THE OPEN UNIVERSITY OF SRI LANKA
Foundation Programme in Science/Continuing Education Programme 2008/2009
PSF 1303/PSE 1303 – CHEMISTRY – LEVEL I
TEST ASSIGNMENT I Answer Guide

1). 1	2). 2	3). 1	4). 2	5). 4
6) 2	7) 2	8) 1	9) 2	10) All
11) 3	12) 2	13) 3	14) 4	15) 4

1.(i) (a) $\nu = c/\lambda = 3.0 \times 10^{8}/639 \times 10^{-9} = 4.69 \times 10^{14}\ S^{-1}$

(b) $E = h\nu = 6.6 \times 10^{-34} \times 4.69 \times 10^{14} = 3.095 \times 10^{-19}$ J

(c) E for mole = E x L_c = 3.095 x 10^{-19} x 6.022 x 10^{23} J mol^{-1}

(ii) (a) s = 2 (b) p = 6 (c) d = 10

(iii) (a) z- 19- $1s^2,2s^2,2p^6,3s^23p^6\ 4s^1$ (b) z- 36 - $1s^2,2s^2,2p^6,3s^23p^6\ 4s^2,3d^{10},4p^6$

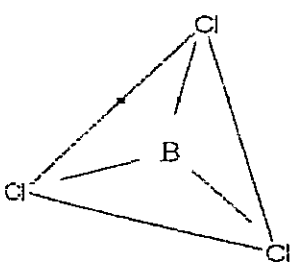
(iv) Not marked

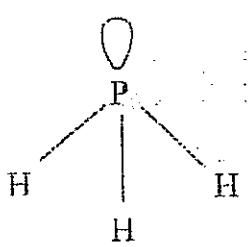
(v)

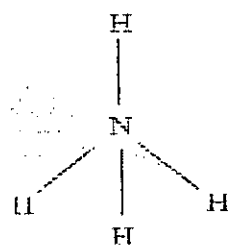
BCl_3
No of electrons from B - 3
3 Cl electrons from - 3
Total No of electrons - 6 /2
No of pairs - 3

PH_3
No of electrons from P - 5
3 Cl electrons from - 3
Total No of electrons - 8 /2
No of pairs - 4

NH_4^+
No of electrons from N - 5
4 H electrons from - 3
Total No of electrons - 8 /2
No of pairs - 4







2. $C_{10}H_8 + 12O_2 \longrightarrow 10CO_2 + 4H_2O$ .....(1) $\Delta H^\theta = -5135$ kJ mol^{-1}

$C + O_2 \longrightarrow CO_2$ .....(2) $\Delta H^\theta = -392.1$ kJ mol^{-1}

$H_2 + 1/2\ O_2 \longrightarrow H_2O$ .....(3) $\Delta H^\theta = -225.5$ kJ mol^{-1}

(2) x 10 + (3) x 4 - (1)

$10\ C + 4\ H_2 \longrightarrow C_{10}H_8$

$\Delta H^\theta = -392.1 \times 10 - 225.5 \times 4 - (-5135) = -482.3$ kJ mol^{-1}

THE OPEN UNIVERSITY OF SRI LANKA
Foundation Programme in Science/Continuing Education Programme 2008/2009
PSF 1303/PSE 1303 – CHEMISTRY – LEVEL I
HOME ASSIGNMENT II Answer Guide

1. a

. (i) $6C_{(s)} + 3H_{2(g)} \longrightarrow C_6H_{6(l)}$ .....(1) ΔH^θ =

$C_6H_{6(l)} + 3O_{2(g)} \longrightarrow 6\,CO_{2(g)} + 3\,H_2O_{(l)}$ .....(1) $\Delta H^\theta = -3267.6$ kJ mol^{-1}

$C + O_2 \longrightarrow CO_{2(g)}$ .....(2) $\Delta H^\theta = -393.5$ kJ mol^{-1}

$H_2 + 1/2\,O_2 \longrightarrow H_2O_{(l)}$ .....(3) $\Delta H^\theta = -285.9$ kJ mol^{-1}

(2) x 6 + (3) x 3 - (1)

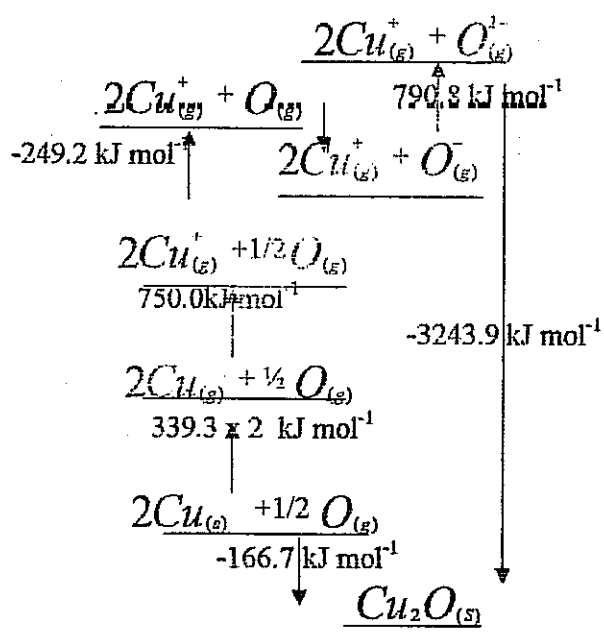
$\Delta H^\theta = -393.5 \times 6 - 285.9 \times 3 - (-3267.6) = +48.9$ kJ mol^{-1}

