

**Unit Code:** J259/02

**Qual Name:** GCSE Physics B (Twenty First Century Science)

**Qual Title:** Depth in physics (Foundation)

**Tier:** Foundation

Question Set	Q. No	Total Marks	AO	Spec Ref.	Topic	Question Subject, If required	Additional Notes/Comments	Maths Skills	Practical Assessment Skills
1	1ai	1	2	1.3.7a	Determining time sound produced from a graph	This question is about measuring the speed of sound.	Graph in (a) (i) required. Please note: Graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		
1	1aai	1	2	1.3.7a	Determining the time the echo received	This question is about measuring the speed of sound.	Graph in (a) (i) required		
1	1aiii	1	2	1.3.7a	Determining the time of travel	This question is about measuring the speed of sound.	Graph in (a) (i) required	Y	
1	1b	2	1 and 2	4.2.1	speed = distance ÷ time	This question is about measuring the speed of sound.			
1	1c	2	3	1.3.7a	Suggesting why answer for speed of sound is inaccurate	This question is about measuring the speed of sound.			
2	1a	3	1	1.4.2, 1.4.5	Interpret a ray diagram of a prism and explain how colour is related to differential absorption.	This question is about refraction in prisms and ripple tanks, and absorption of light.	Diagram of prism required		
2	1bi	2	2	1.3.6	wave speed = frequency × wavelength	This question is about refraction in prisms and ripple tanks, and absorption of light.			
2	1bii	2	3	1.3.7(a), 1.3.7(b), 1.3.8(a)	Relating refraction in a prism to refraction of waves in a ripple tank	This question is about refraction in prisms and ripple tanks, and absorption of light.	Diagrams of prism and ripple tank required.		
3	1a	2	1	2.2.4	The difference between a.c. and d.c.	This question is about the the U.K. electricity supply; voltage, transformers, and the National Grid.			
3	1bi	3	1 and 2	3.4.5	Output current from a transformer	This question is about the the U.K. electricity supply; voltage, transformers, and the National Grid.	Requires Table 3.1	Y	

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3	1bii	3	1 and 2	3.4.4	Output power from a transformer	This question is about the the U.K. electricity supply; voltage, transformers, and the National Grid.	Requires Table 3.1	Y	
3	1biii	2	2	3.4.4	Number of homes that can be supplied	This question is about the the U.K. electricity supply; voltage, transformers, and the National Grid.	Requires answer to (b)(ii)	Y	
3	1c	2	1 and 3	3.4.6	Transmitting power at higher voltage increases efficiency	This question is about the the U.K. electricity supply; voltage, transformers, and the National Grid.			
4	1ai	2	2	2.2.3	Using data to compare output of solar farms and gas power stations	This question is about the comparing solar farms and gas fired power stations	Requires the Table in (a)	Y	
4	1aii	2	2	2.2.1	Factors affecting available solar power	This question is about the comparing solar farms and gas fired power stations			
4	1b*	6	1 and 3	1.2.1, 2.2.1, 2.1.2	Advantages and disadvantages of solar farms and gas power stations	This question is about the comparing solar farms and gas fired power stations	This question requires the two comments and the Table in (a) This question is marked by level of response.		
5	1ai	2	2	5.1.9	Nuclear equation for alpha decay.	This question is about a journey on Mars and includes alpha decay, rechargeable batteries and a distance – time graph.			
5	1aii	2	1 and 2	5.2.1, 5.2.2	Properties of alpha emissions.	This question is about a journey on Mars and includes alpha decay, rechargeable batteries and a distance – time graph.			
5	1bi	3	1 and 3	2.1.8, 2.1.9	Calculate efficiency using a Sankey diagram	This question is about a journey on Mars and includes alpha decay, rechargeable batteries and a distance – time graph.	Fig. 5.1 is required. Please note: Fig. 5.1 is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
5	1bii	2	2 and 3	2.1.3	Calculate time to charge battery: Energy transfer = power × time	This question is about a journey on Mars and includes alpha decay, rechargeable batteries and a distance – time graph.	Fig. 5.1 is required. Please note: Fig. 5.1 is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		

