



Review exercises

1. Chemical formulation

1) Write the name and chemical formula:

Iron(II) oxide:

Sodium oxide:

Gold(III) oxide:

Silver oxide:

Aluminium oxide:

Li_2O :

Cl_2O_5 :

H_3AsO_4 :

Ni_2O_3 :

H_2SO_4 :

Chloric acid:

Hydrobromic acid:

HI :

Iron(III) iodide:

Methane:

Iron(III) sulfide:

Sodium chloride:

Potassium bromide:

Borane:

2) Write the name and chemical formula:

Calcium hydroxide:

Perbromic acid:

Potassium sulfate:

Calcium carbonate:

Phosphoric acid:

$\text{Ni}(\text{SO}_3)_2$:

$\text{Pb}(\text{OH})_4$:

$\text{Mg}(\text{OH})_2$:

$\text{Co}(\text{OH})_3$:

CuOH :

H_2S :

HNO_3 :

HBrO :

NH_3 :

SnS_2 :

CoF_2 :

FeBr_3 :

CdCl_2 :

LiH :

- Define the difference between fundamental and derived physical magnitude and give an example of each.
- Write down the SI units of the following physical magnitudes:
Mass, Density, Length, Volume, Temperature, Weight (Force Weight), Acceleration, Velocity, Energy, Work, Concentration of a solution in mass concentration,



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4. A car travels at a steady speed of 20 m/s. Calculate the distance travelled in 5 s.
5. Change 90 km/h to m/s using conversion factor.
6. Determine the average speed of a car if it travels 600km in 3h.
7. What is the acceleration of a motorcycle that goes from rest to 30 m/s in 10 s?
8. Define density. Write its mathematical formula or equation. Outline if it is an extensive (general) or as intensive (characteristic) property of matter.
9. Define boiling point and explain what happens to the particles of a liquid in order to turn into a gas.
10. Outline the differences between a homogenous and a heterogenous mixture and give an example of each.
11. How many grams of table salt do we need to make a 250 mL solution with a mass concentration of 10 g/L?
12. A solution of water and sugar has a mass concentration of 20 g/L. If 18 g of sugar were added to the water, what is the volume of our solution?
13. How many grams of solute do I need to make a 400 cm³ of a solution with a mass concentration of 12g/L?
14. We use 50 mL of pure water to make a NaCl solution. Calculate the amount of NaCl used if the solution is 30% NaCl by mass.
15. Calculate the mass percent of the following solutions: a) 40 g of table salt in 250 g of water; b) 50 g of sugar in 1 kg of solution; c) 12 g silver nitrate in half a litre of pure water.
16. The subatomic particles of the atom are the _____, with a _____ charge. The _____, with a _____ charge and the _____ with no charge. In the nucleus of the atom we find the _____ and the _____, and the _____, are found in energy shells around the nucleus.
17. An element found in the second period of the periodic table has 3 electrons. To which group does it belong?



18. Complete the following table:

Element	Z	A	Number of electrons	Number of neutrons	Name of the element	Most probable ion
A	35	80				Don't need
B		32	16			To
C	18	40				do
D	32			41		this

19. Sodium has $Z = 11$ and $A = 23$. Determine its number of electrons and explain how you know. Also determine the number of neutrons.

20. Define ion, and state the two types.

21. Hydrochloric acid reacts with Sodium hydroxide to produce sodium chloride and water.

a) Write the balanced chemical equation

b) If during the reaction 20g of salt are produced, how many moles of acid did we start with?

22. A car takes 8 s to increase its velocity from 10 m/s to 30 m/s. What is its average acceleration?

23. An aircraft on its take-off run has a steady acceleration of 3 m/s^2 .

a) What velocity does the aircraft gain in 4 s?

b) If the aircraft passes one post on the runway at a velocity of 20 m/s, what is its velocity 8 s later?

24. Mass is a quantity that measures:

a) The amount of matter in an object

b) The weight of an object

25. Express the following using scientific notation:

a) 12000 N

b) 34500000 kg

c) 57,30 kg



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d) 4580000000000 J

26. Atoms are ordered in the periodic table according to their _____, which determines the number of _____. In an neutral atom, this number is also equal to the number of _____.

27. Calculate the molecular mass of the following compounds:

a) Potassium chloride b) hydrochloric acid c) H₂O d) KClO₃

Atomic masses: K:39; O:16; Cl:35.5; H:1

28. Calcium has $A = 40$ and $Z = 20$. Explain the following questions:
How many electrons, protons and neutrons make up the calcium atom?
How many electrons, protons and neutrons would an isotope have if $A = 41$?

29. An atom of silver has 61 neutrons and $Z = 47$.

a) Write the chemical symbol of silver and give its mass number.
b) **Explain** how many electrons, protons and neutrons does silver have?

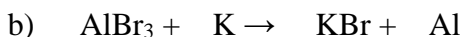
30. Write and balance the following chemical equations:

- Fe reacts with S₈ to produce Iron(II) sulfide
- Al reacts with Hydrochloric acid to produce Aluminium chloride and H₂
- Water decomposes into H₂ and O₂
- HNO₃ reacts with Cu producing Cu(NO₃)₂ and H₂
- KClO₃ decomposes into Potassium chloride and O₂

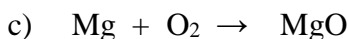
31. Balance the following chemical equations, and answer the corresponding question about each one:



i. If we start with 2 moles of HCl, how many moles of the salt will be produced?



ii. If we start 1 mole of AlBr₃, how many moles of KBr will be produced?



iii. Write down the mole ratio of the reaction.

32. **Calculate** the number of moles in 234g of magnesium hydroxide Mg(OH)₂.

Atomic masses: Mg: 24.5; H:1; O:16.

33. How many grams are there in 5 moles of water? Atomic masses: H:1; O:16.



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34. How many moles are there in 48g of magnesium? Atomic mass: Mg: 24.5

35. Given the following chemical reaction: Atomic masses: Na: 23; O:16



- Write the balanced chemical equation.
- How many moles of sodium oxide are produced?
- How many grams of sodium are consumed?
- What could you do to speed up the rate of the above reaction? Explain how what you have suggested will actually increase the rate of the reaction.

To revise more physics just go over the problems and the theory in the different worksheets for the corresponding units.