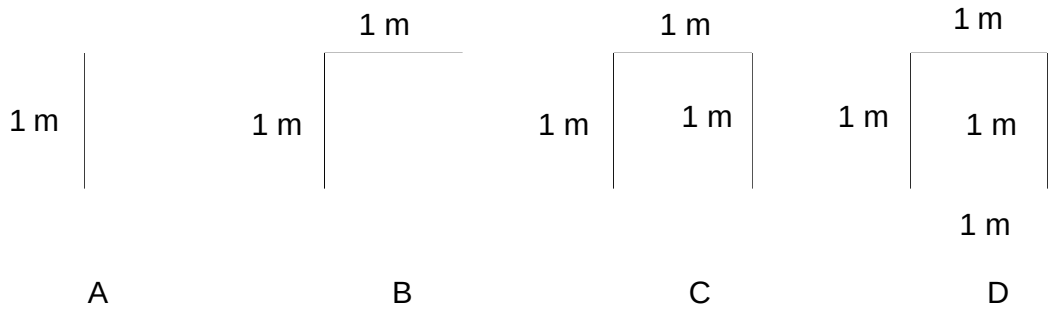
3.5 Elektriese stroomsterkte word gedefinieer as die hoeveelheid lading wat per minuut verby 'n gegewe punt in 'n geleier beweeg. (2)

[10]

VRAAG 4: MEERVOUDIGEKEUSE-VRAE

Vier moontlike opsies, word as antwoorde vir die volgende vrae verskaf. Elke vraag het slegs EEN korrekte antwoord. Kies die antwoord wat na jou mening die korrekte of beste antwoord is en merk die toepaslike blokkie op die antwoordblad met 'n kruisie (X).

4.1 Watter EEN van die volgende verplasingsvektordiagramme sal die grootste resultant lewer?



(3)

4.2 Twee metaalvoorwerpe, met verskillende massas, word vanaf dieselfde hoogte bokant die grond laat val. Ignoreer die effek van lugwrywing. Wanneer hulle 0,8 m bokant die grond is, sal hulle ... dieselfde wees.

A versnelling

B gewig

C kinetiese energie

D gravitasie-potensiële energie (3)

4.3 Die diagram hieronder toon twee punte, X en Y, op 'n golfreeks.

Hoeveel golflengtes skei punt X en punt Y?

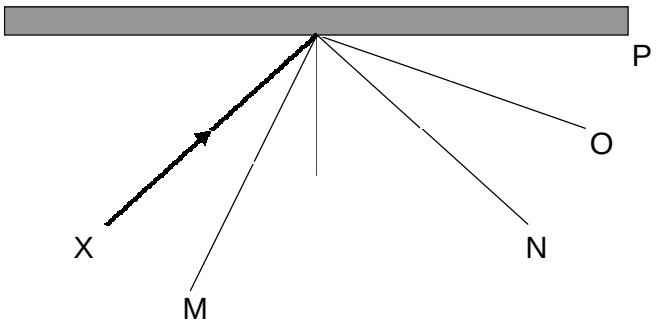
A $\frac{3}{4}$

B 1

C $1\frac{1}{2}$

D 3 (3)

4.4 Die diagram toon die pad van 'n ligstraal, X, wat op 'n vlakspieël gerig is.



Die korrekte weerkaatste straal is ...

A M

B N

C O

D P (3)

4.5 Beskou die volgende stellings oor magneetvelde:

(i) Die rigting van die magneetveldlyne is van noord na suid.
(ii) Die sterkte van die magneetveld word aangedui deur die nabyheid van die veldlyne.
(iii) Die magneetveld van 'n staafmagneet is swakker naby sy pole.

Watter van die bogenoemde stellings is KORREK?