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5	1c	4	1 and 2	4.2.8	Drawing a distance – time graph	This question is about a journey on Mars and includes alpha decay, rechargeable batteries and a distance – time graph.	The graph in part (c) is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
6	1ai	3	1 and 2	4.4.4	Calculate gravitational potential energy	This question is about measuring the energy transfers when trolley rolls down a ramp.	Requires Fig. 6.1 This question assesses practical skills	Y	Y
6	1aii	2	2 and 3	4.4.7	Conservation of energy - effect of friction and air resistance.	This question is about measuring the energy transfers when trolley rolls down a ramp.			Y
6	1aiii	1	2	4.4.7	Calculating a mean value	This question is about measuring the energy transfers when trolley rolls down a ramp.	Requires Table 6.1	Y	Y
6	1bi	1	1	4.4.7	Understanding of the point (0,0)	This question is about measuring the energy transfers when trolley rolls down a ramp.	Requires Fig. 6.1 and Table 6.2 and graph in (b)(ii)		Y
6	1bii	2	2	4.4.7	Plotting results on a graph	This question is about measuring the energy transfers when trolley rolls down a ramp.	Requires Fig. 6.2 Please note: Fig 6.2 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	Y
6	1c	2	3	4.4.7	Describing the trend on a graph	This question is about measuring the energy transfers when trolley rolls down a ramp.	Requires Fig. 6.2 Please note: Fig 6.2 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		Y
7	1ai	1	2	6.2.4	Sample with the fastest particles	This question is about the pressure and volume of a gas.	Requires diagrams ABCD		
7	1aii	1	2	6.2.1	Sample with the greatest density	This question is about the pressure and volume of a gas.	Requires diagrams ABCD		
7	1aiii	1	2	6.2.3, 6.2.4	Sample with the highest pressure	This question is about the pressure and volume of a gas.	Requires diagrams ABCD		
7	1aiv	1	2	6.2.4	Sample with the smallest pressure	This question is about the pressure and volume of a gas.	Requires diagrams ABCD		
7	1b	2	1 and 2	6.4.5	Pressure $\times$ volume = constant	This question is about the pressure and volume of a gas.	Requires diagrams in (b)	Y	
7	1c	3	1 and 2	6.4.2	Pressure = force $\div$ area	This question is about the pressure and volume of a gas.		Y	

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8	1ai	1	1	3.3.5(b)	The variation of resistance of an LDR with light intensity.	This question is about using an LDR to measure light intensity.	Overlap item with HT. The graph is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		
8	1aii	2	2	3.3.5(b)	Determining change in resistance from a graph of R against intensity.	This question is about using an LDR to measure light intensity.	Overlap item with HT. The graph is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	Y
8	1bi	3	1 and 2	3.2.4(a)	Calculate current using potential difference = current $\times$ resistance	This question is about using an LDR to measure light intensity.	Overlap item with HT. The circuit diagram is required.	Y	
8	1bii	3	1 and 2	3.2.4(a), 3.3.4	Calculate potential difference in a series circuit	This question is about using an LDR to measure light intensity.	Overlap item with HT. The circuit diagram is required.	Y	
8	1biii	3	2 and 3	3.2.4(a), 3.3.5	Describe change in resistance of the fixed resistor when light intensity on LDR changes	This question is about using an LDR to measure light intensity.	Overlap item with HT. Requires answers to the previous items.		
9	1a*	6	2 and 3	6.1.6, 3.4.2, 3.4.4	Calculation of specific latent heat, evaluation of experiment and suggestion for improvement.	This question is about measuring the latent heat of vapourisation of water.	Overlap item with HT. This question assesses practical skills and is marked by level of response.	Y	Y
9	1b	3	1 and 3	6.2.3	Use of particle model to explain differences in specific latent heat of vapourisation	This question is about measuring the latent heat of vapourisation of water.	Overlap item with HT.		
10	1a	1	1	3.1.3	Electric fields	This question is about static electricity as a result of rubbing a balloon with a cloth.	Diagrams required		
10	1b	2	2	3.1.1, 4.3.1	Electrostatic forces	This question is about static electricity as a result of rubbing a balloon with a cloth.	Diagrams required		
10	1c	2	1	3.1.2	The transfer of electrons and static electricity	This question is about static electricity as a result of rubbing a balloon with a cloth.	Diagrams and student comment required.		
11	1ai	1	1	2.2.4	The UK domestic electricity supply	This question is about a kettle using the UK domestic electricity supply	The diagram of the kettle label is required.		
11	1aii	3	1	2.2.4	The difference between d.c. and a.c.	This question is about a kettle using the UK domestic electricity supply	The diagrams of the axes for direct and alternating voltage are required.		
11	1aiii	1	2	3.4.2	Energy and power transfer in 1 second	This question is about a kettle using the UK domestic electricity supply			

