CSCA Physics

48 questions | 60 minutes | Marked out of 100 | Single-answer multiple choice | Paper in Chinese or English | No calculator

The official syllabus (2025 edition) has five modules: Mechanics, Electromagnetism, Thermodynamics, Optics and Modern Physics. A line marked "beyond the syllabus" is taught in our course for depth and is not needed for the paper.

How to use it: tick a topic when you can answer questions on it against the clock, not when you have read about it. Lessons and timed mock papers for every topic are free at csca.help.

Module 1 — Mechanics

- [ ] Kinematics in one and two dimensions
- [ ] Projectile motion
- [ ] Newton's three laws
- [ ] Friction and normal forces, including inclines
- [ ] Work, energy and the work-energy theorem
- [ ] Conservation of energy
- [ ] Momentum, impulse and collisions
- [ ] Circular motion
- [ ] Gravitation and orbital problems
- [ ] Simple harmonic motion: springs and pendulums, period, amplitude, forced oscillation and resonance
- [ ] Mechanical waves: $v = \lambda f$, transverse and longitudinal waves, wave graphs, interference and standing waves

Module 2 — Electromagnetism

- [ ] Electric charge and Coulomb's law
- [ ] Electric fields and electric potential
- [ ] Capacitors and stored energy (not named in the syllabus, but part of the textbook electrostatics chapter)
- [ ] DC circuits, Ohm's law and internal resistance
- [ ] Magnetic fields and the force on charges and currents
- [ ] Electromagnetic induction and Faraday's law
- [ ] Lenz's law and its applications

Beyond the syllabus, for depth only: Kirchhoff's rules, Ampère's circuital law, AC circuits and transformers

Module 3 — Thermodynamics

- [ ] Temperature scales and the three modes of heat transfer
- [ ] Thermal expansion, including bimetallic strips and expansion gaps
- [ ] Calorimetry, specific heat capacity and the method of mixtures
- [ ] The ideal gas law and the three simple gas laws
- [ ] The First Law of Thermodynamics and the four standard processes
- [ ] PV diagrams and work as area under the curve
- [ ] Phase changes and latent heat
- [ ] Kinetic theory and root-mean-square speed

Beyond the syllabus, for depth only: the Second Law and entropy; heat engines, refrigerators, efficiency and the Carnot limit

Modules 4 and 5 — Optics and Modern Physics

- [ ] Reflection and mirrors
- [ ] Refraction, Snell's law and total internal reflection
- [ ] Interference and the double-slit experiment
- [ ] Diffraction
- [ ] Wave properties of light

Beyond the syllabus, for depth only: lenses and image formation (the syllabus names only the laws of reflection and refraction)

- [ ] The photoelectric effect
- [ ] Atomic spectra and energy levels
- [ ] Nuclear physics basics: decay types, half-life, mass-energy