A (i), (ii) en (iii)

B (i) en (ii)

C (i) en (iii)

D (ii) en (iii) (3)

[15]

TOTAAL AFDELING A: 35

AFDELING B

INSTRUKSIES

1. Beantwoord hierdie afdeling in die ANTWOORDEBOEK.

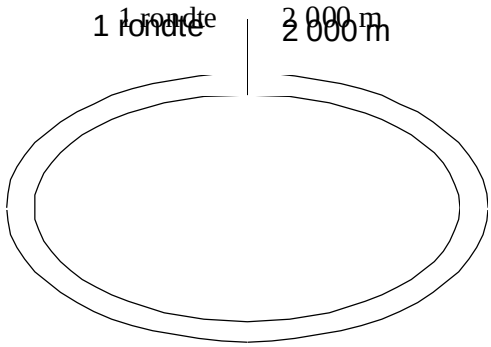
2. In ALLE berekeninge moet die formules en vervangings getoon word.

3. Rond jou antwoorde tot TWEE desimale plekke af.

VRAAG 5

Motorwedrenne is baie gewild in Suid-Afrika. Baie jong mense wil die spoed van hul motors toets en ontmoet gereeld by renbane.

'n Ovaal renbaan het 'n rondteafstand van 2 000 m. 'n Motor moet vyf rondtes voltooi.



5.1 Watter afstand sal die motor na voltooiing van vyf rondtes aflê het? (2)

5.2 Wat sal die verplasing van die motor vanaf die beginpunt na vyf voltooide rondtes wees? (2)

In een van die wedrenne het 'n motor 'n aanloop. Die tydhouer begin sy stophorlosie die oomblik as die motor die beginpunt verbysteek. Die resultate word in die tabel hieronder aangetoon.

Aantal rondtes	Tyd (s)
1	55
2	110
3	165
4	275
5	385

5.3 Teken 'n grafiek van die aantal rondtes (op die afhanklike, y-as) teenoor tyd (op die onafhanklike, x-as) van die motor se lopie op die grafiekpapier aan jou antwoordblad geheg. Stip die punte en verbind hulle met reguitlyne. Verskaf ook 'n toepaslike opskrif. (7)

5.4 Gebruik jou grafiek om die tyd te bepaal wat die motor neem om 2,2 rondtes te voltooi. Dui op jou grafiek aan hoe jy hierdie waarde verkry het. (3)

5.5 Bereken die motor se gemiddelde spoed (in $m \cdot s^{-1}$) vir die vyf rondtes. (4)

5.6 Hoe vergelyk die beweging van die motor tydens die eerste drie rondtes met sy beweging tydens die laaste twee rondtes? (2)

5.7 Daar heers kommer onder die publiek oor motorwedrenne op gemeenskapspaaie. Noem VIER bekommernisse wat die publiek het. (4)
[24]

VRAAG 6

'n Speler skop 'n bal vertikaal opwaarts in die lug. Die massa van die bal is 0,44 kg. Die bal bereik 'n maksimum hoogte van 20 m.

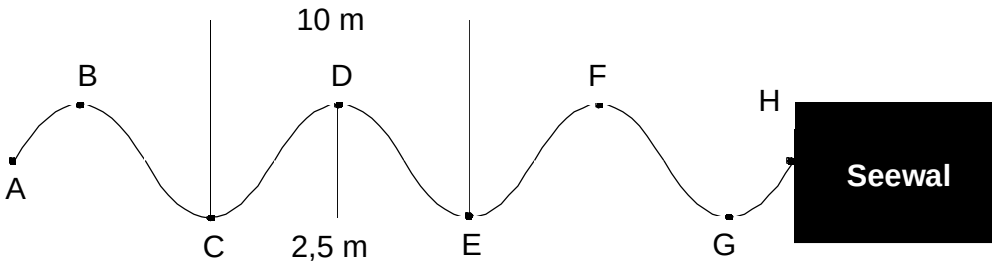
6.1 Bereken die krag wat die aarde op die bal uitoefen. (4)

6.2 Bereken die toename in gravitasie-potensiële energie van die bal by sy hoogste punt. (4)

6.3 Die speler vang die bal by dieselfde hoegte waarvandaan dit geskop is. Bereken die spoed van die bal net voordat dit gevang word. (4)
[12]

VRAAG 7

Watergolwe spoel teen die seewal om die hawe. Ses golwe tref die seewal in 4 s. Die afstand tussen opeenvolgende buike is 10 m. Die hoogte van die golf vanaf buik tot kruin is 2,5 m.



