

Guidance on the use of past paper questions for Advanced Higher Physics

The Curriculum for Excellence Advanced Higher Courses draw on the strengths of popular areas of study from existing Advanced Higher with the introduction of some new content. The purpose of this support document is to help centres and departments to identify suitable past paper questions/items that could be used, or possibly amended, to support learners in their preparation for sitting question papers (exams) as part of the Advanced Higher Course assessment. The advice in this document reflects questions selected from Advanced Higher Physics Past Papers 2010 to 2014 and Revised Advanced Higher Physics Past Papers 2013 to 2014 [past papers](#).

When utilising any past paper questions, you need to take into account the following:

- ◆ You must select questions that provide the learners with the same level of challenge as those in the Advanced Higher Specimen Question Paper.
- ◆ You may be able to use questions as published or with amendments as suggested in the columns below.
- ◆ You must use questions that adhere to the Advanced Higher General Marking Principles and reflect the form of Detailed Marking Instructions as published in the Advanced Higher Specimen Question Paper.

If any change to a question/items is necessary, you must ensure that:

- ◆ The style and structure matches the Specimen Question Paper for Advanced Higher.
- ◆ Marking of the learner's response to the question adheres to the General Marking Principles in the Advanced Higher Specimen Question Paper.
- ◆ Marking Instructions are amended to reflect the style of the Advanced Higher Detailed Marking Instructions.

The details below should be read in conjunction with the relevant:

Mandatory documentation:

- ◆ Course Specification
- ◆ Unit Specifications
- ◆ Course Assessment Specification

Advice and guidance:

- ◆ Course and Unit Support Notes

Assessment:

- ◆ Question Paper Component:
 - general assessment information
 - general marking principles and detailed marking instructions

Related Information as provided in the relevant N5-Advanced Higher Course Comparison Document.

Key for the section below:

- C — amend context as required
- S — amend source as required
- St — amend question style
- Str — amend structure of the question

Not all topic/areas of study will appear every year due to the sampling techniques used in producing question papers.

<p>Information from the Course Assessment Specification</p> <p>The question paper will be made up of restricted, extended response and open-ended questions. Questions will sample the knowledge and understanding and apply skills described in the Further mandatory information on Course coverage section.</p>	<p>The columns below identify additional support questions from Advanced Higher Physics Past Papers 2010 to 2014 and Revised Advanced Higher Physics Past Papers 2013 to 2014.</p> <p>If the same questions appeared in both the revised and the traditional paper we have referenced the one from the revised paper. *There is additional advice and guidance about specific changes to questions in the 'General Notes' section. These are identified by an asterisk.</p> <p>The new Advanced Higher has no half marks. A suggested marking revision has been applied to questions, or question parts, which previously had half marks in their Marking Instructions. New 'marks suggestions' are given under the heading 'Suggested revised marking notes'.</p>					
<p>Advanced Higher Traditional</p>			<p>Advanced Higher Revised</p>			
<p>Use question as published</p>	<p>Amend question context/source</p>	<p>Amend question style/ structure</p>	<p>Use question as published</p>	<p>Amend question context/source</p>	<p>Amend question style/ structure</p>	
<p>Skills</p>						
<p>Units, Prefixes& Scientific Notation</p>				<p>2014 Q7 (b)(i) (Units) *</p>		
<p>Uncertainties</p>	<p>2014 Q7 (a)(ii)(B) (mean)</p>		<p>2014 Q12 (b) (ii) Str (Combination uncertainties) 2013 Q9 (b) Str (Combination uncertainties) *</p>	<p>2014 Q15 (a), (b) (uncertainties)</p>		<p>2014 Q9 (b) (ii) Str (Combination uncertainties) 2013 Q12 (b) Str (Combination uncertainties) *</p>
<p>Data Analysis</p>			<p>2011 Q7 (b) (ii) and (iii) (combining uncertainties) 2012 Q11 (a) (graphical interpretation) Str</p>	<p>2014 Q14 2014 Q15 (c)</p>		

Rotational Motion & Astrophysics						
Kinematic Relationships	2013 Q1 (c) (Calculus methods)			2013 Q1(c) (Calculus methods)		2014 Q1 Str (Calculus)
Angular Motion	2013 Q1 (b)(i) (Centripetal force and acceleration)		2014 Q1 (a)(i) Str (Angular velocity) (b) Str (Ang acc) * 2013 Q1 (a) (b)(ii) Str (Centripetal force and acceleration) 2013 Q2(a)(ii) Str (Angular * displacement, velocity and acceleration)	2013 Q1 (b)(i) (Centripetal force and acceleration) 2013 Q3 (Centripetal force and acceleration)		2013 Q1 (a) (b)(ii) Str (Centripetal force and acceleration) 2013 Q2(a)(ii) Str (Angular * displacement, velocity and acceleration)
Rotational Dynamics	2014 Q1 (a) (iii) (T, I & ang acc) 2014 Q2 (c) (Rot E_k) 2013 Q2(b) (Torque, moment of inertia and angular Acceleration) 2010 Q4 (a) (angular momentum)		2014 Q1 (a) (ii) Str (Rot E_k) (b) Str (T, I & ang acc) * 2014 Q2 (a) Str (T, I & ang acc) (b) Str (Rot E_k) 2013 Q2(a)(i) (a)(ii) Str	2014 Q2 (c) (Rot E_k) 2013 Q2(b) (Torque, moment of inertia and angular Acceleration)		2014 Q2 (a) Str (T, I & ang acc) (b) Str (Rot E_k) 2013 Q2(a)(i) (a)(ii) Str (Torque, * moment of inertia and angular acceleration.)

