Physical Sciences
Know the method.

GRADE 12 • 2026 • DBE/CAPS

Free starter pack

3 worked methods. 3 new practice questions. Explained answers.

Name the physical principle before substituting. Define a positive direction, draw a labelled diagram when useful, convert to SI units and show the rearrangement. Explain chemistry with particles, collisions or equilibrium reasoning. Keep calculator precision until the final answer.

Built for practice

Read the recognition cue. Try the question. Follow each operation or reasoning step. Complete the new question before opening its answer.

Paper 1 is BLUE. Paper 2 is PURPLE. Paper labels remain visible when printed in black and white. Click the method index to jump to a lesson; return using the footer.

About this edition

These are original revision questions, not official DBE questions or predicted exam content. The fuller subject pack is designed for the R99 offer. This edition is an editorial draft pending independent subject-teacher review. No purchase is required to use this copy.

Use alongside lessons, a textbook and complete official papers. The pack covers selected methods rather than every examinable question type. Explanations are in English.

Question-method index

Click a row to open its worked example. The answer link on each lesson opens the practice solution.

Paper 1

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MR-PS-10 | Parallel resistors and current · p. 5

Paper 2

MR-PS-23 | Titration with a mole ratio · p. 6

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Your paper map

Paper 1 • 180 minutes • 150 marks

Physics: mechanics, Doppler effect, electrostatics, circuits, electrodynamics and the photoelectric effect.

Methods included here: Newton's laws; Electric circuits.

Paper 2 • 180 minutes • 150 marks

Chemistry: organic compounds and reactions, reaction rates, equilibrium, acids and bases, and electrochemistry.

Methods included here: Acids and bases.

Read the actual paper instructions

This is a revision route, not a mock exam with official mark allocations. Read command words, units, rounding and answer-book instructions on the examination paper. Do not assume one sentence always earns one mark.

How to mark your practice

Compare your reasoning with the model answer. Mark the first place where your method differs, correct that step and retry from a blank page. An alternative scientifically or mathematically valid method can also be correct.

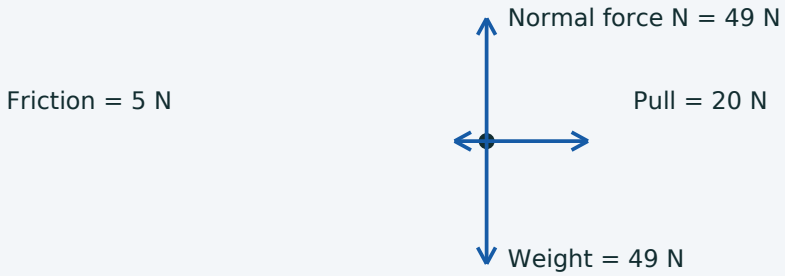
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Horizontal force and friction

MR-PS-01 • Draw only forces acting ON the chosen object; acceleration follows the net force.

Worked example

A 5 kg box moves right on a horizontal floor. A horizontal pull of 20 N acts right and kinetic friction is 5 N left. Find acceleration. Use $g = 9.8$ metres per second squared.



Isolated object; horizontal forces act on the same box.

1. Choose right as positive. The diagram shows pull, friction, normal force and weight.
2. Vertically there is no acceleration: $N = mg = 5 \times 9.8 = 49N$.
3. Net horizontal force: $F = 20 - 5 = 15N$.
4. Apply $F = ma$: $15 = 5a$.
5. Divide both sides by 5: $a = 3$ metres per second squared, to the right.

Check the reasoning

The acceleration points in the direction of the 15 N resultant.

Avoid this mistake

Do not add weight to the horizontal forces or treat friction as a third-law partner of the pull.

Your turn

An 8 kg box moving right is pulled right with 30 N while friction acts left with 6 N. Find acceleration.

Try it first, then click here for the explained answer.

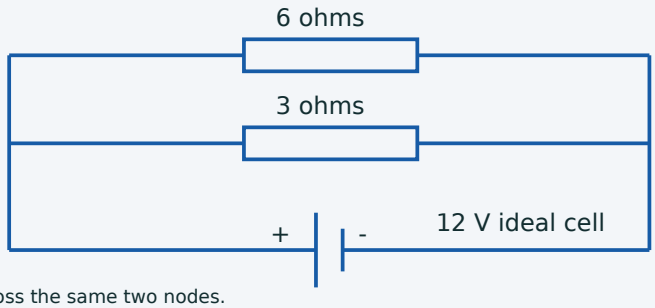
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Parallel resistors and current

MR-PS-10 • Parallel branches have the same potential difference.

Worked example

An ideal 12 V supply is connected across 6-ohm and 3-ohm resistors in parallel. Find equivalent resistance, each branch current and total current.



Both resistors are connected across the same two nodes.

1. Use $\frac{1}{R} = \frac{1}{6} + \frac{1}{3} = \frac{3}{6} = \frac{1}{2}$.

2. Take the reciprocal: $R = 2$ ohms.

3. Each branch has 12 V across it. In the 6-ohm branch: $I = \frac{12}{6} = 2A$.

4. In the 3-ohm branch: $I = \frac{12}{3} = 4A$.

5. Total current: $2 + 4 = 6A$.

Check the reasoning

12 V divided by the equivalent 2 ohms also gives 6 A.

Avoid this mistake

Do not split the voltage between parallel branches.

