



Pearson

Mark Scheme (Results)

Summer 2017

Pearson Edexcel PLSC
Secondary Science (LSC01) Paper 01
Science Year 9 Achievement

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General Marking Guidance

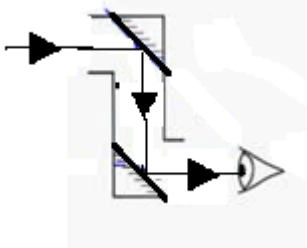
- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

SECTION A

Question Number	Answer	Mark
1	<p>1. The only correct answer is A</p> <p><i>B is not correct because copper is not a mixture</i></p> <p><i>C is not correct because oxygen is not a mixture</i></p> <p><i>D is not correct because steam is not a mixture</i></p>	(1)
2	<p>2. The only correct answer is B</p> <p><i>A is not correct because copper sulfate does not evaporate when added to water</i></p> <p><i>C is not correct because copper sulfate is not insoluble in water</i></p> <p><i>D is not correct because copper sulfate does not melt when added to water</i></p>	(1)
3	<p>3. The only correct answer is B</p> <p><i>A is not correct because prey is not always a carnivore</i></p> <p><i>C is not correct because prey does not kill and eat other animals</i></p> <p><i>D is not correct because prey does not make its own food</i></p>	(1)
4	<p>4. The only correct answer is D</p> <p><i>A is not correct because when gold conducts electricity this does not show that it does not react with oxygen in the air</i></p> <p><i>B is not correct because when gold conducts heat this does not show that it does not react with oxygen in the air</i></p> <p><i>C is not correct because gold having a high melting point does not show that it does not react with oxygen in the air</i></p>	(1)
5	<p>5. The only correct answer is D</p> <p><i>A is not correct because plants showing poor growth is not probably caused by a shortage of calcium ions</i></p> <p><i>B is not correct because plants showing poor growth is not probably caused by a shortage of carbonate ions</i></p> <p><i>C is not correct because plants showing poor growth is not probably caused by a shortage of chloride ions</i></p>	(1)

6	<p>6. The only correct answer is D</p> <p><i>A is not correct because electricity is not a force</i></p> <p><i>B is not correct because light is not a force</i></p> <p><i>C is not correct because mass is not a force</i></p>	(1)
7	<p>7. The only correct answer is C</p> <p><i>A is not correct because the forces acting on the football will cause it to move to the right</i></p> <p><i>B is not correct because the forces acting on the football will cause it to move to the right</i></p> <p><i>D is not correct because the forces acting on the football will cause it to move to the right</i></p>	(1)
8	<p>8. The only correct answer is A</p> <p><i>B is not correct because this is not the symbol for a buzzer</i></p> <p><i>C is not correct because this is not the symbol for a buzzer</i></p> <p><i>D is not correct because this is not the symbol for a buzzer</i></p>	(1)
9	<p>9. The only correct answer is C</p> <p><i>A is not correct because the blue tit is not the producer</i></p> <p><i>B is not correct because the caterpillar is not the producer</i></p> <p><i>D is not correct because the owl is not the producer</i></p>	(1)
10	<p>10. The only correct answer is A</p> <p><i>B is not correct because 7 is not the pH value of a very strong acid</i></p> <p><i>C is not correct because 8 is not the pH value of a very strong acid</i></p> <p><i>D is not correct because 14 is not the pH value of a very strong acid</i></p>	(1)
Total marks		(10)

Question	Acceptable answers			Additional guidance	Mark
11	Letter of organ	Name of organ	Function of organ	Reject ribcage Accept circulate blood Allow moves the blood/pushes the blood Ignore references to types of blood vessels Ignore transports blood Reject large intestine/duodenum Accept ileum	(3)
	A	lung(s)	takes in oxygen and removes carbon dioxide		
	B	heart	pump blood		
	C	small intestine	breaks down food into simpler substances and absorbs these into the blood		
	1 mark each			Total for question	(3)

Question	Acceptable answers	Additional guidance	Mark
12	 <p>correct position of both mirrors (1)</p> <p>ray of light shown with <u>correct direction</u> arrows (1)</p>	Do not allow this mark if shading on wrong side. Minimum 2 arrows	(2)
	Total for question		

Question	Acceptable answers	Additional guidance	Mark
13	(a) sulfuric (acid) (1)	accept sulphuric accept H ₂ SO ₄ Allow alkali for base Ignore word/formulae equation	(2)
	(b) copper oxide is a base (1)		
	OR an acid neutralises/reacts with a base (1)		
		Total for question	(2)

