Unit Code: J259/04
Qual Name: GCSE Physics B (Twenty First Century Science)
Qual Title: Depth in physics (Higher)
Tier Higher

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	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 FT. 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.		
1	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 FT. 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
1	1bi	3	1 and 2	3.2.4(a)	Calculate current using potential difference = current × resistance	This question is about using an LDR to measure light intensity.	Overlap item with FT. The circuit diagram is required.	Y	
1	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 FT. The circuit diagram is required.	Y	
1	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 FT. Requires answers to the previous items.		
2	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 vapouristaion of water.	Overlap item with HT. This question assesses practical skills and is marked by level of response.	Y	Y

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2	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 vapouristaion of water.	Overlap item with HT.		
3	1ai	3	1	5.1.9	Complete a nuclear equation for alpha decay	This question is about a journey on Mars and includes alpha decay, the time to heat water and the time to travel a journey when distance per day is limited by needing to recharge batteries.			
3	1aii	3	1 and 2	4.4.9	Power = energy transferred × time	This question is about a journey on Mars and includes alpha decay, the time to heat water and the time to travel a journey when distance per day is limited by needing to recharge batteries.		Y	
3	1aiii	5	1 and 2	6.1.5(a)	Using SHC and power to calculate the time for a temperature rise.	This question is about a journey on Mars and includes alpha decay, the time to heat water and the time to travel a journey when distance per day is limited by needing to recharge batteries.		Y	
3	1bi	4	1 and 2	4.2.1	Speed = distance ÷ time	This question is about a journey on Mars and includes alpha decay, the time to heat water and the time to travel a journey when distance per day is limited by needing to recharge batteries.		Y	
3	1bii	1	3	4.2.1, 4.2.2	Suggest reason for longer journey time	This question is about a journey on Mars and includes alpha decay, the time to heat water and the time to travel a journey when distance per day is limited by needing to recharge batteries.			
4	1ai	3	1 and 2	4.2.3(a)	Calculate the time for a pendulum to swing from given equation	This question is about measurement of the speed of sound		Y	
4	1aii	3	1 and 2	4.2.1, 4.2.3a	Calculate speed of sound	This question is about measurement of the speed of sound		Y	
4	1bi	1	3	4.2.1, 4.2.3a	Explain which of measurement is likely to be least accurate	This question is about measurement of the speed of sound			Y
4	1bii	2	3	4.2.1, 4.2.3a	Explain why calculated speed is too low	This question is about measurement of the speed of sound			
5	1ai	2	1 and 3	4.4.4	Identifying errors in converting units	This question is about how the initial KE of a trolley rolling down a ramp affects the stopping distance.	This question assesses practical skills. Fig. 5.1 is required.		Y
5	1aii	3	3	4.4.4	Improving measurement	This question is about how the initial KE of a trolley rolling down a ramp affects the stopping distance.	This question assesses practical skills. Fig. 5.1 is required.		Y

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5	1bi	1	1	4.4.4, 4.4.7	Explaining why there is a point at (0,0)	This question is about how the initial KE of a trolley rolling down a ramp affects the stopping distance.	This question assesses practical skills. The Table 5.1 and Fig. 5.2 are required.		Y
5	1bii	2	2	4.4.4, 4.4.7	Plotting points and drawing a line of best fit	This question is about how the initial KE of a trolley rolling down a ramp affects the stopping distance.	This question assesses practical skills. The Table 5.1 and Fig. 5.2 are required.	Y	Y
5	1c	4	2 and 3	4.4.7	Discuss student comments relating to the graph	This question is about how the initial KE of a trolley rolling down a ramp affects the stopping distance.	All the question is required.		Y
6	1a	3	1 and 2	6.2.4, 6.4.2, 4.3.4	Kinetic energy	This question is about air pressure explanations.			
6	1b	3	1 and 2	6.4.6	Explaining why atmospheric pressure varies with height	This question is about air pressure explanations.			
7	1a	3	2	2.1.8	Efficiency and calculating power	This question is about solar farms.		Y	
7	1b	6	1, 2 and 3	1.2.1, 2.2.1, 2.1.2	Advantages and disavantages of solar farms and comparison with gas-fired power stations	This question is about solar farms.	This question is marked by level of response.		
8	1a	2	1 and 3	5.1.12	Estimate half-life from a graph	This question is about the half- life of americium-241 and modelling radioactive decay.	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	
8	1b	4	1 and 2	5.2.1, 5.2.2	The hazards of alpha emitters; penetration, contamination and irradiation.	This question is about the half- life of americium-241 and modelling radioactive decay.			
8	1ci	1	2	5.1.10	Interpreting a dice roll model of radioactive decay	This question is about the half- life of americium-241 and modelling radioactive decay.			
8	1cii	1	2	5.1.10	Interpreting a dice roll model of radioactive decay	This question is about the half- life of americium-241 and modelling radioactive decay.			
8	1ciii	3	2	5.1.10	Interpreting a dice roll model of radioactive decay	This question is about the half- life of americium-241 and modelling radioactive decay.			

