1.9 B ✓✓ (2)

QUESTION 11/*VRAAG 11*

11.1 The magnitude of the induced emf across the ends of a conductor is directly proportional to the rate of change in the magnetic flux linkage with the conductor. ✓✓
Die grootte van die geïnduseerde emk oor die punte van 'n geleier is direk eweredig aan die tempo van verandering van die magnetiese vloedkoppeling met die geleier.
[2 or/of 0] (2)

11.2 $\varepsilon = \frac{-N\Delta\phi}{\Delta t}$ ✓
$7 = \frac{-400\,\Delta\phi}{0{,}08}$ ✓
$\Delta\Phi$ = - 1,4 x 10^{-3} Wb ✓ (-0,0014) (3)

11.3 **POSITIVE MARKING FROM QUESTION 11.2**
POSITIEWE NASIEN VANAF VRAAG 11.2

$\Delta\Phi = AB(\cos\theta_f - \cos\theta_i)$ ✓
-0,0014 ✓ = $(0{,}03)^2 B(\cos 45^\circ - \cos 0^\circ)$ ✓
B = 5,31 T ✓ (4)

11.4 Increase/*Toeneem* ✓ (1)

11.5 $\varepsilon \propto \frac{1}{\Delta t}$ ✓
OR/*OF*
Emf is inversely proportional to time.
Emk is omgekeerd eweredig aan tyd.
If the time decreases, the emf will increase.
Indien die tyd verminder, sal die emk toeneem. (1)

11.6 North/*Noord* ✓ (1)

11.7 From A to B/*Van A na B* ✓ (1)
[13]

1.9 C ✓✓ (2)

QUESTION/*VRAAG 9*

9.1 The magnitude of the induced *emf* across the ends of a conductor is directly proportional to the rate of change in the magnetic flux linkage with the conductor. ✓✓
Die grootte van die geïnduseerde emk oor die ente van 'n geleier is direk eweredig aan die tempo van verandering van die magnetiese vloedkoppeling met die geleier. ✓✓ (2)

9.2 Accept any correct combination of coordinates from the graph for example:
($^1/_{\Delta t}$; ε) can be (1,8 ; 3) OR (1,2 ; 2) OR (0,6 ; 1)
Aanvaar enige korrekte kombinasie van koördinate vanaf die grafiek byvoorbeeld: ($^1/_{\Delta t}$; ε) kan wees (1,8 ; 3) OF (1,2 ; 2) OF (0,6 ; 1)

OPTION 1/*OPSIE 1*	**OPTION 2/*OPSIE 2***
$\varepsilon = \frac{-N\Delta\Phi}{\Delta t}$ ✓ 3✓ = -(200)✓ΔΦ(1,8) ✓ ΔΦ = -0,0083 Wb ✓	$\varepsilon = \frac{-N\Delta\Phi}{\Delta t}$ ✓ 3 ✓ = -(200)✓ΔΦ($\frac{1}{0,56}$) ✓ ΔΦ = -0,0083 Wb ✓
OPTION 3/*OPSIE 3*	
gradient = εΔt = -NΔΦ ✓ 3✓(0,56) ✓ = -(200)✓ΔΦ ΔΦ = -0,0083 Wb ✓	

(5)

9.3 **POSITIVE MARKING FROM 9.2**
POSITIEWE NASIEN VANAF VRAAG 9.2
ΔΦ = Φ_f - Φ_i✓
-0,0083 ✓ = $\underline{(4,86 \times 10^{-3})(2,4)\cos 90° - (4,86 \times 10^{-3})(2,4)\cos\theta}$ ✓
θ = 44,64° ✓ (4)

[11]

Elektromagnetisme Memo
November 2016

1.10 B √√ (2)

1.8 D ✓✓

[15]

QUESTION/*VRAAG 12*

12.1 12.1.1

$\Phi = BA\cos\theta$ ✓
$= (0,6)\,\pi\, r^2 \cos\theta$
$= \frac{(0,6)(\pi \times 0,06^2)}{}$ ✓$\cos 0°$ ✓
$= (0,6)(0,01)$
$= 6,79 \times 10^{-3}$ Wb ✓ (4)

12.1.2 **POSITIVE MARKING FROM QUESTION 12.1.1**
POSITIEWE NASIEN VAN VRAAG 12.1.1

$\varepsilon = \frac{-N\,\Delta\Phi}{\Delta t}$ ✓

$= \frac{(-1)(0 - 6,79 \times 10^{-3})}{0,04}$ ✓

$= 0,17$ V ✓ (4)

1.2.2 12.2.1 DECREASES/*NEEM AF* ✓ (1)

12.2.2 INCREASES/*NEEM TOE* ✓ (1)
[10]

1.9 C✓✓ (2)

QUESTION 10/*VRAAG109*

10.1 North Pole/*Noordpool* ✓✓ (2)

10.2 North Pole/*Noordpool* ✓ (1)

10.3 There will be no reading (deflection) ✓
Daar sal geen lesing (afwyking) waargeneem word nie
An emf is induced only when the magnetic (flux) links with the coil. This is achieved when either the magnet (producing the field) or coil is moving. ✓
'n Emk word slegs geïnduseer as die magnetiese vloedlyne met die spoel koppel. Dit word bereik wanneer óf die magneet (wat die veld verskaf) óf die spoel beweeg.
ACCEPT/*AANVAAR*
Either the coil or magnet must be moving to induce an emf.
Óf die spoel óf die magneet moet beweeg om 'n emk te induseer. (2)

