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

VCE Chemistry ½

Moles & Molar Mass [2.1]

Test Solutions

20 Marks. 1 Minute Reading. 16 Minutes Writing

Results:

Quiz Questions	_____ / 15
Extension	_____ / 5

Section A: Quiz Questions (15 Marks)

Question 1 (3 marks)

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

Statement	True	False
a. One mole of silver will have the same number of atoms as one mole of copper.	✓	
b. Avogadro's number tells us the number of moles that we have in one gram of every substance.		✓
c. The number 0.001 only has one significant figure, whereas the number 1.00001 has a total of 6 significant figures.	✓	
d. One method of calculating moles is by using Avogadro's number and the number of atoms, whereas the other method requires you to use the mass of atoms you have and the molar mass of the compound.	✓	
e. The molar mass of fluorine is 9, and the molar mass of hydrogen is 1.		✓
f. Five moles of glucose would have the same mass as five moles of silver ethanoate since both glucose and silver ethanoate are polyatomic compounds.		✓

Space for Personal Notes

Question 2 (5 marks)

Sia is curious as to the sheer number of atoms that she could have in her hand at any given time. In order to put a number to this, Sia takes a sample of sodium from her school lab and uses this to test some of her mole calculation skills.

a. How many atoms are in one mole of Sodium? (1 mark)

$6.02 \times 10^{23} atoms$

b. Given that Sia has 64.0 grams of sodium, how many moles would this be? (1 mark)

$2.7826\ mol$

c. Thus, in this sample, how many atoms would Sia have? (1 mark)

$1.675 \times 10^{24}\ atoms$

d. Explain to Sia what Avogadro's number is and how it helps us in chemistry. Make reference to Sia's one-mole sample of sodium. (2 marks)

Avogadro's number refers to the total number of atoms or electrons present in one mole of any given substance. We can use it to firstly find the moles of something depending on the number of atoms or particles present, or we can use it to find the number of particles based on the number of moles. For example, Avogadro's number is equivalent to the number of atoms of sodium in Sia's sample.

Space for Personal Notes

Question 3 (4 marks)

A chemist, upon performing a careful analysis of a sample of hexane, identifies that they have a total of 4.99×10^3 molecules of hexane in a beaker, which will be later used for a combustion reaction inside of an engine.

a. How many moles of hexane exist in this sample? (1 mark)

$8.29 \times 10^{-21} moles$

b. What mass of hexane is the chemist using in this sample? (1 mark)

7.12×10^{-19}

c. The chemist notices that the values for the moles of hexane are less convenient to use than the number of molecules of hexane since the factors are smaller, as seen in its power notation. Given this inconvenience, why are moles used? (2 marks)

Moles are used because the atoms and particles are extremely small. Due to this most samples contain such a large number of atoms and molecules they can't be quantified in a simple way. The mole acts as a unit to allow this occur. In this case, it may seem unusual, but that's only because the sample of hexane is extremely small.

Space for Personal Notes

Question 4 (3 marks)

After a long day at school, Rehaan makes it to his lab, where he begins experimenting with different chemicals to see what he can produce. During this reaction, Rehaan combines Lithium, his favourite metal, with oxygen to produce Lithium oxide.

a. Rehaan started off with ten grams of Lithium. How many moles is this? (1 mark)

$1.449\ moles$

b. After the experiment, Rehaan was left with 10.968 grams of Lithium oxide. How many molecules is this? (1 mark)

$2.2\times 10^{23}\ molecules$

c. Given this calculation, how many moles of oxygen gas were consumed? (1 mark)

$9.2\times 10^{-2} moles$

Space for Personal Notes

Section B: Extension (5 Marks)

Question 5 (5 marks)

Taige is obsessed with the world of chemistry calculations and the concept of the mole. In her off time, she is helping a friend revise so that they can become as educated as her on the concept.

a. Explain, in chemistry terms, what 1 mole means. (2 marks)

A mole refers to a unit of measurement that allows us to quantify a certain amount of atoms/molecules. One mole of any element will contain the same number of atoms as any other element, which would be equivalent to Avogadro's number.

b. Taige takes 5.44×10^{14} atoms of Beryllium and places it in front of her friend. What would the mass of this beryllium be? (2 marks)

$n(\text{Beryllium}) = 9.037 \times 10^{-10}$ atoms

$m(\text{Beryllium}) = 8.133 \times 10^{-9}\ g$

c. After looking at atoms on the periodic table, Taige notices the number 12 on the carbon atom and sees this as the atomic mass. What is the unit for this number? (1 mark)

There is no unit. The atomic mass has its own unit, so we don't need to write units after this.

Space for Personal Notes

CONTOUREDUCATION

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.

1-on-1 Video Consults	Text-Based Support
➢ 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