			(Torque, * moment of inertia and angular acceleration) 2010 Q4 (b)(i) Str (angular momentum)		
Gravitation	2014 Q3 (a)(i) (b) (Escape velocity)		2014 Q3 (a)(iii) Str (Escape velocity) 2013 Q3(a)(i)(ii)(b) Str (Gravitational field strength)	2014 Q3 (a)(i) (b) (Escape velocity)	2014 Q3 (a)(iii) Str (Escape velocity)
General Relativity	2013 Q3(c)(i) (Black holes)		2013 Q3(c)(ii) Str (Black holes)	2014 Q4 (a)(i) (Black holes) 2014 Q5 (Equivalence principle) 2013 Q4(a) (Spacetime diagrams) Q4(b) (Equivalence principle)	2014 Q4 (a)(ii) Str (Black holes) 2013 Q4(c) Str (Equivalence principle)
Stellar Physics				2014 Q4 (b) (HR diagram) 2013 Q5(a)(c) (HR diagram) (d) (Stellar evolution)	2014 Q4 (c) Str (Properties of Stars) 2014 Q7 (a) Str (Properties of Stars) 2013 Q5 (b) Str (HR diagram)

						(e)(i) Str (H fusion) (e)(ii) (iii) Str (Stellar evolution) (f) Str (Properties of stars) *
Electromagnetism						
Fields	2013 Q7 (a) (Force on a current carrying conductor) (e)(ii) (Force on current carrying conductor) 2013 Q8 (a) (Motion of charged particles in uniform electric fields) 2013 Q9 (c) (Electric Potential)		2014 Q6 (a)(i) (ii) Str (Coulomb's Law) (b)(i) Str (Electric potential) 2014 Q7 (b)(i) Str (Uniform Electric field) (b)(ii) Str (Uniform Electric field) 2013 Q5 (b) Str (Compare fields) 2013 Q6 (a)(i) Str (Motion of charged particles in uniform electric fields) 2013 Q7 (b) (c) Str (Force on a current	2014 Q12 (a) (Electric potential and electric field strength) (b) (Ferromagnetism)		2013 Q11 (a) (b) Str (Force on a current carrying conductor) (c) Str (Magnetic Induction) 2013 Q12 (a) Str (Electrical Potential)

			carrying conductor (d) Str (Magnetic Induction) (e)(i) Str (Force on current carrying conductor) 2013 Q8 (b) (c) Str (Motion of charged particles in uniform electric fields) 2013 Q9 (a) Str (Electric Potential)			
Circuits			2014 Q10 (a) (b) Str (Inductors in Circuits) (c) Str (Inductors in ac) 2013 Q10 (a)(i)(ii) Str (Inductors in dc circuits) (b) Str (Lenz's Law)	2013 Q13 (a) (Time constant for CR circuit) 2013 Q15 (c) (capacitors and inductors in ac)		2014 Q13 (a) (b) Str (Inductors in Circuits) (c) Str (Inductors in ac) 2013 Q13 (b) Str (time constant for CR circuit) 2013 Q14 (a)(i) (ii) Str (Inductors in dc circuits) (b) Str (Lenz's Law) 2013 Q15 (a)