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9	1a	2	2	1.3.8(a), 1.3.8(b), 1.3.9, 1.3.10, 1.4.2	Refraction at a boundary; wavelength and speed of light in different materials	This question is about refraction of light in a prism and waves from an earthquake in the Earth.			
9	1bi	2	1 and 2	1.3.9, 1.3.10, 1.4.8(b)	Change of direction and speed when earthquake waves move from the mantle to the core.	This question is about refraction of light in a prism and waves from an earthquake in the Earth.			
9	1bii	2	1 and 2	1.3.9, 1.3.10	Interpreting a continuous change in direction of earthquake waves in the mantle	This question is about refraction of light in a prism and waves from an earthquake in			
10	1ai	1	2	4.3.8, 4.3.10	Direction of rotation of gears	This question is about gears and levers.	Overlap item with FT Fig. 1.2 is required		
10	1aii	2	2	4.3.10	Gear ratios and number of revolutions	This question is about gears and levers.	Overlap item with FT Fig. 1.2 is required	Y	
10	1b	3	1 and 2	4.3.9	Calculating the moment of a force	This question is about gears and levers.	Overlap item with FT Fig. 1.3 is required	Y	Y
11	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 FT. Fig. 2.1 and 2.2 required. This question is marked by level of response . Please note: Fig 2.2 not to	Y	Y
12	1a	2	3	3..3.5b	The effect of changing light intensity on a LDR	This question is about investigating LDRs.	Overlap item with FT Requires Fig. 3.1 and Fig. 3.2		Y
12	1b	2	1	3.2.6a, 3.2.7	Completing a circuit diagram	This question is about investigating LDRs.	Overlap item with FT Requires Fig. 3.3		Y
12	1ci	1	3	3..3.5b	The design and use of a circuit to measure light intensity with an LDR	This question is about investigating LDRs.	Overlap item with FT		Y
12	1cii	1	3	3..3.5b	The design and use of a circuit to measure light intensity with an LDR	This question is about investigating LDRs.	Overlap item with FT		Y
13	1ai	2	2	6.4.4	Explaining effect of increasing volume of gas	This question is about the relationship between the pressure and volume of a gas.	Requires diagram in (a)		Y
13	1aii	3	2 and 3	6.4.4	Explain how to take measurements and analyse data	This question is about the relationship between the pressure and volume of a gas.	Requires diagram in (a) and student comment.	Y	Y
13	1b	3	1 and 2	6.4.5	pressure × volume = constant	This question is about the relationship between the pressure and volume of a gas.	Requires table in (b)	Y	
14	1a	3	1	1.3.9, 1.3.10	Refraction and the speed frequency and wavelength of waves	This question is about ultrasound and the eye.	Requires Fig.5.1		
14	1b	4	1 and 2	4.2.1	ultrasound speed = distance ÷ time	This question is about ultrasound and the eye.		Y	