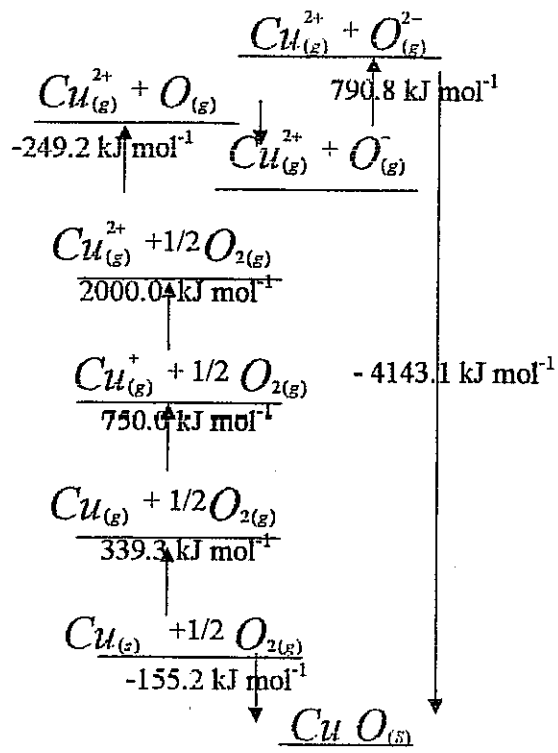
(ii) Endothermic compound

(i) $= 4\,\Delta H^\theta_{fH_2O} - 2\Delta H^\theta_{fNH_4NO_3} = 4 \times (-285.9\ \text{kJmol}^{-1}) - 2 \times (-364.6\ \text{kJmol}^{-1})$
$= -414.4$ kJmol^{-1}

(ii) Good explosive must decompose rapidly and produced large changes in volume by releasing gases. Ammonium nitrate does decomposes rapidly it also gives a huge increase in volume.

(c)





2. (a)

$$SO_{2(g)} + 1/2\,O_{2(g)} \rightleftharpoons SO_{3(g)}$$

Initial moles	2.0	1.0	
Reacted moles	- 1.8	- 0.9	
At equilibrium moles	0.2	0.1	1.8
Mole fraction	0.2/2.1	0.1/2.1	1.8/2.1
Concentration	0.2/60 x 10^{-3}	0.1/60 x 10^{-3}	1.8/ 60 x 10^{-3}
Partial pressure	0.2 x 2 x 10^{-5}/2.1	0.1 x 2x 10^{-5}/2.1	1.8 x 2x 10^{-5} /2.1

$$K_p = P_{SO_3} / P_{SO_2} P_{O_2}^{1/2} = \frac{1.8 \times 2\times 10^{-5}/2.1}{0.2 \times 2 \times 10^{-5}/2.1 \times (0.1 \times 2\times 10^{-5}/2.1)^{1/2}} = 9.22 \times 10^{3}\ Pa^{-1/2}$$

$$K_c = \frac{[SO_{3(g)}]}{[SO_{2(g)}][O_{2(g)}]^{1/2}} = \frac{1.8 / 60 \times 10^{-3}}{0.2/60 \times 10^{-3} \times [0.1 / 60 \times 10^{-3}]^{1/2}} = 7.5\ mol^{1/2}\ dm^{-3/2}$$

b)

$$P_Q = P^0_Q X_Q$$

$X_Q = \frac{0.95 \times 10^5}{1.25 \times 10^5} = 0.76$ $\quad X_R = 0.24$

THE OPEN UNIVERSITY OF SRI LANKA
B.Sc/B.Ed DEGREE PROGRAMME/STAND ALONE COURSE IN SCIENCE
PSF 1303/PSE 1303 CHEMISTRY II – 2008/2009
ANSWER SHEET FOR MCQ

Index No. | |

Unanswered		
Correct Answered		
Wrong Answered		
Total		

1.	1	2	3	4	5	2.	1	2	3	4	5	3.	1	2	3	4	5		
4.	1	2	3	4	5	5.	1	2	3	4	5	6.	1	2	3	4	5		
7.	1	2	3	4	5	8.	1	2	3	4	5	9.	1	2	3	4			
10.	1	2	3	4	5	11.	1	2	3	4	5	12.	1	2	3	4	5		
13.	1	2	3	4	5	14.	1	2	3	4	5	15.	1	2	3	4	5		