Possible Answers March 2006

SECTION A *AFDELING A*

Question 1 *VRAAG 1*

1.1	B	1.2	B	1.3	D	1.4	D	1.5	C
1.6	C	1.7	D	1.8	B	1.9	C	1.10	C
1.11	C	1.12	C	1.13	D	1.14	B	1.15	A

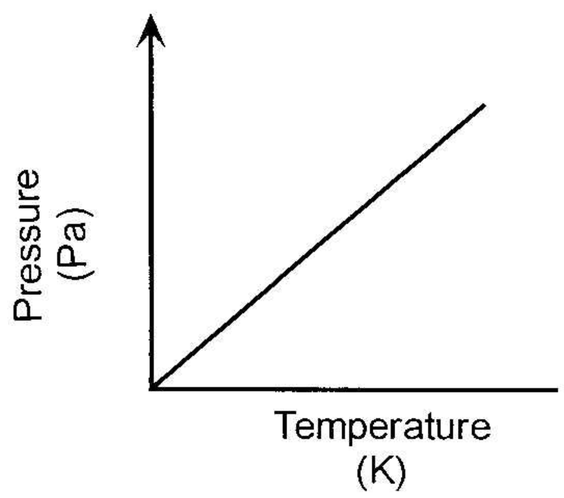
SUBTOTAL: 15 X 4 = [60]

Question 2 / *VRAAG 2*

2.1

2.1.1 Low pressure ✓ and High temperature ✓ (2)

2.1.2



Axes –correctly label ✓ /
Asse korrek benoem ✓
Shape / Vorm ✓✓

(3)

2.1.3 $n = \frac{pV}{RT} = (\frac{V}{R}) \times (\frac{p}{T}) = (\frac{V}{R}) \times \text{gradient}$ x✓✓

(2)

2.2 $pV = nRT$✓

$$\therefore p = \frac{nRT}{V} = \frac{\frac{1}{32} \times 8{,}31 \times (273+80)}{500 \times 10^{-6}} = 183339\,Pa = 183\,kPa = 1{,}83\,kPa$$

✓✓✓ ✓ ✓

(6)

2.3 Increase in temperature provides more kinetic energy ✓ to gas particles. Gas particles move faster ✓and collide more frequently ✓ with the walls of the cylinder. Pressure therefore increases ✓ / (4)
Die toename in temperatuur verskaf meer kinetiese energie ✓aan die gasdeeltjies wat vinniger beweeg ✓en bots meer dikwels ✓met die wande van die silinder. Dus neem die druk toe ✓en die deksel spring af

[17]

Question 3 / *Vraag 3*

3.1 $FeS + 2HC\ell$ ✓ → $H_2S + FeC\ell_2$ ✓ (✓ balancing) (3)

3.2

3.2.1 $Cu \rightarrow Cu^{2+} + 2e^-$ ✓✓ (2)

3.2.2 $SO_4^{2-} + 4H^+ + 2e^- \rightarrow SO_2 + 2H_2O$ ✓✓ (2)

3.2.3 $Cu + SO_4^{2-} + 4H^+ \rightarrow Cu^{2+} + SO_2 + H_2O$ ✓✓ (2)

3.3 Yellow solid/sulphur ✓ and moisture ✓ (2)
Geel vastestof(spikkels)/swawel ✓ en waterdamp ✓

3.4 $SO_2 + 2H_2S$ ✓ → $3S(s) + 2H_2O$ ✓ (✓ balancing) (3)

3.5 More dense than H_2S.✓ / *Meer dig as H_2S* (1)

3.6 The rate of the reaction will be less./ The formation of the products is slower ✓✓ (2)
/ Die vorming van die produkte sal stadige plaasvind/ Reaksietempo kleiner ✓✓

[17]

QUESTION 4 / *VRAAG 4*

4.1

4.1.1 Dilute ✓/ *Verdun* ✓ (1)

4.1.2 $NO_3^- + 4H^+ + 3\,e^- \rightarrow NO + 2H_2O$ ✓✓ (⇌ ½) (2)