7.1 Watter soort golwe is water golwe? (2)

7.2 Skryf die letters neer wat enige TWEE punte aandui wat:

7.2.1 In fase is (2)
7.2.2 Uit fase is (2)
7.2.3 Een golflengte voorstel (2)

7.3 Bereken die amplitude van die golf. (2)

7.4 Bewys dat die periode van die golf 0,67 s is. (2)

7.5 Bereken die frekwensie van die golwe. (3)

7.6 Bereken die snelheid van die golwe. (3)
[18]

VRAAG 8

In 'n tou, beweeg 'n puls met amplitude +15 mm na regs en 'n puls met amplitude –10 mm beweeg na links.

8.1 Maak 'n skets met byskrifte wat hierdie twee pulse voorstel. (2)

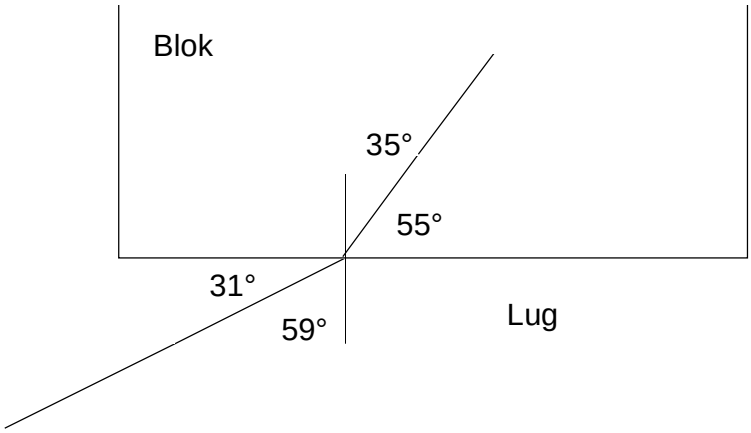
8.2 Watter tipe interferensie vind plaas wanneer die twee pulse mekaar ontmoet? (2)

8.3 Maak 'n skets met byskrifte wat die resulterende puls voorstel:

8.3.1 Wanneer hulle mekaar kruis (2)
8.3.2 Nadat hulle mekaar gekruis het (2)
[8]

VRAAG 9

Lig beweeg vanaf lug in 'n deurskynende reghoekige blok soos hieronder aangedui.



9.1 Skryf die waarde van die invalshoek neer. (1)

9.2 Skryf die waarde van die brekingshoek neer. (1)

9.3 Bereken die brekingshoek van die blok. (4)

9.4 Teken die bostaande diagram oor en voltooi die diagram (NIE volgens skaal nie) om die straal wat die blok by die tweede oppervlak verlaat, aan te toon. Benoem die ligstraal by die tweede oppervlak. Sluit die hoeke en die normaal by hier-die oppervlak in. (4)

9.5 'n Ligstraal gaan 'n blok met hoër brekingsindeks as die een hierbo binne. Hoe vergelyk die brekingsindeks van hierdie blok met die bogenoemde een. Antwoord slegs GROTER, KLEINER of DIESELFDE BLY. (2)
[12]

VRAAG 10

Een van die voorgestelde ontwikkelingsteikens in Suid-Afrika is dat alle gemeenskappe in die land toegang tot elektrisiteit moet kry.

10.1 Stel TWEE maniere voor waarop die voorsiening van elektrisiteit die sosiale en/of ekonomiese ontwikkeling van 'n gemeenskap sal bevorder. (4)

10.2 In Suid-Afrika word die meeste elektrisiteit deur steenkoolkragstasies opgewek. Noem TWEE redes waarom steenkool nie die voorkeurkeuse is om elektrisiteit op te wek nie. (4)

10.3 Noem EEN volhoubare bron van elektrisiteit in Suid-Afrika. Verduidelik kortliks hoe dit benut kan word. (4)

100 energie-eenhede word in 'n elektriese gloeilamp per uur verbruik. Hiervan word 98 eenhede in hitte omgesit terwyl slegs 2 eenhede in lig omgesit word.