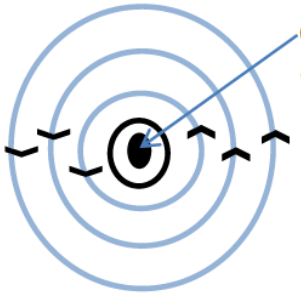
10.4 The magnitude of the induced emf (in a conductor) is equal to the rate of change of magnetic flux linkage. ✓✓
Die grootte van die geïnduseerde emk (in 'n geleier) is gelyk aan die tempo van verandering van magnetiese vloedkoppeling.
OR/*OF*
The emf induced in a conducting loop is equal to the negative of the rate at which the magnetic flux through the loop is changing with time✓✓
Die geïnduseerde emk in 'n geleidende lus is gelyk aan die negatiewe van die tempo waarteen die magnetiese vloedlyne deur die lus verander oor tyd.
ACCEPT/*AANVAAR*:
The emf induced in a conductor is proportional to the rate at which magnetic field lines are cut by a conductor. ✓✓
Die geïnduseerde emk in 'n geleier is eweredig aan die tempo waarteen die magneetveldlyne deur 'n geleier gesny word. (2)

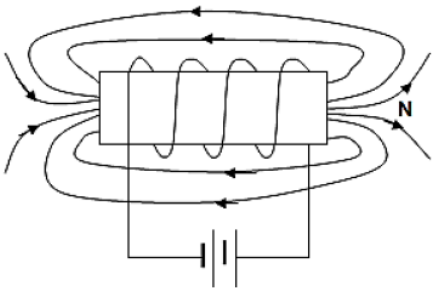
10.5 $\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ ✓
OR
$\varepsilon = -N\frac{(\Phi_{70} - \Phi_{30})}{\Delta t} = -N\frac{(BA\cos 70° - BA\cos 30°)}{\Delta t}$
$= -100\frac{[(4\times10^{-4})(4{,}8\times10^{-4})\cos 70° - (4\times10^{-4})(4{,}8\times10^{-4})\cos 30°)}{0{,}2}$ ✓ ✓
OR/*OF*
$-100\frac{[(4\times10^{-4})(4{,}8\times10^{-4})](\cos 70° - \cos 30°)}{0{,}2}$ ✓ ✓
$\varepsilon = 5{,}03 \times 10^{-5}$ V✓ (5)

10.6 $\varepsilon = IR$✓
$I = \frac{5{,}03\times10^{-5}}{2}$ ✓
$= 2{,}52 \times 10^{-5}$ A ✓ (3)
[15]

Elektromagnetisme Memo
November 2013

QUESTION/VRAAG 10

<table>
<tr><td rowspan="2">10.1</td><td>10.1.1</td><td> 

circular field/sirkelvormige veld √
anticlock wise/antikloksgewys √</td><td>(2)</td></tr>
<tr><td>10.1.2</td><td> 

shape/vorm √
position of north and direction N to S/
posisie van noord en rigting N na S√</td><td>(2)</td></tr>
<tr><td></td><td></td><td></td><td></td></tr>
<tr><td rowspan="3">10.2</td><td>10.2.1</td><td>Φ = BAcos θ √ = 0,72 (0,0176) cos 0° √ = 0,013 Wb √ (0,012672 Wb)</td><td>(3)</td></tr>
<tr><td colspan="3">POSITIVE MARKING FROM Q10.2.1/POSITIEWE NASIEN VANAF VR10.2.1</td></tr>
<tr><td>10.2.2</td><td>$\varepsilon = -N\frac{\Delta\Phi}{\Delta t}$ √ $= -\frac{450\ (0 - 0{,}013)}{0{,}22}$ √ = 26,59 V √</td><td>(3)</td></tr>
</table>

[10]

1.9 D ✓✓ (2)

QUESTION 11/*VRAAG 11*

11.1 The (magnitude of the) emf induced in a conductor is equal to the rate of change of magnetic flux linkage (through it). ✓✓
Die (grootte van die emk) geïnduseer in 'n geleier is gelyk aan die tempo van verandering van magnetiese vloedkoppeling (daar deur). ✓✓ (2)

11.2

11.2.1

$$\text{emf/}emk = -N\frac{\Delta\phi}{\Delta t} \checkmark$$

$$-15{,}2 \checkmark = -(200)\frac{\Delta\phi}{3{,}2\times10^{-2}} \checkmark$$

$\therefore \Delta\phi = 2{,}43 \times 10^{-3}$ Wb ✓ or/*of* $(2{,}43 \times 10^{-3}$ V·s) (4)

11.2.2 $\Delta\phi = (B_f - B_i)A\cos\theta$ ✓

$2{,}432 \times 10^{-2} = (0{,}42 - 0{,}22)A\cos0°$ ✓

$\therefore A = 0{,}012$ m^2

Area of circle/*Oppervlak van sirkel* $= \pi r^2$

$0{,}012 = \pi r^2$ ✓

$\therefore r = 6{,}22 \times 10^{-2}$ m ✓ (4)

11.3 15,2 V ✓ (1)

[11]