4.1.3 Cu^{2+} ✓✓ (2)

4.2

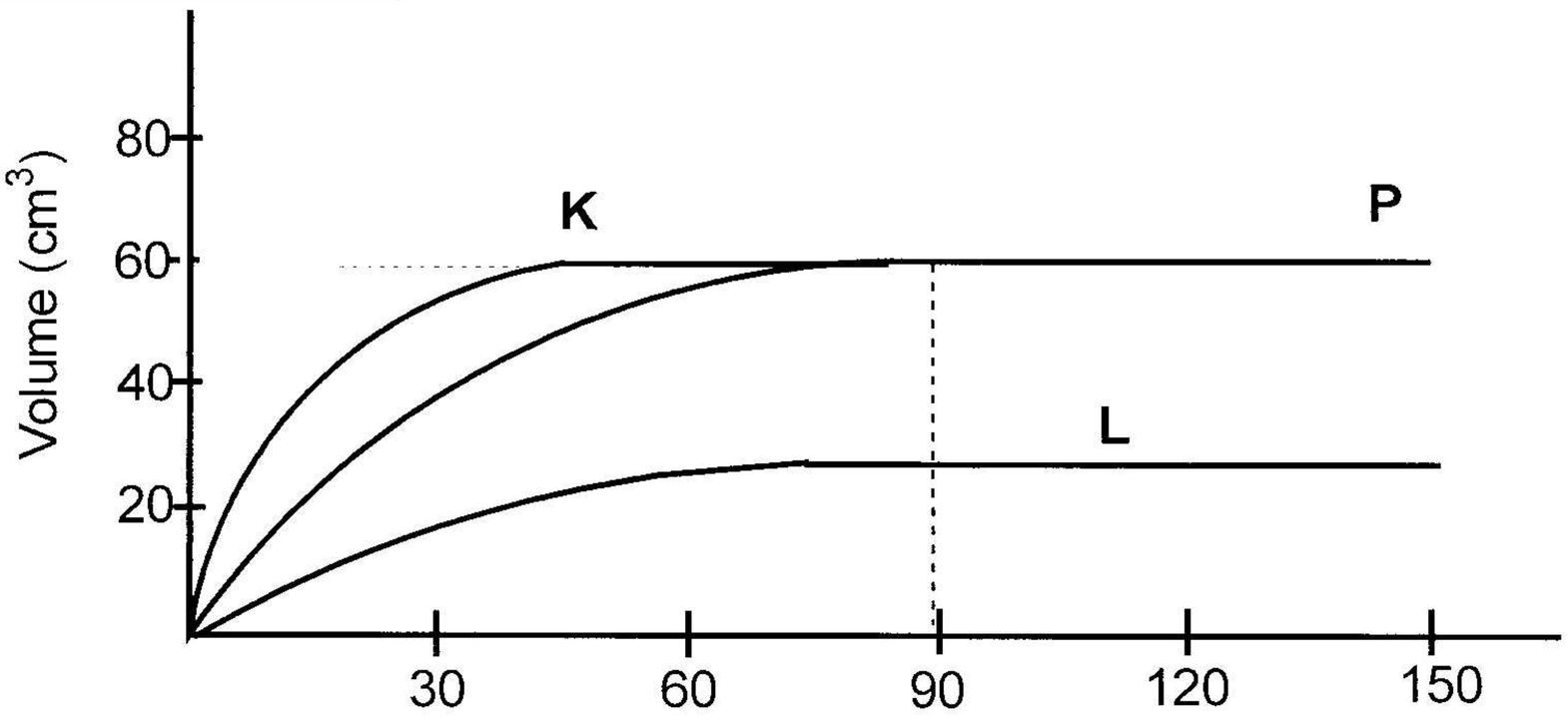
4.2.1 $KBr + AgNO_3$ ✓ → $AgBr + KNO_3$ ✓ (✓ balancing) (3)

4.2.2 Br_2 ✓✓is formed / *word gevorm*. (2)

4.2.3 KCℓ ✓✓ (2)
[12]

QUESTIONS 5 / *VRAAG 5*

5.1



5.1.1 **K** steeper curve✓ same height✓ / *steiler kurwe* ✓ *dieselfde hoogte* ✓ (2)

5.1.2 **L** lower curve ✓ halve the height(30 cm^3)✓/ *laer kurwe* ✓ *die hoogte halfpad (30 cm^3)* ✓✓ (2)