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11	1bi	3	1 and 2	2.1.3	Energy transferred = power × time	This question is about a kettle using the UK domestic electricity supply	The table in (b) is required.	Y	
11	1bii	2	3	3.4.2	Time related to energy transfer and power rating	This question is about a kettle using the UK domestic electricity supply	The table in (b) is required.		
11	1c	1	1	2.2.5	Use of transformers in the National Grid	This question is about a kettle using the UK domestic electricity supply			
12	1ai	2	2	1.4.5	How colour is related to absorption and scattering	This question is about colour and refraction of light.	Fig. 3.1 and Fig. 3.2 required		
12	1aii	1	2	1.4.5	How colour is related to absorption and scattering	This question is about colour and refraction of light.	Fig. 3.1 required.		Y
12	1b	2	3	1.3.8a	Angles of incidence and refraction	This question is about colour and refraction of light.	Fig. 3.3 and Fig. 3.4 and the student comment required		Y
12	1c	3	1 and 2	1.3.6	Wave speed = frequency × wavelength	This question is about colour and refraction of light.		Y	
13	1ai	1	1	6.5.1, 6.5.6, 5.3.4	Difference between planets and stars	This question is about stars, planets, solar systems and galaxies.			
13	1aii	6	1 and 2	6.5.1, 6.5.6, 6.5.4	Structure and formation of a solar system	This question is about stars, planets, solar systems and galaxies.	This question is marked by level of response.		
13	1bi	1	3	6.5.8	Galaxies: Distance and speed of recession	This question is about stars, planets, solar systems and galaxies.	Table in (b) is required		
13	1bii	2	3	6.5.7	Red shift and speed of recession of a galaxy	This question is about stars, planets, solar systems and galaxies.	Table in (b) is required		
14	1a	1	1	5.2.1	Penetration properties of radioactive emissions	This question is about smoke detectors and half-life of a radioactive source.	The photograph is required		
14	1b	2	3	5.2.1	Penetration properties of radioactive emissions	This question is about smoke detectors and half-life of a radioactive source.	The photograph is required		Y
14	1c	2	1 and 2	5.2.4	Hazardous effect of ionising radiation	This question is about smoke detectors and half-life of a radioactive source.	The student comment in (c) is required		
14	1di	2	1 and 3	5.1.12	Half-life from a radioactive decay curve	This question is about smoke detectors and half-life of a radioactive source.	The graph in (d) is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
14	1dii	3	2	5.1.12	Activity and half-life from a radioactive decay curve	This question is about smoke detectors and half-life of a radioactive source.	The graph in (d) is required	Y	

