

## Working as a Physicist (MCQs)

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

**Q1.**

The newton can be written in base units as

- A** kg m
- B** kg m s<sup>-1</sup>
- C** kg m s<sup>-2</sup>
- D** kg m<sup>2</sup> s<sup>-2</sup>

**(Total for question = 1 mark)**

**Q2.**

Which of the following gives the S.I. base units equivalent to the volt?

- A** J C<sup>-1</sup>
- B** J A<sup>-1</sup> s<sup>-1</sup>
- C** kg m<sup>2</sup> s<sup>-2</sup> C<sup>-1</sup>
- D** kg m<sup>2</sup> s<sup>-3</sup> A<sup>-1</sup>

**(Total for question = 1 mark)**

**Q3.**

All quantities may be expressed in terms of SI base units.

Select the row of the table that states the SI base units for the given quantity.

	Quantity	SI base unit
<input type="checkbox"/> <b>A</b>	charge	C
<input type="checkbox"/> <b>B</b>	charge	A s <sup>-1</sup>
<input type="checkbox"/> <b>C</b>	power	J s <sup>-1</sup>
<input type="checkbox"/> <b>D</b>	power	kg m <sup>2</sup> s <sup>-3</sup>

**(Total for question = 1 mark)**

**Q4.**

Answer the question with a cross in the box you think is correct . If you change your mind about an answer, put a line through the box  and then mark your new answer with a cross .

Which of the following is the SI base unit for resistance?

- A  $\Omega$
- B  $V A^{-1}$
- C  $kg m^2 s^{-3} A^{-2}$
- D  $kg m^2 s^{-1} C^{-2}$

(Total for question = 1 mark)

**Q5.**

Select the row of the table that identifies an SI base unit and a derived unit.

	Base unit	Derived unit
<input type="checkbox"/> A	coulomb	ampere
<input type="checkbox"/> B	joule	volt
<input type="checkbox"/> C	newton	kilogram
<input type="checkbox"/> D	second	watt

(Total for question = 1 mark)

**Q6.**

Which of the following is a S.I. base quantity?

- A energy
- B length
- C speed
- D velocity

(Total for question = 1 mark)

**Q7.**

Which of the following lenses would produce a real image of an object placed 15 cm away from the lens?

- A** converging, focal length = 10 cm
- B** converging, focal length = 20 cm
- C** diverging, focal length = 10 cm
- D** diverging, focal length = 20 cm

**(Total for question = 1 mark)**

**Q8.**

Which of the following is a correct statement?

- A** charge is a base quantity
- B** velocity is a base quantity
- C** mass is a derived quantity
- D** resistance is a derived quantity

**(Total for question = 1 mark)**

**Q9.**

Which of the following best describes the newton as used in physical measurements?

- A** base quantity
- B** base unit
- C** derived quantity
- D** derived unit

**(Total for question = 1 mark)**

**Q10.**

Which of the following is a base SI unit?

- A** ampere
- B** coulomb
- C** joule
- D** newton

**(Total for question = 1 mark)**

**Q11.**

Which of the following is the unit for tension expressed in SI base units?

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

**(Total for question = 1 mark)**

**Q12.**

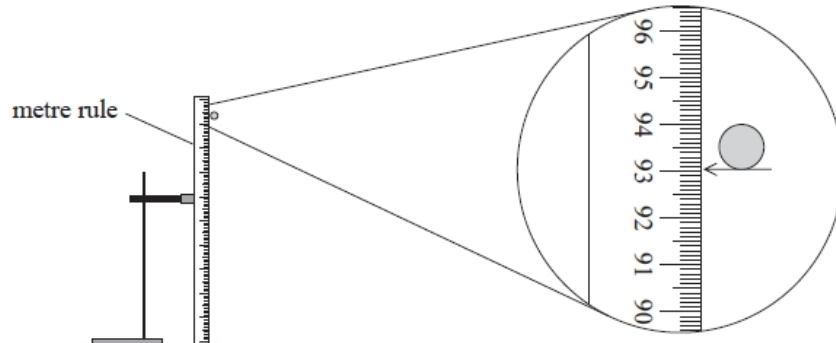
Which of the following are the base units for impulse?

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

**(Total for question = 1 mark)**

**Q13.**

A student carried out an experiment to determine the acceleration of free fall. The initial height of a ball bearing was measured using a metre rule.



What is the best estimate of the percentage uncertainty in the measurement of height?