5.2 $Mg + 2HC\ell$ ✓→ $MgC\ell_2 + H_2$ ✓ (✓ balancing) (3)

5.3 Redox ✓ / *Redoks* ✓ (1)
[8]

QUESTION 6 / *VRAAG 6*

6.1

	CO_2	H_2	CO	H_2O
Mol initial */begin*	2,0	1,0	0	0
Mol formed / reacted / *Mol gevorm / reageer*	0,723	0,723	0,723	0,723
Mol at equilibrium / *Mol by ewewig*	1.277 ✓	0,277 ✓	0,723 ✓	0,723
[ ] at equilibrium / [ ]*by ewewig*	0,64	0,14	0,36	0,36 ✓

$$K_c = \frac{[CO][H_2O]}{[CO_2][H_2]} = \frac{0,36^2}{0,64 \times 0,14} = 1,48$$ ✓ (1,45 rounded/afgerond) (8)

6.2 $\Delta H < 0$ ✓ (1)

6.3 Kc decreased, therefore less products were formed, thus the reverse reaction is favoured.✓ When T (temperature) increases, the endothermic reaction is favoured ✓ which is the reverse reaction. Thus the forward reaction is exothermic. ✓ */ Kc verminder, dus minder produkte word gevorm, gevolglik is die terugwaartse reaksie bevoordeel.✓ Indien T (temperatuur) toeneem, word die endotermiese reaksie bevoordeel ✓wat die terugwaartse reaksie is. Dus is die voorwaartse reaksie eksotermies✓* (3)

6.4.1 [CO] decreases ✓✓ /[CO] *neem af* ✓✓ (2)

6.4.2 The $[H_2O]$ is increased. The reaction that will use / decrease the $[H_2O]$ is favoured.✓ Thus the reverse reaction is favoured ✓ and the [CO(g)] will decrease✓*/ Die $[H_2O]$ word verhoog. Die reaksie wat die verhoogde $[H_2O]$ verminder / verbruik word bevoordeel ✓Dus word die terugwaartse reaksie bevoordeel✓en die [CO(g)] sal verminder✓* (3)

6.5.1 YES ✓*/ JA*✓ (1)

6.5.2 The volume is increased. ✓ No change in the number of mole at equilibrium ✓ Thus c = n/V will be smaller.✓ */ Die volume word vergroot*✓ *maar die getal /aantal mol by ewewig bly dieselfde*✓*Dus c = n/V sal verminder*✓ (3)

[21]

QUESTION 7 /*VRAAG 7*

7.1.1 10^{-3} ✓✓ (2)

7.1.2 3 ✓✓ (2)

7.1.3 10^{-4} ✓✓ (2)

7.1.4 10^{-10} ✓✓ (2)

7.2

7.2.1 $CO_3^{2-} + H_2O$ ✓ ⇌ $HCO_3^- + OH^-$ ✓ (✓ balancing) (3)

7.2.2 CO_3^{2-} and /*en* HCO_3^- ✓✓

H_2O and / *en* OH^- ✓✓ (4)

7.2.3 $n(Na_2CO_3) = \frac{m}{M}$ ✓ $= \frac{5,3}{106}$ ✓ $= 0,05$ mol ✓

□ $n(HZ) = 2 \times n(Na_2CO_3) = 0,1$ mol ✓

□ $c(HZ) = \frac{n}{V}$ ✓ $= \frac{2 \times 0,05}{0,2}$ ✓ $= 0,5$ mol.dm^{-3} ✓ (7)

[22]

QUESTION 8 / *VRAAG 8*

8.1

8.1.1 Copper / *Koper.* ✓✓ (2)

8.1.2 $CuSO_4$ + Fe ✓ → Cu + Fe SO_4 ✓ (2)

8.2

8.2.1 $Ag^+ + e^- \rightarrow Ag$ ✓✓ (2)

8.2.2 No / *Nee* (2)

8.2.3 Pt is not a strong enough ✓✓ RA to reduce Ag^+ to Ag ✓✓ (2)
OR
Ag^+ is not a strong enough OA to oxidise Pt to Pt^{2+}
Pt is nie sterk genoeg ✓✓ RM om Ag^+ na Ag te reduseer nie ✓✓
OF
Ag^+ is nie 'n sterk genoeg OM om Pt na Pt^{2+} te oksideer nie.