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14	1c	2	3	1.3.8a	Reflection and refraction at interfaces	This question is about ultrasound and the eye.	Requires Fig. 5.3		
15	1a	2	3	2.1.8	Analysing table for best choice of bulb, including efficiency	This question is about power and other differences between types of light bulb.	Requires Table 6.1 and the student comment		
15	1b	2	2	2.1.2	Comparing energy transfers for different power ratings, and times of use	This question is about power and other differences between types of light bulb.	Requires Table 6.1	Y	
15	1c	4	1 and 2	2.1.3	Calculating k Wh and cost	This question is about power and other differences between types of light bulb.	Requires Table 6.1	Y	
16	1ai	1	3	3.6.2	Fleming's left Hand rule	This question is about the force on a current carrying wire in a magnetic field.	Figure 7.1 is required		
16	1aii	1	1	3.6.2	Fleming's left Hand rule	This question is about the force on a current carrying wire in a magnetic field.	Figure 7.1 is required		
16	1b	2	1	3.6.1	The force on a current carrying wire in a magnetic field	This question is about the force on a current carrying wire in a magnetic field.			
16	1c	4	1 and 2	3.6.3	Calculation of the force on the wire	This question is about the force on a current carrying wire in a magnetic field.		Y	
16	1d	2	2	3.6.3	Effect of doubling the current in the wire	This question is about the force on a current carrying wire in a magnetic field.			
17	1*	6	1 and 2	3.7.6, 3.7.7, 3.7.8a,b	The structure, stepping-up and down of voltage, effect of turns ratio and how transformers are used in the National Grid.	This question is about transformers and the National Grid.	This question is marked by level of response.		
18	1a	2	3	4.3.7, 4.3.8	Circular motion, force speed and velocity	This question is about orbits, stars, galaxies and the Big Bang.	Requires Fig. 9.1 and student comment		
18	1bi	2	1	6.5.5, 6.5.6	Formation of stars, including particle model	This question is about orbits, stars, galaxies and the Big Bang.			
18	1bii	2	1	6.5.8, 6.5.9	Expanding universe and the Big bang model	This question is about orbits, stars, galaxies and the Big Bang.			
18	1c	4	1 and 2	4.3.2, 4.3,12	Resultant force on a rocket = mass × acceleration	This question is about orbits, stars, galaxies and the Big Bang.	Requires Fig. 9.2	Y	
19	1ai	3	2	4.2.9	Interpreting lines and sloped in velocity – time graphs	This question is about analysing a velocity – time graph and a momentum – time graph.	Fig. 10.1 is required. Please note: Fig 10.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		

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19	1aii	3	1 and 2	4.2.8	Calculating acceleration from a velocity – time graph	This question is about analysing a velocity – time graph and a momentum – time graph.	Fig. 10.1 is required. Please note: Fig 10.2 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
19	1bi	2	1 and 2	4.3.4	Conservation of momentum and information from a momentum time graph.	This question is about analysing a velocity – time graph and a momentum – time graph.	Fig. 10.2 is required. Please note: Fig 10.1 not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.		
19	1bii	3	1 and 2	4.3.4	Conservation of momentum and calculating speed.	This question is about analysing a velocity – time graph and a momentum – time graph.	Requires information given in (b) (i)	Y	
20	1a	2	3	5.2.4	Treatment of cancer cells with radiotherapy	This question is about radioactive emissions, activity and half-life.	Requires table		
20	1bi	3	2 and 3	5.1.10, 5.1.12	Sketching an activity – time graph, knowing the half-life.	This question is about radioactive emissions, activity and half-life.	Requires graph. Please note: Graph is not to scale. It may vary in colour, density, shade and size when reproduced using different printers and photocopiers.	Y	
20	1bii	3	2	5.1.11	Half-life and fractionof sample remaining.	This question is about radioactive emissions, activity and half-life.		Y	
20	1c	2	3	5.2.5	Dependence of hazard on emission and half-lfe; implications for storage	This question is about radioactive emissions, activity and half-life.	Requires student comments.		
21	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 FT		
21	1b	2	1	6.5.7, IaS3.3	Peer review	This question is about the red shift of galaxies.	This question assesses Ideas about science. Overlap item with FT		
22	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 FT	Y	