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14	1diii	3	2	5.1.10, 5.1.12	Sketching a radioactive decay curve	This question is about smoke detectors and half-life of a radioactive source.	The graph in (d) is required	Y	
15	1a	3	2	4.2.8, 4.2.9	Relating lines and slopes on a distance – time graph to motion represented.	This question is about distance – time and velocity – time graphs.	Fig. 6.1 is required.		
15	1bi	2	3	4.2.8, 4.2.9	Relating lines and slopes on a velocity – time graph to motion represented.	This question is about distance – time and velocity – time graphs.	Fig. 6.2 is required.		
15	1bii	2	3	4.2.8, 4.2.9	Relating lines and slopes on a velocity – time graph to motion represented.	This question is about distance – time and velocity – time graphs.	Fig. 6.2 is required.		
15	1c	3	1 and 2	4.2.6a	Acceleration = change in speed ÷ time taken	This question is about distance – time and velocity – time graphs.		Y	
15	1di	1	2	4.3.18	Estimate mass in the context of road transport.	This question is about distance – time and velocity – time graphs.		Y	
15	1dii	3	1 and 2	4.3.12	Force = mass × acceleration	This question is about distance – time and velocity – time graphs.		Y	
16	1ai	1	1	3.2.6a	I V curve for a filament lamp	This question is about electric circuits.	The diagram in (a)(i) is required.		
16	1aii	3	1 and 2	3.2.2	Charge = current × time	This question is about electric circuits.	Fig. 7.1 is required.	Y	
16	1aiii	3	1 and 2	3.4.4	Power = potential difference × current	This question is about electric circuits.		Y	
16	1b	2	2	3.3.3, 3.3.2, 3.3.4	The effect on total current of adding a resistor in parallel	This question is about electric circuits.	Fig. 7.2 is required.		
16	1ci	1	1	3.2.6b	Diode conducts in only one direction	This question is about electric circuits.			
16	1cii	1	1	3.2.7	Circuit symbol for a diode	This question is about electric circuits.			
17	1ai	1	2	4.3.8, 4.3.10	Direction of rotation of gears	This question is about gears and levers.	Overlap item with HT Fig. 8.2 is required		
17	1aii	2	2	4.3.10	Gear ratios and number of revolutions	This question is about gears and levers.	Overlap item with HT Fig. 8.2 is required	Y	
17	1b	3	1 and 2	4.3.9	Calculating the moment of a force	This question is about gears and levers.	Overlap item with HT Fig. 8.3 is required	Y	Y
18	1*	6	1, 2 and 3	6.1.2, 6.1.1b	Using a graph to compare the density of two liquids.	This question is about using a graph to compare the density of two liquids.	Overlap item with HT. This question is marked by level of response .	Y	Y
19	1a	2	3	3.3.5 b	The effect of changing light intensity on a LDR	This question is about investigating LDRs.	Overlap item with HT Requires Fig. 10.1 and Fig. 10.2		Y
19	1b	2	1	3.2.6a, 3.2.7	Completing a circuit diagram	This question is about investigating LDRs.	Overlap item with HT Requires Fig. 10.3		Y

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19	1ci	1	3	3.3.5 b	The design and use of a circuit to measure light intensity with an LDR	This question is about investigating LDRs.	Overlap item with HT		Y
19	1cii	1	3	3.3.5 b	The design and use of a circuit to measure light intensity with an LDR	This question is about investigating LDRs.	Overlap item with HT		Y
20	1a	1	1	1.4.2	Ray diagrams for refraction	This question is about refraction and dispersion of visible light.			Y
20	1b	1	1	1.4.2	Dispersion by a prism	This question is about refraction and dispersion of visible light.	Requires Fig. 1.1		
20	1ci	1	1	1.4.2	Dispersion and colour	This question is about refraction and dispersion of visible light.	Requires Fig. 1.1		
20	1cii	1	1	1.4.2	Dispersion and colour	This question is about refraction and dispersion of visible light.	Requires Fig. 1.1		
20	1ciii	1	1	1.4.5	Dispersion and colour	This question is about refraction and dispersion of visible light.	Requires Fig. 1.1		
21	1a	2	1	3.5.1	Magnetic attraction and repulsion	This question is about magnetism.	Requires Fig. 2.1		Y
21	1bi	1	2	3.5.2	Magnetic field of a bar magnet	This question is about magnetism.	Requires Fig. 2.2		Y
21	1bii	2	2	3.5.2	Magnetic field of a bar magnet	This question is about magnetism.	Requires Fig. 2.2		
21	1c	1	1	3.5.4	Induced and permanent magnets	This question is about magnetism.			
22	1ai	1	1	4.3.2	Balanced forces on a body.	This question is about forces on and motion of a falling body.			
22	1aii	2	2	4.3.2	Free body force diagrams.	This question is about forces on and motion of a falling body.	Diagram required with space around to add arrows.		
22	1b	2	2	4.1.7	weight = mass × gravitational field strength.	This question is about forces on and motion of a falling body.		Y	
22	1ci	1	1	4.2.5	Vectors and scalars	This question is about forces on and motion of a falling body.			
22	1cii	1	1	4.2.5	Vectors and scalars	This question is about forces on and motion of a falling body.			
23	1ai	2	1	6.3.3b PAG2	Measuring and observing forces on a spring	This question is about the force on a material under stress.	The diagram, the table and the graph in Fig. 4.1 are all required. Please note: Fig 4.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers. This question assesses practical skills.	Y	Y
23	1aii	1	2	6.3.3a	Relationship between force and extension of a spring	This question is about the force on a material under stress.	Fig 4.1 is required. Please note: Fig 4.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		Y