Question	Acceptable answers	Additional guidance	Mark
14	A nucleus (1)	Allow nuclei Ignore components of nucleus Reject cytoplasm Ignore references to chlorophyll	(2)
	B chloroplast (1)		
		Total for question	(2)

Question Number	Answer	Mark
15	<p>15. The only correct answer is B</p> <p><i>A is not correct because slate is a metamorphic rock, limestone is a sedimentary rock, (marble is a metamorphic rock is correct)</i></p> <p><i>C is not correct because granite is an igneous rock, slate is a metamorphic rock, marble is a metamorphic rock</i></p> <p><i>D is not correct because granite is an igneous rock, slate is a metamorphic rock, marble is a metamorphic rock</i></p>	(1)
16	<p>16. The only correct answer is D</p> <p><i>A is not correct because an addictive substance is not described as one that improves a person's health</i></p> <p><i>B is not correct because an addictive substance is not described as one that is added to food</i></p> <p><i>C is not correct because an addictive substance is not described as one that is added to a medicine to improve its taste</i></p>	(1)
17	<p>17. The only correct answer is B</p> <p><i>A is not correct because the formula of calcium carbonate is CaCO₃</i></p> <p><i>C is not correct because the formula of calcium carbonate is CaCO₃</i></p> <p><i>D is not correct because the formula of calcium carbonate is CaCO₃</i></p>	(1)

<p>18</p>	<p>18. The only correct answer is D</p> <p><i>A is not correct because to measure the voltage a cell produces in an electrical circuit should be done by connecting a voltmeter in parallel with the cell not in series</i></p> <p><i>B is not correct because to measure the voltage a cell produces in an electrical circuit should be done by connecting a voltmeter in parallel with the cell not an ammeter in series</i></p> <p><i>C is not correct because to measure the voltage a cell produces in an electrical circuit should be done by connecting a voltmeter in parallel with the cell not an ammeter in parallel</i></p>	<p>(1)</p>
<p>19</p>	<p>19. The only correct answer is C</p> <p><i>A is not correct because the fact that metals can be bent into different shapes is because they are malleable not because they are conductors</i></p> <p><i>B is not correct because the fact that metals can be bent into different shapes is because they are malleable not because they are insulators (they are not)</i></p> <p><i>D is not correct because the fact that metals can be bent into different shapes is because they are malleable not because they are shiny</i></p>	<p>(1)</p>
<p>20</p>	<p>20. The only correct answer is D</p> <p><i>A is not correct because the energy transfers that take place from the top of a slide to the bottom are gravitational potential energy → thermal (heat) energy + kinetic energy</i></p> <p><i>B is not correct because the energy transfers that take place from the top of a slide to the bottom are gravitational potential energy → thermal (heat) energy + kinetic energy</i></p> <p><i>C is not correct because the energy transfers that take place from the top of a slide to the bottom are gravitational potential energy → thermal (heat) energy + kinetic energy</i></p>	<p>(1)</p>
<p>21</p>	<p>21. The only correct answer is C</p> <p><i>A is not correct because it represents a compound not a mixture of an element and a compound</i></p> <p><i>B is not correct because it represents a mixture of elements not a mixture of an element and a compound</i></p> <p><i>D is not correct because it represents a mixture of elements not a mixture of an element and a compound</i></p>	<p>(1)</p>

22	<p>22. The only correct answer is B</p> <p><i>A is not correct because the gravitational force is greatest closer to the centre of the earth</i></p> <p><i>C is not correct because the gravitational force is greatest closer to the centre of the earth</i></p> <p><i>D is not correct because the gravitational force is greatest closer to the centre of the earth</i></p>	(1)
23	<p>23. The only correct answer is A</p> <p><i>B is not correct because height is not an example of discontinuous variation</i></p> <p><i>C is not correct because hair colour is not an example of discontinuous variation</i></p> <p><i>D is not correct because weight is not an example of discontinuous variation</i></p>	(1)
24	<p>24. The only correct answer is C</p> <p><i>A is not correct because if poison kills some of the hawks the blackbirds and lettuces are both likely to increase in number</i></p> <p><i>B is not correct because if poison kills some of the hawks the blackbirds and lettuces are both likely to increase in number</i></p> <p><i>D is not correct because if poison kills some of the hawks the blackbirds and lettuces are both likely to increase in number</i></p>	(1)
Total marks		(10)

Question	Acceptable answers	Additional guidance	Mark
25(a)	<p>Any ONE from</p> <ul style="list-style-type: none"> • improve resistance to diseases/insects/pests/pathogens/fungi/viruses/parasites/frost/drought • improve resistance to weedkiller/herbicide • increase yield/vitamin content/nutritional content (of wheat/crops) • improve shelf life 	<p>Ignore infection</p> <p>Ignore to change properties/characteristics unqualified eg to grow better wheat</p> <p>Allow to grow more wheat/food (to feed increasing population)</p> <p>Ignore to make more money unqualified</p> <p>Ignore grow faster unqualified</p>	(1)