						(b) Str (capacitors and inductors in ac)
Electromagnetic Radiation	These are new topics for which there are no suitable questions in previous papers.					
Quanta & Waves						
Introduction to Quantum Theory	2014 Q5 (a)(i)(ii) (Wave Particle Duality) (d)(i) (Bohr Model) 2013 Q5 (a)(iii) (Wave particle duality)		2014 Q5 (b), (c) Str (de Broglie) (d)(ii) Str (Bohr Model) 2013 Q5 (a) (i) Str (Bohr Model) (a)(ii) Str (de Broglie waves)	2014 Q6 (a)(i)(ii) (Wave Particle Duality) (d)(i) (Bohr Model) 2013 Q10 (c)(ii) (Uncertainty principle)		2014 Q6 (b), (c) Str (Bohr Model) (d) (ii) Str (Bohr Model) 2013 Q10 (a) Str (Bohr Model) (b) Str (de Broglie waves) (c)(i) Str (Uncertainty principle)
Particles from Space	2014 Q8 (a)(i)(b) (Solar Wind) 2014 Q9 (a)(i)(ii)(c)(i)(ii) (Solar Wind)		2014 Q8 (a)(ii)(iii) (b)(ii) Str (Solar Wind)	2014 Q7 (b)(ii) A, (iii) (Cosmic Rays) 2013 Q6 (Solar wind)		2014 Q7 (b)(ii) B Str (Cosmic Rays)
Simple Harmonic Motion	2014 Q4 (a), (b) (Dynamics of SHM)		2014 Q4 (c) Str (Solutions of SHM & Kinetic Energy) 2013 Q4 (a), Str (Dynamics of SHM) (b)(i) (ii) Str (Solutions of SHM) (c) Str (E_k & E_p in SHM)	2014 Q8 (a), (b) (Dynamics of SHM)		2014 Q8 (c) Str (Solutions of SHM & Kinetic Energy) 2013 Q7(a) Str (Dynamics of SHM) (b)(i)(ii) Str (Solutions of SHM) (c) Str (E_k & E_p in SHM)

Waves	2013 Q12 (b)(i) (Mathematical representation of travelling wave)		2013 Q12 (a) Str (Mathematical representation of travelling wave) (b)(ii) Str (Energy proportional to square of amplitude)	2013 Q9 (b)(i) (Mathematical representation of travelling wave)		2013 Q9 (a) Str (Mathematical representation of travelling wave) (b)(ii) Str (Energy proportional to square of amplitude)
Interference	2014 Q12 (a) (division of wavefront) 2014 Q11 (a) & (c) (division of amplitude) 2013 Q11 (b)		2014 Q12 (b) (i) Str (division of wavefront) 2014 Q11 (b) Str (division of amplitude) 2013 Q11 (a) Str (Wedge fringes) (c)(i) (ii) Str (Phase difference and OPD)	2014 Q9 (a) (division of wavefront) 2014 Q10 (a) & (c) (division of amplitude) 2013 Q8 (b)		2014 Q9 (b) (i) Str (division of wavefront) 2014 Q10 (b) Str (division of amplitude) 2013 Q8 (a) Str (Wedge fringes) (c)(i) (ii) Str (Phase difference and OPD)
Polarisation	2014 Q13 (a) (i) & (ii) (Plane Polarisation) 2013 Q13 (a)(b) (Plane Polarisation) (c)(i) (Brewster's angle)		2014 Q13 (b) Str (Brewster's Angle) 2013 Q13(c)(ii) Str (Brewsters angle)	2014 Q11 (a) (i) & (ii) (Plane Polarisation) 2013 Q16 (a) (Plane Polarisation) (b) (Brewster's angle)		2014 Q11 (b) Str (Brewster's Angle)

Resources

SQA past papers www.sqa.org.uk/pastpapers/findpastpaper.htm	Additional assessment support material is available here: Education Scotland www.educationscotland.gov.uk/ Glow www.educationscotland.gov.uk/usingglowandict/ Glow Log-in https://secure.glowscotland.org.uk/login/login.htm
---	---

*General Notes

2014 Revised Q7 b (i) could be attributed to units (eV) or Fields. b(ii) & (iii) could be attributed to either Particles From Space or Fields.

2014 Revised Q9 b (ii) could be attributed to uncertainties or interference.

2014 Trad Q1 (b) has been attributed to both Angular Motion and Rotational Dynamics as it has parts in both.

2013 Rev & Trad Q2 (a)(ii) is in both Angular Motion & Rotational Dynamics as part of the same question refer to both areas.

2013 Revised Q5(f) has been attributed to Stellar Physics (Properties of Stars) but it is a problem solving data handling question.

2013 Revised Q12 (b) could be attributed to Fields but has been put into uncertainties.

2013 Trad Q9 b could be attributed to Fields (Electric Potential) but has been put into uncertainties.

When a question is likely to change marks, eg most simple calculations were previously 2 marks and will now be 3 marks, they have been flagged as **Str**.

Suggested revised marking notes

2014 Traditional new marks suggestions

Q1 (a) (i) 2 changes to 3 (ii) changes to 3 (b) 3 changes to 4 or 5.

Q2 (a) 2 changes to 3, (b) 4 changes to 5.

Q3 (a)(iii) 3 changes to 4.

Q4 (c) (i) 3 changes to 4, (ii) 2 changes to 3.

Q5 (b) 2 changes to 3, (c) 2 changes to 3 & (d) (ii) 2 changes to 3.

Q6 (a) (i) 2 changes to 3 (ii) 3 changes to 4 or 5 (b)(i) 2 changes to 3.