Your turn

An ideal 18 V supply feeds 9-ohm and 6-ohm resistors in parallel. Find equivalent resistance and total current.

Try it first, then click here for the explained answer.

Back to method index

Titration with a mole ratio

MR-PS-23 • Convert volume to cubic decimetres before using concentration times volume.

Worked example

25.0 cubic centimetres of H_2SO_4 is neutralised by 20.0 cubic centimetres of 0.100 mol per cubic decimetre NaOH. Use $H_2SO_4 + 2NaOH \rightarrow Na_2SO_4 + 2H_2O$. Find acid concentration.



Burette: NaOH

20.0 cm^3 at 0.100 mol/dm^3

Flask: 25.0 cm^3 H_2SO_4

Question sketch - schematic; use the stated values, not measurements.

1. Convert base volume: $\frac{20.0}{1000} = 0.0200$ cubic decimetres.

2. Base moles: $n = cV = 0.100 \times 0.0200 = 0.00200$ mol.

3. The ratio is 1 mol acid to 2 mol base: acid moles $= \frac{0.00200}{2} = 0.00100$ mol.

4. Acid volume: $\frac{25.0}{1000} = 0.0250$ cubic decimetres.

5. Acid concentration: $c = \frac{0.00100}{0.0250} = 0.0400$ mol per cubic decimetre.

Check the reasoning

The acid and base mole amounts are not equal in this reaction.

Avoid this mistake

Do not use equal concentration-volume products without checking the balanced coefficients.

Your turn

10.0 cubic centimetres of HCl needs 15.0 cubic centimetres of 0.200 mol per cubic decimetre NaOH. The reaction ratio is 1:1. Find HCl concentration.

Try it first, then click here for the explained answer.

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Horizontal force and friction

MR-PS-01 • Independent practice

An 8 kg box moving right is pulled right with 30 N while friction acts left with 6 N. Find acceleration.

Step-by-step answer

1. Choose right positive. Net horizontal force: $30 - 6 = 24\text{N}$.

2. Use $F = ma$: $24 = 8a$.

3. Divide by 8: $a = 3$ metres per second squared, right.

Make the correction useful

Write down the first step you missed and why. Close this answer, solve the question again, then explain your method in your own words.

Return to the worked method

Parallel resistors and current

MR-PS-10 • Independent practice

An ideal 18 V supply feeds 9-ohm and 6-ohm resistors in parallel. Find equivalent resistance and total current.

Step-by-step answer

1. $\frac{1}{R} = \frac{1}{9} + \frac{1}{6} = \frac{5}{18}$, so $R = \frac{18}{5} = 3.6$ ohms.

2. Branch currents: $\frac{18}{9} = 2A$ and $\frac{18}{6} = 3A$.

3. Total current is 5 A.

Make the correction useful

Write down the first step you missed and why. Close this answer, solve the question again, then explain your method in your own words.

Return to the worked method

Titration with a mole ratio

MR-PS-23 • Independent practice

10.0 cubic centimetres of HCl needs 15.0 cubic centimetres of 0.200 mol per cubic decimetre NaOH. The reaction ratio is 1:1. Find HCl concentration.

Step-by-step answer

1. Base volume: 0.0150 cubic decimetres.

2. Base moles: $0.200 \times 0.0150 = 0.00300$ mol.

3. The acid also has 0.00300 mol.

4. Acid concentration: $\frac{0.00300}{0.0100} = 0.300$ mol per cubic decimetre.

Make the correction useful

Write down the first step you missed and why. Close this answer, solve the question again, then explain your method in your own words.

Return to the worked method

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Practise. Check. Retry.

1. Choose one Paper 1 method and one Paper 2 method from the index. Attempt both before reading the solutions.

2. Identify the first incorrect operation or missing causal link. Record it below.

3. Study that part of the explanation, then redo the full question without copying.

4. Complete the new practice question and compare reasoning, units, terminology and conclusion.

5. After a gap, mix question types so you must choose the method yourself.

6. Use a complete released DBE paper with its matching memo to practise unfamiliar wording and pacing.

Personal pacing

Each written paper is 180 minutes for 150 marks in the cited guideline. Reserving 15 minutes for checks leaves about 1.10 minutes per mark. This is a planning aid, not an instruction to stop midway through useful working.

Error log

Question ID: _____ Date: _____
My first incorrect step: _____
The reason it failed: _____
The corrected method: _____
Retry date and result: _____

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Continue with official papers

Scope checked 9 October 2026. Circular E17 of 2025 retains the 2021 NSC examination guidelines for the 2026 examinations. The paper map uses the subject guideline; the questions and explanations here are newly authored.

Open this subject's DBE examination guideline

Open Circular E17: guideline extension to 2026

Open the DBE FET annual teaching plan directory

Open DBE May/June 2026 papers and marking guidelines

Open the DBE Mind the Gap study-guide directory

Choose the correct subject, paper number, language and exam session. Download its matching memo and any addendum. Resource titles above are clickable. Official resources remain freely accessible.

Coverage still to practise

Further practice: universal gravitation, two-dimensional electric fields, vertical-motion graphs, motors and generators, multi-loop circuit changes, quantitative gas equilibrium, acid-base titration curves, organic structural isomers and integrated multi-step problems. This is a core-method selection, not the entire syllabus.

Scope references support topic placement; they are not an official endorsement or a claim that these original questions appeared in an examination. Independent teacher moderation remains pending.

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