Matter, Models and Density

Collins
GCSE OCR Revision • Physics

What is a typical size of an **atom**? Choose from the following.

10^{-15} m 10^{-12} m 10^{-10} m

1

Matter, Models and Density

The size of an **atom** is of the order of 10^{-10} m.

1

Temperature and State

Collins
GCSE OCR Revision • Physics

What is the difference between the **specific heat capacity** and the **specific latent heat** of a material?

2

Temperature and State

Specific heat capacity is the energy needed to raise the temperature of 1 kg of the material by 1 °C, with no change of state.

Specific latent heat is the energy needed to change the state of 1 kg of the material, with no change in temperature.

2

Pressure

Collins
GCSE OCR Revision • Physics

A gas is contained at **constant volume**. Explain what happens to the **pressure** of the gas if the gas is heated.

3

Pressure

The **pressure** of the gas **increases** with increasing temperature, because at a higher temperature the **particles** in the gas move faster. They bombard the walls of the container harder and more frequently.

3

Journeys

Collins
GCSE OCR Revision • Physics

State the equation for calculating the **kinetic energy** of a moving object, and give the **unit** of each quantity.

4

Journeys

Kinetic energy = 0.5 × mass × (speed)^2

Unit of kinetic energy: **joule** (J)

Unit of mass: **kilogram** (kg)

Unit of speed: **metres per second** (m/s)

4

Forces

Collins
GCSE OCR Revision • Physics

Which equation is a statement of **Newton's second law**?

5

Forces

Force = mass × acceleration is a statement of **Newton's second law**.

5

Force, Energy and Power

Collins
GCSE OCR Revision • Physics

What is meant by **work** in physics?

6

Force, Energy and Power

Work is done on an object when a **force** causes the object to move through a distance.

Work done = force × distance (along the line of action of the force)

The work done is equal to the **energy transferred**.

6

Changes of Shape

Collins
GCSE OCR Revision • Physics

What is the difference between **elastic deformation** and **plastic deformation**?

7

Changes of Shape

Elastic deformation: forces make an object change shape, but it returns to its original shape when the forces are removed.

Plastic deformation: forces make an object change shape, and the object keeps its new shape when the forces are removed.

7

Levers, Gears and Hydraulic Systems

Collins
GCSE OCR Revision • Physics

The **moment of a force** about a **pivot** is given by $M = Fd$.

Describe fully what d represents.

8

Levers, Gears and Hydraulic Systems

d is the perpendicular (shortest) distance from the **pivot** to the line of action of the **force**.

8

Electric Charge

Collins
GCSE OCR Revision • Physics

What is meant by an **electric field**?

9

Electric Charge

An **electric field** is a region around an **electrically charged** object in which another electrically charged object will experience a **force**.

9

Circuits

Collins
GCSE OCR Revision • Physics

What is the relationship between the **potential difference** across, the **current** through and the **resistance** of a component in a circuit?

10

Circuits

Potential difference = current × resistance

10

Resistors and Energy Transfers

Collins
GCSE OCR Revision • Physics

State the equation for calculating the electrical **power** of a device in terms of its **resistance** and the **current** through it, and state the **unit** of power.

11

Resistors and Energy Transfers

Power = (current)^2 × resistance

The **unit** of power is the **watt**, W (equivalent to J/s).

11

Magnetic Fields and Motors

Collins
GCSE OCR Revision • Physics

Describe the basic structure of an **electromagnet** and how it works.

12

Magnetic Fields and Motors

An **electromagnet** is a coil of wire of many turns wound on an **iron core**. When **current** is passed through the coil, a strong **magnetic field** is set up through the core and around the coil.

12

Magnetic Fields and Motors HT

Collins
GCSE OCR Revision • Physics

Describe briefly how a **motor** works.

13

Magnetic Fields and Motors HT

A **current-carrying coil** in a **magnetic field** experiences **force**. The direction of the force depends on the direction of the current relative to the magnetic field. The result is a pair of oppositely directed forces on opposite sides of the coil, which cause rotation.

13

Electromagnetism HT

Collins
GCSE OCR Revision • Physics

Explain why a **transformer** works with **alternating current** but not with a constant **direct current**.

14

Electromagnetism HT

The two coils of a **transformer** are not connected. A **varying** current in one coil produces a varying **magnetic field**, which **induces** a varying voltage and hence a varying current in the other coil.

A constant **direct current** in the first coil produces a static magnetic field. This does **not** induce a voltage in the second coil.

14

Sound, Sonar and Ultrasound

Collins
GCSE OCR Revision • Physics

What is a **wavelength** and what is its **unit**?

15

Sound, Sonar and Ultrasound

A **wavelength** is the **distance** from one point on a wave to the equivalent point on the next wave. Its **unit** is **metre** (m).

15

Sound, Sonar and Ultrasound HT

Collins GCSE OCR Revision • Physics

One type of **seismic wave** is a **transverse** wave that cannot travel through a liquid. Another type of seismic wave is a **longitudinal** wave.

Give the names of each of these types of seismic wave.

16

Sound, Sonar and Ultrasound HT

S-waves are **transverse** and cannot travel through a liquid.

P-waves are **longitudinal**.

16

Electromagnetic Radiation

Collins GCSE OCR Revision • Physics

List the types of radiation in the **electromagnetic spectrum**, in order of **increasing frequency**.

17

Electromagnetic Radiation

In order of **increasing frequency**:

radio waves, **microwaves**, **infrared** radiation, visible light, **ultraviolet** (UV) radiation, **X-rays**, **gamma rays**.

