

CCEA A2 1

| Spec Ref | Topic | TAP episode | comments |
|----------|--|-------------|----------|
| 4.1 | conservation of momentum | 220 | |
| | elastic and inelastic collisions | 220, 221 | |
| 4.2 | pV/T is constant | 601 | |
| | $pV = nRT = NkT = 1/3Nm\langle c^2 \rangle$ | 602, 603 | |
| | absolute zero | 602 | |
| | internal energy | 603 | |
| | $KE = 1/2 m\langle c^2 \rangle = 3/2kT$ | 603 | |
| | specific heat capacity, $Q = mc\Delta\theta$ | 607 | |
| 4.3 | angular velocity $v = r\omega$, $F=ma = mv^2/r$ | 225 | |
| 4.4 | SHM, $a = -\omega^2x$ | 302 | |
| | free & forced vibrations | 307 | |
| | damping and critical damping | 306 | |
| 4.5 | atomic nuclei, alpha-particle scattering | 521 | |
| | $r = r_0A^{1/3}$ | 524 | |
| 4.6 | props of α , β and γ | 510 | |
| | nuclear transformations | 512 | |
| | radioactive decay, $A = \lambda N$ and $A = A_0e^{-\lambda t}$ | 514,515 | |
| | half-life, $t_{1/2} = 0.693/\lambda$ | 515 | |
| 4.7 | $E = mc^2$ and use in nuclear calculations | 525 | |
| | binding energy per nucleon | 525 | |
| | fission and fusion | 527, 528 | |
| 4.8 | fission reactor, chain reaction | 528, 527 | |
| | critical size, moderators, control rods, cooling, shielding | 528 | |
| | nuclear fusion, temperature required for fusion | 528 | |
| | plasma confinement: gravitational, inertial and magnetic | | No ref |
| | JET fusion reactor; the D-T reaction | | No ref |