10.4 Bereken die doeltreffendheid van hierdie gloeilampe. (3)

10.5 In 'n poging om elektrisiteit te bespaar het sommige munisipaliteite besluit om alle huishoudelike wolframgloeilampe (witgloeiend) met kompakte fluoresseerlampe (energiebesparingslampe) te vervang. Hierdie fluoresseerlampe is 20% doeltreffend. As die energiebesparingslampe in plaas van die ou lampe gebruik word, bepaal die persentasie elektrisiteit bespaar. (2)
[17]

VRAAG 11

Nazli en Leila voer 'n eksperiment uit om die aard van die lading op 'n metaalsfeer te bepaal. Hulle gaan soos volg te werk:

(i) Hulle heg 'n opgeblaasde ballon aan die een ent van 'n houtstok.
(ii) Hulle laai die ballon negatief deur dit met 'n wollap te vryf.
(iii) Hulle het 'n metaalsfeer op 'n geïsoleerde staander verkry. Die sfeer is geaard. (FIGUUR A)

11.1 Hoekom moet die sfeer in FIGUUR A geaard wees?

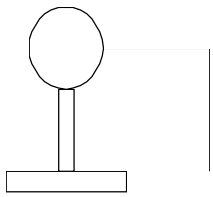


Fig. (a)
FIGUUR A

(2)

11.2 In FIGUUR B is die aard verwyder. Die negatief gelaaide ballon word dan naby die sfeer gebring. Hoe sal die lading op die sfeer versprei wees?

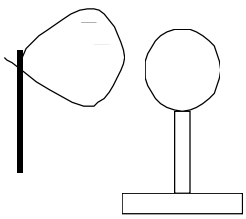
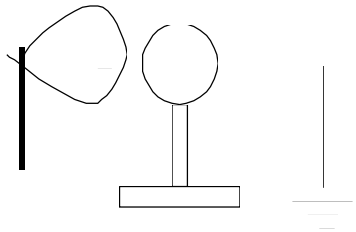


Fig. (b)
FIGUUR B

(2)

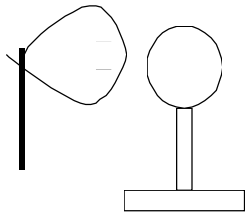
11.3 In FIGUUR C word die verbinding aan die ander kant van die sfeer geaard. Beweeg die negatiewe ladings vanaf die sfeer na die aarde of vanaf die aarde na die sfeer?



FIGUUR C
Fig (d)

(2)

11.4 In FIGUUR D word die verbinding van die aarde weereens verwyder.



FIGUUR D

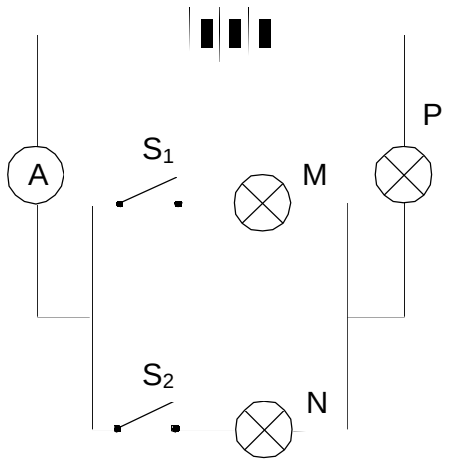
(2)

11.4.1 Wat sal die aard van die lading op die sfeer nou wees? (2)

11.4.2 Noem of die ballon deur die sfeer aangetrek of afgestoot is. (2)
[10]

VRAAG 12

In die stroombaan hieronder is drie identiese gloeilampe gekoppel soos aangetoon. Die ammeter, verbindingsdrade en battery het weglaatbare weerstand. Bestudeer die diagram en beantwoord dan die vrae wat volg.