17

Waves at Surfaces and Inside Materials

Collins GCSE OCR Revision • Physics

Describe the difference between a **convex** lens and a **concave** lens.

18

Waves at Surfaces and Inside Materials

A **convex** lens is thicker in the middle than at the edges. Parallel rays of light **converge** after passing through a convex lens.

A **concave** lens is thicker at the edges than in the middle. Parallel rays of light spread out (**diverge**) after passing through a concave lens.

18

Nuclei of Atoms

Collins GCSE OCR Revision • Physics

Choose the correct word to complete this sentence.

Isotopes of an element contain the same number of …

… **neutrons** … **protons**

19

Nuclei of Atoms

Isotopes of an element contain the same number of **protons**.

They have **different** numbers of **neutrons**.

19

Nuclei of Atoms

Collins GCSE OCR Revision • Physics

Which type of **radioactive emission** is **least penetrating**, and why?

alpha **beta** **gamma**

20

Nuclei of Atoms

Alpha radiation is **least penetrating** because it loses its energy in the shortest distance, by strongly **ionising** the atoms of a material.

20

Decay, Fission and Fusion

Collins
GCSE OCR Revision • Physics

Define the **half-life** of a **radioactive** material, and explain why radioactive **decay** can be considered **random**.

21

Decay, Fission and Fusion

The **half-life of** a **radioactive** material is the time taken for the number of undecayed nuclei in a sample of the material to reduce by half. The decay of a particular nucleus is unpredictable, so the decay is described as **random**.

21

Decay, Fission and Fusion

Collins
GCSE OCR Revision • Physics

How does a **chain reaction** start during nuclear **fission**?

22

Decay, Fission and Fusion

During **fission**, a large nucleus splits into two smaller ones and a few **neutrons** are emitted with kinetic energy. Fission can be initiated by a large nucleus absorbing a neutron. So the neutrons emitted from the first fission can go on to cause fission of other nuclei, and so the process continues and escalates.

22

Systems and Transfers

Collins
GCSE OCR Revision • Physics

True or false?
If all of the electrical energy supplied to an efficient kettle is used to heat the water, this equation determines the change in temperature of the water.

potential difference × current × time = mass of water × specific heat capacity of water × change in temperature

23

Systems and Transfers

True.
The electrical energy supplied to the kettle is **potential difference × charge = potential difference × current × time**.
The rise in temperature of the water depends on the mass and the **specific heat capacity** of the water. The thermal energy change of water is **mass × specific heat capacity × change in temperature**.

23

Energy, Power and Efficiency

Collins
GCSE OCR Revision • Physics

When a device **transfers energy**, some energy is wasted. How does the energy transfer obey the **law of conservation of energy**?

24

Energy, Power and Efficiency

Energy is said to be wasted when the useful output energy of a device is less than the input (supplied) energy. This does not contravene the **law of conservation of energy** because the 'wasted' energy is **dissipated** to the surroundings, raising the temperature.

24

Energy, Power and Efficiency

Collins
GCSE OCR Revision • Physics

Complete this sentence correctly.
On a very cold day, a hut with thin metal walls will cool down very quickly because of the metal's …

… **low thermal conductivity**
… **high thermal conductivity**

25

Energy, Power and Efficiency

On a very cold day, a hut with thin metal walls will cool down very quickly because of the metal's **high thermal conductivity**.
The higher the thermal conductivity of a material, the higher the **rate of energy transfer** by **conduction** through the material.

25

Physics on the Road

Collins GCSE OCR Revision • Physics

What is a typical **speed** for a cyclist on a clear flat road? Choose from:

1 m/s **10 m/s** **100 m/s**

26

Physics on the Road

A typical **speed** for a cyclist on a clear flat road is **10 m/s**.

A person walking slowly would have a speed of about 1 m/s.

A plane, or an extremely fast train, might have a speed of 100 m/s.

26

Energy for the World

Collins GCSE OCR Revision • Physics

Give some types of **bio-fuel**, and explain whether bio-fuels are **renewable** or **non-renewable** energy resources.

27

Energy for the World

Types of **bio-fuel** include: wood; oils and 'bio-diesels' from crops such as rape and palm; also 'bio-ethanol' from crops such as sugar cane.

Bio-fuels are **renewable** energy resources, because we can plant more trees and crops.

27

Energy at Home

Collins GCSE OCR Revision • Physics

Why are **transformers** used in the **national grid**?

28

Energy at Home

Transformers are used in the **national grid** to increase (**step up**) the generated voltage to a high value for transmission around the country, because there is then less energy loss from the cables. Transformers are then used to reduce (**step down**) the voltage to a safer and more convenient voltage for the user.

28

Space

Collins GCSE OCR Revision • Physics

How does **red shift** provide evidence supporting the **Big Bang model**?

29

Space

Light from all distant **galaxies** shows **red shift** – an increase in wavelength – which tells us they are all moving away from us. More distant galaxies have greater red shift, which means they are moving away with greater speed. This agrees with the **Big Bang model**, which proposes that the universe began from a very small, hot and dense region.

29

Space

Collins GCSE OCR Revision • Physics

Our Sun was formed from dust and gas drawn together by **gravity**. What prevents its complete gravitational 'crush'?

30

Space

The initial **gravitational collapse** made the inner material of the Sun so hot that **nuclear fusion** began. The Sun is now in the stable part of its lifecycle. There is **equilibrium** (a balance) between its inward gravitational collapse and outward expansion due to energy radiated from nuclear fusion in the core.

30