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23	1aiii	3	1 and 2	6.3.5	force = extension × spring constant	This question is about the force on a material under stress.	Fig 4.1 is required. Please note: Fig 4.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	Y
23	1b	2	2	6.3.4	Force extension relationship for a rubber band	This question is about the force on a material under stress.	Fig 4.2 is required.		Y
24	1a	1	2	5.1.4	protons and neutrons in the nucleus	This question is about the nucleus and radioactive decay.	The table is required.		
24	1b	1	2	5.1.5	isotopes	This question is about the nucleus and radioactive decay.	The table is required.		
24	1c	1	1	5.1.7	radioactive decay emissions	This question is about the nucleus and radioactive decay.			
25	1a	4	1 and 2	3.2.3, 3.2.4a	Calculation of resistance of a fixed resistor using data from a graph	This question is about the resistance of circuit components.	Requires Fig. 6.1 Please note: Fig 6.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
25	1b	3	3	3.2.5 PAG6	Resistance of a filament lamp from a graph.	This question is about the resistance of circuit components.	Requires Fig. 6.2 Please note: Fig 6.2 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		
26	1	6	1, 2 and 3	4.2.1, 2,3	Measuring the speed of sound	This question is about measuring the speed of sound.	This question is marked by level of response.	Y	Y
27	1a	3	1	6.2.2	Changes of state.	This question is about changes of state, density, and the particle model.	Diagram required.		
27	1b	2	2	6.2.1	Density of different states of matter explained by particle model	This question is about changes of state, density, and the particle model.			
28	1ai	1	2	4.2.9	Interpreting a distance – time graph	This question is about distance – time graphs.	The graph is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
28	1aii	1	2	4.2.9	Interpreting a distance – time graph	This question is about distance – time graphs.	The graph is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		



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28	1b	2	2	4.2.8, 9	Calculating average speed	This question is about distance – time graphs.	The graph is required. Please note: The graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
29	1ai	2	3	2.2.3, 2.2.7	Interpreting data on electricity generation by solar panels	This question is about generating electricity with wind turbines and solar panels.	Bar chart and table in (a) required		
29	1aii	2	3	2.2.3, 2.2.7	Interpreting data on electricity generation by solar panels	This question is about generating electricity with wind turbines and solar panels.	Bar chart and table in (a) required		
29	1bi	3	2	2.2.3	Calculating cost of using solar panels.	This question is about generating electricity with wind turbines and solar panels.	Table in (b) required	Y	
29	1bii	2	3	2.2.3	Comparing cost of generation using wind turbines and solar panels.	This question is about generating electricity with wind turbines and solar panels.	Table in (b) required		
30	1a	2	1	6.1.5b PAG 5	Equipment required for the experiment	This question is about the measurement of specific heat capacity of water.	Nina's comment required. This question assesses practical skills.		Y
30	1b	4	1 and 2	2.1.3	Calculation of energy = power × time	This question is about the measurement of specific heat capacity of water.		Y	Y
30	1ci	2	2	2.1.8	Calculation of efficiency	This question is about the measurement of specific heat capacity of water.		Y	Y
30	1cii	2	2	2.1.8, 6.1.5a	Calculation of specific heat capacity	This question is about the measurement of specific heat capacity of water.		Y	Y
30	1di	1	3	2.1.5	Energy transfer to surroundings	This question is about the measurement of specific heat capacity of water.			Y
30	1dii	1	3	2.1.6	Suggesting an improvement to the experiment	This question is about the measurement of specific heat capacity of water.			Y
31	1a	4	3	6.5.7	Red shift of spectral lines from galaxies	This question is about the red shift of galaxies.	The diagram is required. Overlap item with HT		
31	1b	2	1	6.5.7, 1aS3.3	Peer review	This question is about the red shift of galaxies.	This question assesses Ideas about science. Overlap item with HT		
32	1a	3	2	3.4.5	Rate of energy transfer - Transformer	This question is about the national grid, generating electricity, and transformers.	Overlap item with HT	Y	

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32	1bi	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 13.2 Overlap item with HT Please note: Fig 13.2 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
32	1bii	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 13.2 Overlap item with HT	Y	
32	1biii	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 13.2 Overlap item with HT	Y	
32	1c	6	1, 2 and 3	2.2.2/ 2.2.3/ 2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 13.2 Overlap item with HT		