12.1 *Skakelaars S_1 en S_2 is oop*. Watter gloeilampe, indien enige, sal gloei? (2)

12.2 *Skakelaar S_1 word gesluit en S_2 is oop*. Vergelyk die helderheid van gloeilampe M, N en P. (3)

12.3 *Skakelaars S_1 en S_2 word gesluit*. Vergelyk die potensiaalverskil oor gloeilampe M, N en P. (3)

Vir VRAAG 12.4 en VRAAG 12.5 kies die antwoord uit die woorde tussen hakies.

12.4 As meer gloeilampe in parallel geskakel word, veroorsaak dit:

12.4.1 Dat die weerstand in die stroombaan (toeneem/afneem/dieselfde bly) (2)

12.4.2 Dat die potensiaalverskil oor die battery (toeneem/afneem/dieselfde bly) (2)

12.5 Parallele stroombane kan as (stroom/potensiaal)-verdelers beskou word. (2)

[14]

TOTAAL AFDELING B: 115

GROOTTOTAAL: 150

NASIONALE SENIOR SERTIFIKAAT-EKSAMEN
NATIONAL SENIOR CERTIFICATE EXAMINATION

GEGEWENS VIR FISIESE WETENSKAPPE GRAAD 10
VRAESTEL 1 (FISIKA)

DATA FOR PHYSICAL SCIENCES GRADE 10
PAPER 1 (PHYSICS)

TABEL 1: FISIESE KONSTANTES / *TABLE 1: PHYSICAL CONSTANTS*

NAAM / *NAME*	SIMBOOL / *SYMBOL*	WAARDE / *VALUE*
Swaartekragversnelling *Acceleration due to gravity*	*g*	$9{,}8\ m{\cdot}s^{-2}$
Spoed van lig in 'n vakuum *Speed of light in a vacuum*	c	$3{,}0 \times 10^{8}\ m{\cdot}s^{-1}$

TABEL 2: FORMULES / *TABLE 2: FORMULAE*

BEWEGING / *MOTION*

$v_f = v_i + a\,\Delta t$	$\Delta x = v_i \Delta t + \frac{1}{2} a \Delta t^2$
$v_f{}^2 = v_i{}^2 + 2a\Delta x$	$\Delta x = \left(\frac{v_f + v_i}{2} \right) \Delta t$

GEWIG EN MEGANIESE ENERGIE / *WEIGHT AND MECHANICAL ENERGY*

$F_g = mg$	$U = E_p = mgh$
$K = E_k = \frac{1}{2} mv^2$	

GOLWE, LIG EN KLANK / *WAVES, LIGHT AND SOUND*

$v = f\lambda$ or $v = \nu\lambda$	$T = \frac{1}{f}$ or $T = \frac{1}{\nu}$
$n_i \sin\theta_i = n_r \sin\theta_r$	$n = \frac{c}{v}$

ELEKTRISITEIT EN MAGNETISME / *ELECTRICITY AND MAGNETISM*

$I = \frac{Q}{\Delta t}$	$V = \frac{W}{Q}$

FISIESE WETENSKAPPE GRAAD 10 ANTWOORDBLAD
PHYSICAL SCIENCES GRADE 10 ANSWER SHEET

VRAAG 1 / *QUESTION 1*

1.1 _____ (1)

1.2 _____ (1)

1.3 _____ (1)

1.4 _____ (1)

1.5 _____ (1)

[5]

VRAAG 2 / *QUESTION 2*

2.1 _____ (1)

2.2 _____ (1)

2.3 _____ (1)

2.4 _____ (1)

2.5 _____ (1)

[5]

VRAAG 3 / *QUESTION 3*

3.1 _____ (2)

3.2 _____ (2)

3.3 _____ (2)

3.4 _____ (2)

3.5 _____ (2)

[10]

VRAAG 4 / *QUESTION 4*

4.1	A	B	C	D
4.2	A	B	C	D
4.3	A	B	C	D
4.4	A	B	C	D
4.5	A	B	C	D

(5 x 3) [15]

TOTAAL AFDELING A / *TOTAL SECTION A: 35*

ESKAMENNOMMER:

VRAAG 5.3