



Website: contoureducation.com.au | Phone: 1800 888 300

Email: hello@contoureducation.com.au

VCE Chemistry ½
Stoichiometry [2.3]
Test Solutions

20 Marks. 1 Minute Reading. 16 Minutes Writing

Results:

Quiz Questions	_____ / 15
Extension Questions	_____ / 5



Section A: Quiz Questions (15 Marks)

Question 1 (3 marks)

Tick whether the following statements are **true** or **false**.

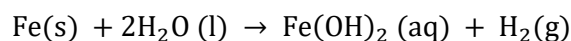
Statement	True	False
a. When balancing a chemical equation our goal is to ensure that there are equal numbers of each atom on the left and right hand side of the equation.	☒	
b. The stoichiometric ratio can be identified by dividing the known by the unknown.		☒
c. Stoichiometry is used to identify how much of each reactant will be consumed in relation to one another in a given reaction.	☒	
d. The limiting reagent refers to the one that will be left over at the end of a chemical reaction.		☒
e. In the equation for the oxidation of silver, two moles of oxygen gas are consumed for every four moles of silver metal which is consumed.	☒	
f. An excess reagent refers to the reactant which must be more in order to allow the reaction to take place.		☒

Space for Personal Notes

Question 2 (8 marks)

Iron (II) hydroxide can be produced on the outside surface of pure exposed oxygen under ideal conditions. This reaction involves iron hydroxide coming in contact with water, in a typical metal-water reaction.

- a. Provide the balanced equation for the formation of iron hydroxide. (1 mark)



- b. Harry reacts 48.0 grams of iron with water and wishes to convert all of the iron to iron oxide. How much water would be necessary to achieve this? (3 marks)

$$\begin{aligned} n(\text{Fe}) &= \frac{48}{55.8} = 0.8602 \text{ mol} \\ n(\text{H}_2\text{O}) &= 2 \times n(\text{Fe}) \\ &= 1.720 \\ m(\text{H}_2\text{O}) &= n \times M \\ &= 1.720 \times 18 \\ &= 30.97 \text{ g} \end{aligned}$$

- c. Given that Harry's reaction produced three moles of hydrogen gas, what would be the moles of OH^- ions produced from this same reaction? (2 marks)

$$\begin{aligned} n(\text{Fe(OH)}_2) &= n(\text{H}_2) \\ &= 3 \text{ mol} \\ n(\text{OH}^-) &= 2 \times n(\text{Fe(OH)}_2) \\ &= 2 \times 3 = 6 \text{ mol} \end{aligned}$$

- d. If Harry mixed 12.0 grams of iron with 25.0 grams of water, which one would be the excess reagent? (2 marks)

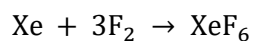
$$\begin{aligned} n(\text{Fe}) &= \frac{12}{55.8} = 0.2151 \text{ mol} & n(\text{H}_2\text{O}) &= \frac{25}{18} = 1.389 \text{ mol} \\ \frac{0.2151}{1} &= 0.2151 \text{ mol} & \frac{1.389}{2} &= 0.6945 \text{ mol} \\ \therefore \text{Iron is limiting \& H}_2\text{O is excess.} \end{aligned}$$

Space for Personal Notes

Question 3 (4 marks)

When a mixture of xenon and fluorine is mixed in one to six ratios at temperatures above 400°C xenon hexafluorine is able to form.

- a. Provide the balanced equation for the formation of fluorine hexafluoride. (1 mark)



- b. Explain why fluorine hexafluoride is unlikely to form at SLC. (1 mark)

Xenon is an example of a noble gas, and as a result it has a full outer shell and is inert.

- c. If a reaction were to occur in a chamber with 2.00 g of xenon exactly, what mass of fluorine would need to be added? (2 marks)

$$\begin{aligned} n(\text{Xe}) &= 0.0152 \\ n(\text{F}_2) &= 0.045699 \\ m(\text{F}_2) &= 1.73656 \text{ g} \end{aligned}$$

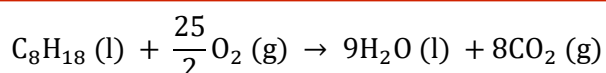
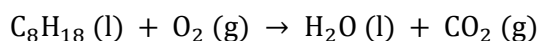
Space for Personal Notes

Section B: Extension Questions (5 Marks)

Question 4 (5 marks)

Octane is a fuel that is widely available at petrol stations and used as the main reactant in internal combustion engines for modern vehicles.

- a. Balance the equation for the combustion of octane. (1 mark)



- b. Sia wants to know how much oxygen her car will need in order to combust the octane she just put into the tank. Given that octane has a density of 0.79 kg/L and she just filled up with 45 litres, how many grams of oxygen would she need? (3 marks)

$$\begin{aligned} m(\text{C}_8\text{H}_{18}) &= 45 \times 0.79 \\ &= 35.55 \text{ kg} \\ &= 3.555 \times 10^4 \text{ g} \\ n(\text{C}_8\text{H}_{18}) &= \frac{3.555 \times 10^4}{114.23} = 311.8 \text{ mol} \end{aligned}$$

$$\begin{aligned} n(\text{O}_2) &= \frac{25}{2} \times n(\text{C}_8\text{H}_{18}) = 3.898 \times 10^3 \text{ mol} \\ m(\text{O}_2) &= 3.898 \times 10^3 \times 32 \end{aligned}$$

$$= 1.2 \times 10^5 \text{ g (2 s.f.)}$$

- c. Given that this much oxygen was consumed, how many moles of carbon dioxide would be produced? (1 mark)

$$\begin{aligned} n(\text{CO}_2) &= \frac{16}{25} \times n(\text{O}_2) \\ &= \frac{16}{25} \times 3.898 \times 10^3 \end{aligned}$$

$$= 2.5 \times 10^3 \text{ mol (2 s.f.)}$$

Space for Personal Notes



Website: contoureducation.com.au | Phone: 1800 888 300 | Email: hello@contoureducation.com.au

VCE Chemistry ½

Free 1-on-1 Support



Be Sure to Make The Most of These (Free) Services!

- Experienced Contour tutors (45+ raw scores, 99+ ATARs).
- For fully enrolled Contour students with up-to-date fees.
- After school weekdays and all-day weekends.

<u>1-on-1 Video Consults</u>	<u>Text-Based Support</u>
➤ Book via bit.ly/contour-chemistry-consult-2025 (or QR code below). ➤ One active booking at a time (must attend before booking the next).	➤ Message +61 440 137 304 with questions. ➤ Save the contact as "Contour Chemistry".

Booking Link for Consults

bit.ly/contour-chemistry-consult-2025



Number for Text-Based Support

[+61 440 137 304](tel:+61440137304)