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22	1bi	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 2.2 Overlap item with FT Please note: Fig 2.2 not to scale. It may vary in colour,	Y	
22	1bii	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 2.2 Overlap item with FT	Y	
22	1biii	1	2	2.2.7	Generating Electricity	This question is about the national grid, generating electricity, and transformers.	Requires Fig 2.2 Overlap item with FT	Y	
22	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 2.2 Overlap item with FT This question is marked by level of response		
23	1a	2	1	1.4.2	Drawing rays to show refraction in a prism.	This question is about Refraction of light.	The diagram is required.		Y
23	1b	2	2	1.3.8, 1.3.9, 1.4.4	The effect of refraction through a prism.	This question is about Refraction of light.	The table and the student comment is required.		Y
24	1ai	3	1	6.3.3a	The relationship for stretching a spring	This question is about stretching a spring	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
24	1aii	2	2	6.3.3a PAG2	The relationship for stretching a spring	This question is about stretching a spring	The graph is required.		Y
24	1b	4	1 and 2	6.3.7	The enrgy stored in a stretched spring	This question is about stretching a spring		Y	Y
25	1a	1	2	3.2.1	Conditions for electric charge to flow	This question is about electric circuits.			Y
25	1bi	4	1 and 2	3.2.2	Charge = current × time	This question is about electric circuits.	Fig. 5.1 is required.	Y	
25	1bii	3	1 and 2	3.3.1, 3.4.3	P.d. = work done ÷ charge	This question is about electric circuits.	Fig 5.1 is required.	Y	
25	1c	3	3	3.2.3	Effect of resistance on current	This question is about electric circuits.	Diagram in table in (c) are required		
25	1d	3	3	3.3.3	Effect on resistance of adding a resistor in parallel	This question is about electric circuits.	Fig 5.2 is required		Y
26	1a	3	2	6.4.10	Factors influencing floating and sinking	This question is about pressure and depth in a fluid.			
26	1b	4	1 and 2	6.4.8	Calculating pressure at a depth	This question is about pressure and depth in a fluid.		Y	

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27	1ai	1	3	6.1.5b PAG5	Measuring the specific heat capacity of water	This question is about specific heat capacity of water.	This question assesses practical skills.		Y
27	1aii	1	3	6.1.5b PAG5	Measuring the specific heat capacity of water	This question is about specific heat capacity of water.	This question assesses practical skills.		Y
27	1b	4	1 and 2	3.4.2, 6.1.5a	Calculating the specific heat capacity of water	This question is about specific heat capacity of water.		Y	
27	1c	3	1	6.1.7	How energy stored changes when water is boiled	This question is about specific heat capacity of water.			
28	1	6	1, 2 and 3	4.2.4, 4.2.6a, 4.2.9, 4.2.10, 4.4.2	Comparing two different velocity time graphs, including calculations of acceleration and distance travelled.	This question is about velocity – 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. This question is marked by level of response.	Y	
29	1ai	1	2	2.2.3	Plotting points on a graph	This question is about a graph of power against monthly temperature for a wind farm.	Student comments, graph and table 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	1aii	1	2	2.2.3	Drawing a line of best fit	This question is about a graph of power against monthly temperature for a wind farm.	Student comments, graph and table required		
29	1b	3	3	2.2.3	Judging the validity of the student comments.	This question is about a graph of power against monthly temperature for a wind farm.	Student comments, graph and table required		
30	1ai	3	1 and 2	3.5.8, 3.5.9	How the magnetic effect of a solenoid can be increased	This question is about magnetic fields in solenoids being used to generate sound.	Diagram and student comments required		Y
30	1aii	5	1 and 2	1.3.6	wavespeed = wavelength × frequency	This question is about magnetic fields in solenoids being used to generate sound.		Y	
30	1b	4	1	3.5.9, 3.6.1	Loudspeaker response to a.c. and d.c.	This question is about magnetic fields in solenoids being used to generate sound.			
31	1a	4	2 and 3	3.7.1, 3.7.3	Induction of p.d. in a coil by a magnetic field, and direction of p.d.	This question is about electromagnetic induction.	The diagram is required.		

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31	1b	2	2 and 3	3.7.1	Induction of p.d. in a coil by a changing magnetic field	This question is about electromagnetic induction.	The diagram is required.		