8.3 $E^\circ_{cell} = E^\circ_{OA} - E^\circ_{RA}$ ✓
1,82 = E°_{OA} -(-0,40) ✓
E°_{OA} = +1,42 V ✓
Au/ Au^{3+} ✓✓ (5)

8.4

8.4.1 $H_2O_2 + 2H^+ + 2e^- \rightarrow 2H_2O$ ✓✓ (2)

8.4.2 $2H_2O_2$ ✓ → $2H_2O + O_2$ ✓ (✓ balancing) (3)

8.4.3 Catalyst ✓✓ / *Katalisator* ✓✓ (2)

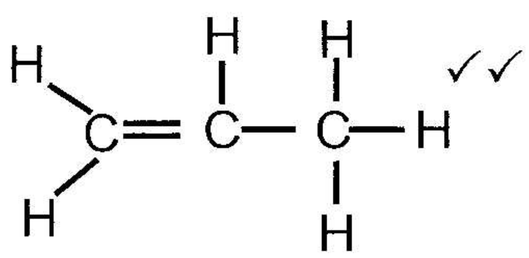
[22]

QUESTION 9 *VRAAG 9*

9.1

9.1.1 Compounds consisting of carbon ✓ and hydrogen only ✓ (2)
Verbindings wat slegs koolstof- ✓ en waterstofatome ✓ bevat

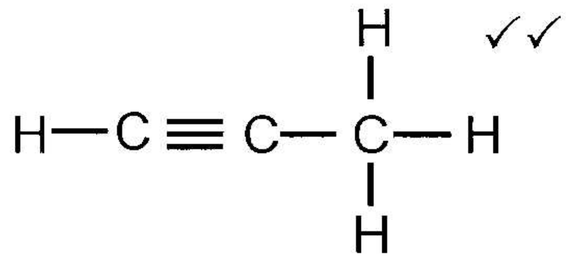
9.1.2



✓✓

propene ✓

OR



✓✓

propyne ✓

(4)

9.2

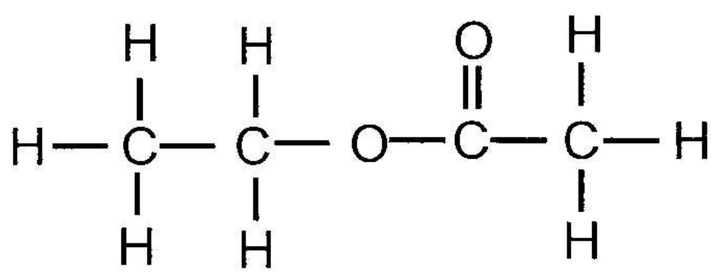
9.2.1 Oxidation ✓✓ / *Oksidasie* ✓✓ (2)

9.2.2 Methanoic acid and / or methanal ✓✓ (2)
Metanoësuur en / of metanaal ✓✓

9.3

9.3.1 esters ✓✓ / *esters* ✓✓ (2)

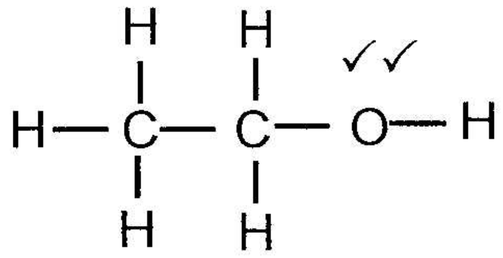
9.3.2



✓✓✓

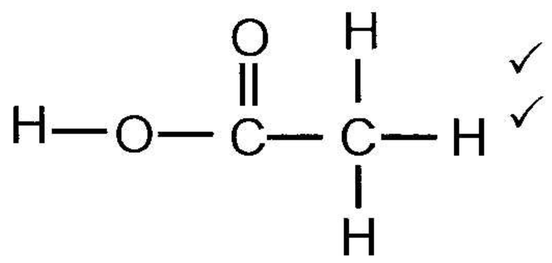
(3)

9.3.3



✓✓

ethanol / *etanol* ✓



✓
✓

ethanoic acid ✓
etanoësuur

(6)

[21]

Total / Totaal [200]

