Le Chatelier Questions - Answers

1.

$$A_{(g)} + 3B_{(g)} \rightleftharpoons 2C_{(g)} + 3D_{(g)}$$

(a)	↑ T				
(b)	add A	shift fwd	↓	↓	↑ ↑
(c)	add C	shift rvs	↑	↑	↓ ↓
(d)	remove D	shift fwd	↓	↓	↑ ↑
(e)	↑P/↓V	shift rvs	↑	↑	↓ ↓

* fwd rxn consume add A
* rvs rxn consume add C
* fwd rxn produce D
* few mol of gas in reactants

2.

$$A_{(g)} + 3B_{(g)} \rightleftharpoons 2C_{(g)} + 3D_{(g)}$$

a) ↑ Temp
b) add A
c) add C
d) remove D
e) ↑P/↓V

} no affect on K_{eq}

3

$$2BrF_{5(g)} \rightleftharpoons Br_{2(g)} + 5F_{2(g)}$$

$[BrF_5]$ ↑
$[Br_2]$ ↓
$[F_2]$ ↓

if P↑ by ↓V

→ shift left → fewer moles of gas
→ fewer particles to collide w/ side of container
→ will result in ↓P

4.

$$2C_{(s)} + O_{2(g)} \rightleftharpoons 2CO_{(g)}$$

$[O_2]$ ↑
$[CO]$ ↓

if P↑ shifts left
→ fewer moles of gas

(5) $[Co(OH_2)_6]Cl_{2\,(s)} \rightleftharpoons [Co(OH_2)_4Cl_2]_{(s)} + H_2O_{(g)}$

pink — blue

blue indicates dry air

→ if $[H_2O_{(g)}]$ is low forward rxn is favoured

→ if $[H_2O_{(g)}]$ is high rvs rxn is favoured

(6)

$6\,CO_{2\,(g)} + 6\,H_2O_{(l)} \rightleftharpoons C_6H_{12}O_{6\,(s)} + 6O_{2\,(g)} \quad \Delta H = -2801$

a) $[CO_2]\uparrow$	fwd	↓		↑	forward rxn consumes added CO_2
b) P_{O_2}	rvs	↑		↓	rvs rxn ↓ P_{O_2}
c) $C_6H_{12}O_6$ removed	—	—		—	- solid constant [ ]
d) ↑P	—	—		—	same # mol gas on both sides
e) ↑T	rvs	↑		↓	- rvs rxn endothermic consume the add E
f) catalyst	—	—		—	