Q7 (b)(i) remain 1 mark total, no half mark for formula since given in &(a)(i)

(b)(ii) 3 changes to 5

(b)(iii) 2 changes to 3

Q8 (a)(ii) 2 changes to 3, (iii) 2 changes to 3, (b)(ii) 2 changes to 3 or 4.

Q10 (a) 2 changes to 3 (b) 2 changes to 3 (c) 1 changes to 2 (note Trad (c) different from Revised Q13(c)).

Q11 (b) 2 changes to 3.

Q12 (b) (i) 2 changes to 3 (ii) 3 changes to either 4 or 5.

Q13 (b) 2 changes to 3.

2013 Traditional new marks suggestions

Q1 (a) 2 changes to 3 (3 single marks) or stays at 2 with 1 for equations and equality and one for substitution. (b)(ii) 3 changes to 4.

Q2 (a)(i) 3 changes to 4, (a)(ii) 3 changes to 4.

Q3 (a)(i) 2 changes to 3, (ii) 1 changes to 2, (b) 2 changes to 3, (c)(ii) 2 changes to 3.

Q4 (a) 1 remains 1 but both half mark points now required for 1 mark, (b)(i) 3 changes to 4, (b)(ii) 2 changes to 3, (c) 3 changes to 4.

Q5 (a)(i) 2 changes to 3, (ii) 2 changes to 3, (b) 3 changes to 5.

Q6 (a)(i) 2 changes to 3.

Q7 (b) 2 changes to 3, (c) 2 remains 2 but two half marks required for second mark, (d) 2 changes to 3, (e)(i) 2 changes to 3.

Q8 (b) 1 remains 1 but must have both forces and direction to get mark, (c) 3 changes to 4.

Q9 (a) 2 changes 3, (b) 2 changes to 3.

Q10 (a)(i) 2 changes to 3, (ii) 2 changes to 3, 2 changes to 3.

Q11 (a) 3 changes to 4, (c) (i) 2 changes to 3, (c)(ii) 2 changes to 3.

Q12 (a) 2 changes to 3, (b)(ii) 2 changes to 3.

Q13 (c)(ii) 1 changes to 2.

2012 Traditional new marks suggestions

Q11 (a)(i) changes to 3 marks.

2011 Traditional new marks suggestions

Q7 (b)(ii) changes to 4 marks — the two half marks for RU becoming one mark.

Q7 (b)(iii) changes to 5 marks.

2014 Revised new marks suggestions

Q1 (a) 2 changes to 3, (b) 3 changes to 4.

Q2 (a) 2 changes to 3, (b) 4 changes to 5.

Q3 (a)(iii) 3 changes to 4.

Q4 (a)(ii) 3 changes to 4, (c) (i) 2 changes to 3, (ii) 2 changes to 3.

Q6 (b) 2 changes to 3, (c) 2 changes to 3 & (d) (ii) 2 changes to 3.

Q7 (a) 2 changes to 3, (b)(ii) B 3 becomes 4.

Q8 (c) (i) 3 changes to 4, (ii) 2 becomes 3.

Q9 (b) (i) 2 changes to 3 (ii) 3 changes to either 4 or 5.

Q10 (b) 2 changes to 3.

Q11 (b) 2 changes to 3.

Q13 (a) 2 changes to 3 (b) 2 changes to 3 (c) 3 changes to 4.

2013 Revised new marks suggestions

Q1 (a) 2 changes to 3 (3 single marks) or stays at 2 with 1 for equations and equality and one for substitution. (b)(ii) 3 changes to 4.

Q2 (a)(i) 3 changes to 4, (a)(ii) 3 changes to 4.

Q4 (c) 2 remains at 2 but lose half mark, only first point and one of second or third point required.

Q5 (b) 2 changes to 3 or 4, (e)(i) 2 changes to 3 or 4, (e)(ii) 1 changes to 2, (e)(iii) 1 changes to 2, (f) 2 changes to 3.

Q7 (a) 1 remains 1 but both half mark points now required for 1 mark, (b)(i) 3 changes to 4, (b)(ii) 2 changes to 3, (c) 3 changes to 4.

Q8 (a) 3 changes to 4, (c) (i) 2 changes to 3, (c)(ii) 2 changes to 3.

Q9 (a) 2 changes to 3, (b)(ii) 2 changes to 3.

Q10 (a) 2 changes to 3, (b) 2 changes to 3, (c)(i) 2 changes to 3.

Q11 (a) 2 changes to 3, (b) 2 remains 2 but two half marks required for second mark, (c) 2 changes to 3.

Q12 (a) 2 changes to 3, (b) 2 changes to 3.

Q13 (b) 2 changes to 3.

Q14 (a)(i) 2 changes to 3, (ii) 2 changes to 3, (b) 2 changes to 3.

Q15 (a) 1 remains 1 but need both equations and equality for mark, (b) 2 changes to 3.