Unit 1: Atomic structure

Subunit 1.2: Isotopes

Topical Question No: 1

1 The prefixes nano (n), micro (μ) and pico (p) are often used with units.

Which row shows their correct values?

	n	μ	p
A	10^{-6}	10^{-9}	10^{-12}
B	10^{-6}	10^{-12}	10^{-9}
C	10^{-9}	10^{-6}	10^{-12}
D	10^{-12}	10^{-9}	10^{-6}

Topical Question No: 2

3 The SI unit of specific heat capacity is $\mathrm{J\,kg^{-1}\,K^{-1}}$.

What is the unit of specific heat capacity expressed in SI base units?

A $\mathrm{m\,s^{-2}\,K^{-1}}$ **B** $\mathrm{kg\,m\,s^{-1}\,K^{-1}}$ **C** $\mathrm{m^2\,s^{-2}\,K^{-1}}$ **D** $\mathrm{kg\,m^2\,s^{-1}\,K^{-1}}$

Topical Question No: 3

2 At temperatures close to 0 K, the specific heat capacity c of a particular solid is given by $c = bT^3$, where T is the temperature and b is a constant, characteristic of the solid.
The SI unit of specific heat capacity is $\mathrm{J\,kg^{-1}\,K^{-1}}$.

What is the unit of constant b, expressed in SI base units?

A $\mathrm{m^2\,s^{-2}\,K^{-3}}$

B $\mathrm{m^2\,s^{-2}\,K^{-4}}$

C $\mathrm{kg\,m^2\,s^{-2}\,K^{-3}}$

D $\mathrm{kg\,m^2\,s^{-2}\,K^{-4}}$

Topical Question No: 4

1 The table shows some measurable quantities.

Which row gives the correct order of magnitude of the measurable quantity in the stated unit?

	measurable quantity	order of magnitude	unit
A	mass of a coin	10^{-4}	kg
B	thickness of a sheet of paper	10^{-2}	m
C	weight of an apple	10^{0}	N
D	temperature of a person's body	10^{1}	K

Topical Question No: 5

2 Which physical quantity could have units of $\mathrm{N\,s^2\,m^{-1}}$?

A acceleration

B force

C mass

D momentum

Topical Question No: 6

1 Decimal sub-multiples and multiples of units are indicated using a prefix to the unit. For example, the prefix milli (m) represents 10^{-3}.

Which row gives the sub-multiples or multiples represented by pico (p) and giga (G)?

	pico (p)	giga (G)
A	10^{-9}	10^{9}
B	10^{-9}	10^{12}
C	10^{-12}	10^{9}
D	10^{-12}	10^{12}

Topical Question No: 7

1 Which list contains only SI base units?

A ampere, kelvin, joule, gram

B kilogram, newton, metre, ampere

C metre, coulomb, second, kelvin

D second, kelvin, ampere, kilogram

Topical Question No: 8

2 The stress σ needed to fracture a particular solid is given by the equation

$$\sigma = k\sqrt{\frac{\gamma E}{d}}$$

where E is the Young modulus, d is the distance between planes of atoms, and k is a constant with no units.

What are the SI base units of γ?

A $\mathrm{kg\,m\,s^{-2}}$ **B** $\mathrm{kg\,s^{-2}}$ **C** $\mathrm{kg\,m\,s^{-1}}$ **D** $\mathrm{kg\,s^{-1}}$

Topical Question No: 9

2 What is the symbol for the SI base unit of temperature?

A C **B** K **C** °C **D** °K

Topical Question No: 10

2 Which two units are **not** equivalent to each other?

A N m and $\mathrm{kg\,m^2\,s^{-2}}$

B N s and $\mathrm{kg\,m\,s^{-1}}$

C $\mathrm{J\,s^{-1}}$ and $\mathrm{kg\,m^2\,s^{-3}}$

D Pa and $\mathrm{kg\,m\,s^{-2}}$