5 · Thermodynamics, Radiation, Oscillations and Cosmology

Pearson Edexcel · International A-Level · Physics · Vocabulary in context

Word	Example
Internal energy /ɪn'tɜ:nl 'enədʒi/	Heating a gas raises its **internal energy**.
Specific heat capacity /spə'sɪfɪk hi:t kə'pæsɪti/	Water has a high **specific heat capacity**, so it heats up slowly.
Specific latent heat /spə'sɪfɪk 'leɪtənt hi:t/	The **specific latent heat** of melting ice is 334 kJ/kg. 334 kJ/kg
thermistor /'θɜ:mɪstə/	A **thermistor** measures the temperature.
potential divider /pə'tenʃl dɪ'vaɪdə/	Two resistors in a **potential divider** share the voltage.
Absolute zero /'æbsəlu:t 'zɪərəʊ/	**Absolute zero** is 0 K, or −273 °C. 0 K −273 °C
Absolute temperature /'æbsəlu:t 'temprɪtʃə/	The **absolute temperature** of 27 °C is 300 K. 27 °C 300 K
ideal gas /aɪ'dɪəl gæs/	An **ideal gas** follows pV = nRT exactly. pV = nRT
mean square speed /mi:n skweə spi:d/	The **mean square speed** is the average of the squared speeds.
root mean square speed /ru:t mi:n skweə spi:d/	The **root mean square speed** of air molecules is about 500 m/s. 500 m/s
mass deficit /mæs 'defɪsɪt/	A nucleus has a **mass deficit**: it weighs less than its separate parts.

Word	Example
binding energy /ˈbaɪndɪŋ ˈenədʒi/	The **binding energy** holds the nucleus together.
unified atomic mass unit /ˈjuːnɪfaɪd əˈtɒmɪk mæs ˈjuːnɪt/	A proton has a mass of about one **unified atomic mass unit**.
Nuclear fusion /ˈnjuːklɪə ˈfjuːʒn/	**Nuclear fusion** powers the Sun.
Nuclear fission /ˈnjuːklɪə ˈfɪʃn/	**Nuclear fission** splits uranium in a power station.
Alpha radiation /ˈælfə ˌreɪdɪˈeɪʃn/	**Alpha radiation** is stopped by a sheet of paper.
Beta radiation /ˈbiːtə ˌreɪdɪˈeɪʃn/	**Beta radiation** is stopped by a few millimetres of aluminium.
Gamma radiation /ˈgæmə ˌreɪdɪˈeɪʃn/	**Gamma radiation** needs thick lead to stop it.
nuclear equations /ˈnjuːklɪə ɪˈkweɪʒnz/	**Nuclear equations** must balance both the top and bottom numbers.
Background radiation /ˈbækgraʊnd ˌreɪdɪˈeɪʃn/	**Background radiation** comes from rocks, space and the air.
Radioactive decay /ˌreɪdɪəʊˈæktɪv dɪˈkeɪ/	**Radioactive decay** is random: you cannot predict when a nucleus will decay.
Activity /ækˈtɪvɪti/	**Activity** is the number of nuclei that decay each second.
becquerels /ˈbekwərəlz/	A source of 200 **becquerels** has 200 decays each second.
decay constant /dɪˈkeɪ ˈkɒnstənt/	A large **decay constant** means fast decay.

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Word	Example
half-life /hɑːf laɪf/	After one **half-life**, half the nuclei have decayed.
Simple harmonic motion /ˈsɪmpl hɑːˈmɒnɪk ˈməʊʃn/	**Simple harmonic motion** repeats back and forth, like a spring.
free oscillation /friː ˌɒsɪˈleɪʃn/	A pendulum swinging on its own is in **free oscillation**.
forced oscillation /fɔːst ˌɒsɪˈleɪʃn/	Pushing a swing again and again makes a **forced oscillation**.
Natural frequency /ˈnætʃərəl ˈfriːkwənsi/	A pendulum's **natural frequency** depends on its length.
Resonance /ˈrezənəns/	**Resonance** can make a bridge shake badly.
Damping /ˈdæmpɪŋ/	**Damping** makes a swing slowly stop.
Plastic deformation /ˈplæstɪk ˌdiːfɔːˈmeɪʃn/	**Plastic deformation** leaves the wire longer after the load is removed.
gravitational field /ˌgrævɪˈteɪʃənl fiːld/	The Earth's **gravitational field** pulls the Moon.
Gravitational field strength /ˌgrævɪˈteɪʃənl fiːld streŋθ/	On Earth, **gravitational field strength** is about 9.8 N/kg. $9.8\ \mathrm{N/kg}$
Gravitational potential /ˌgrævɪˈteɪʃənl pəˈtenʃl/	**Gravitational potential** is potential energy per unit mass.
black body /blæk ˈbɒdi/	A perfect **black body** absorbs all light.
Luminosity /ˌluːmɪˈnɒsɪti/	The Sun's **luminosity** is the total power it gives out.

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Word	Example
Intensity /ɪn'tensɪti/	**Intensity** is the power falling on each square metre.
Trigonometric parallax /ˌtrɪgənəʊ'metrɪk 'pærəlæks/	**Trigonometric parallax** uses a star's small shift to find its distance.
parsec /'pɑːsek/	The nearest star is about 1.3 **parsec**s away.
standard candle /'stændəd 'kændl/	A **standard candle** is a star of known brightness.
Hertzsprung–Russell diagram /'hɜːtssprʌŋ 'rʌsl 'daɪəgræm/	A **Hertzsprung–Russell diagram** plots brightness against temperature.
main sequence /meɪn 'siːkwəns/	The Sun is on the **main sequence**.
Red giants /red 'dʒaɪənts/	**Red giants** are huge, cool stars.
White dwarfs /waɪt dwɔːfs/	**White dwarfs** are small, hot and dim.
Doppler effect /'dɒplə ɪ'fekt/	The **Doppler effect** makes a passing car's sound change pitch.
Redshift /'redʃift/	**Redshift** shows that distant galaxies are moving away.
Hubble's law /'hʌblz lɔː/	**Hubble's law** says far galaxies move away faster.
Hubble constant /'hʌbl 'kɒnstənt/	The **Hubble constant** links a galaxy's speed to its distance.
Hubble time /'hʌbl taɪm/	The **Hubble time** is roughly the age of the universe.
Dark matter /dɑːk 'mætə/	We cannot see **dark matter**, but we can detect its gravity.

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