- A**  $\pm 0.001\%$
- B**  $\pm 0.01\%$
- C**  $\pm 0.1\%$
- D**  $\pm 1\%$

**(Total for question = 1 mark)**

**Q14.**

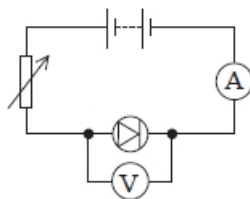
Which of the following is the SI base unit for the Planck constant?

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

**(Total for question = 1 mark)**

## Q15.

A student carried out an experiment to investigate the current-potential difference characteristics of a diode using the circuit below.



He plotted the graph of potential difference  $V$  on the  $y$ -axis against the corresponding current  $I$  on the  $x$ -axis.

Which graph would be obtained by the student?

(1)

<input checked="" type="checkbox"/> A	
<input checked="" type="checkbox"/> B	
<input checked="" type="checkbox"/> C	
<input checked="" type="checkbox"/> D	

(Total for question = 1 mark)

## Mark Scheme: Working as a Physicist

Q1.

Question Number	Answer	Mark
	C	1

Q2.

Question Number	Answer	Mark
	D $\text{kg m}^2 \text{s}^{-3} \text{A}^{-1}$	1
	Incorrect Answers: A – correct units but J and C are not base units B – correct units but J is not a base unit C – correct units but C is not a base unit	

Q3.

Question Number	Answer	Mark
	D power $\text{kg m}^2 \text{s}^{-3}$	1
	Incorrect Answers: A – Coulombs is not an SI base unit B – Incorrect, as the unit for charge in SI base units is A s C – $\text{J s}^{-1}$ is not in SI base units	

Q4.

Question Number	Answer	Mark
	C $\text{kg m}^2 \text{s}^{-3} \text{A}^{-2}$	1
	Incorrect Answers: A – $\Omega$ is not a base unit B – V is not a base unit D – C is not a base unit	

Q5.

Question Number	Answer	Additional Guidance	Mark
	<b>D is the only correct answer</b>	A is incorrect because coulombs is a derived unit and amperes is a base unit B is incorrect because joules is a derived unit C is incorrect because newtons is a derived unit and kilograms is a base unit	<b>1</b>

Q6.

Question Number	Answer	Mark
	<b>B length</b>	<b>1</b>
	Incorrect Answers: A energy is a derived quantity C speed is a derived quantity D velocity is a derived quantity	

Q7.

Question Number	Acceptable answer	Additional guidance	Mark
	A	The only correct answer is A because a real image is produced at a distance of 30 cm from the lens B is not the correct answer because the object distance is less than the focal length so the image is virtual C is not the correct answer because diverging lenses produce virtual images with real objects D is not the correct answer because diverging lenses produce virtual images with real objects	<b>1</b>

Q8.

Question Number	Acceptable Answer	Additional Guidance	Mark
	D		<b>1</b>



Q9.

Question Number	Answer	Mark
	<b>D – derived unit</b>	<b>1</b>
	Incorrect Answers: A – not a base quantity B – not a base unit C – not a derived quantity	

Q10.

Question Number	Acceptable answers	Additional guidance	Mark
	The only correct answer is A  ampere	B,C and D are not base units	<b>1</b>

Q11.

Question Number	Acceptable Answer	Additional Guidance	Mark
	<b>D</b> $\text{kg m s}^{-2}$		<b>1</b>

Q12.

Question Number	Acceptable answers	Additional guidance	Mark
	<b>The only correct answer is A</b>  <i>B is not correct because these are base units of force</i> <i>C is not correct because these are not base units</i> <i>D is not correct because these are not base units</i>	$\text{kg m s}^{-1}$	<b>1</b>

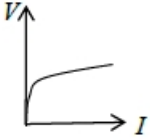
Q13.

Question Number	Answer	Mark
	<b>C <math>\pm 0.1\%</math></b>	<b>1</b>
	Incorrect Answers: A – the calculation has not been multiplied by 100 to give the % uncertainty i.e. $\frac{0.1}{93} = 0.001$ B – the uncertainty in mm has not been converted to cm and the calculation has not been multiplied by 100 i.e. $\frac{1}{93} = 0.01$ D – the uncertainty in mm has not been converted to cm i.e. $\frac{1}{93} \times 100 = 1$	

Q14.

Question Number	Answer	Mark
	<b>C <math>\text{kg m}^2 \text{s}^{-1}</math></b>	<b>1</b>
	Incorrect Answers: A – N is not an SI base unit and incorrect arrangement B – N is not an SI base unit D – incorrect arrangement	

Q15.

Question Number	Acceptable Answer	Additional Guidance	Mark
	<b>C</b> 		<b>1</b>