<p>25(b)</p>	<p>Any one concern from:</p> <ul style="list-style-type: none"> • idea of unknown/possible future/long term health effects • genes being passed on (to other organisms) • (may feel they) do not have enough knowledge/information about GM (wheat/crops) 	<p>Allow speculative health problems eg</p> <ul style="list-style-type: none"> • the wheat/it may be dangerous for human health • the wheat/it may contain chemicals that may harm humans • the wheat/it may harm human health <p>Reject suggested definite health problems eg</p> <ul style="list-style-type: none"> • the wheat/it causes harm • the wheat/it causes a disease/cancer/illness • the chemicals in the wheat/it harm our bodies • the wheat/it contains artificial genes which results in health problems <p>Ignore wheat would have genes it does not normally have</p> <p>Ignore references to cost but Allow state seed more expensive for farmers to buy</p> <p>Ignore references to allergies</p>	<p>(1)</p>
		<p>Total for question</p>	<p>(2)</p>

Question	Acceptable answers	Additional guidance	Mark
26(a)	acid rain (1)	Accept <u>air</u> pollution Ignore pollution unqualified	(1)
26(b)	<p>sulfur dioxide (1)</p> <p>(sulfur present in fossil) fuels/ coal/oil/diesel (1)</p> <p>(fossil fuel/coal/oil/diesel/sulfur) burns/combusts (forming sulfur dioxide) (1)</p> <p>OR</p> <p>If oxides of nitrogen (0)</p> <p>(formed in vehicle) engines/(emitted from) exhausts (1)</p> <p>when nitrogen reacts with oxygen (at high temperature) (1)</p> <p>OR</p> <p>If carbon dioxide (0)</p> <p>(carbon present in fossil) fuels/ coal/oil/diesel/petrol/wood (1)</p> <p>(when) (fossil fuel/coal/oil/diesel/petrol/wood) burns/combusts (carbon dioxide forms and goes into air/atmosphere) (1)</p>	<p>Accept the spelling "sulphur" throughout</p> <p>Accept (sulfur dioxide formed in vehicle) engines/(emitted from) exhausts</p> <p>For burns/combusts Allow reacts with oxygen/air</p> <p>Ignore (coal/wood) fires</p> <p>Allow (formed by) lightning</p> <p>Accept (carbon dioxide formed in vehicle) engines/(emitted from) exhausts</p> <p>For burns/combusts Allow reacts with oxygen/air Ignore (coal/wood) fires</p> <p>If carbon monoxide then can score last two marks</p>	(3)
		Total for question	(4)

Question	Acceptable answers	Additional guidance	Mark
27(a)	500 ÷ 0.02 = 25 000 Pa or N/m ² or Nm ⁻²	(1) (1) (1) Answer 25 000 with no working scores 2 marks Allow 1 mark for 12 500 or 50 000	(3)
27(b)	(Pressure would) <u>double</u>	(1) Accept (calculation to obtain) 50 000 allow ECF from answer in (a) Ignore units Ignore increase	(1)
Total for question			(4)

Question Number	Answer	Mark
28	<p>28. The only correct answer is C</p> <p><i>A is not correct because when plants such as strawberry plants produce new plants from runners it is true that only one parent strawberry plant is required</i></p> <p><i>B is not correct because when plants such as strawberry plants produce new plants from runners it is true that the new plants are clones of the parent plant</i></p> <p><i>D is not correct because when plants such as strawberry plants produce new plants from runners it is true that the new plants contain the same genes as the parent plant</i></p>	(1)
29	<p>29. The only correct answer is D</p> <p><i>A is not correct because blood group is not both inherited and affected by the environment</i></p> <p><i>B is not correct because eye colour is not both inherited and affected by the environment</i></p> <p><i>C is not correct because gender is not both inherited and affected by the environment</i></p>	(1)

<p>30</p>	<p>30. The only correct answer is D</p> <p><i>A is not correct because choosing the heaviest female and male turkeys to breed from is not an example of asexual reproduction</i></p> <p><i>B is not correct because choosing the heaviest female and male turkeys to breed from is not an example of cloning</i></p> <p><i>C is not correct because choosing the heaviest female and male turkeys to breed from is not an example of genetic modification</i></p>	<p>(1)</p>
<p>31</p>	<p>31. The only correct answer is A</p> <p><i>B is not correct because in Ptolemy's model of the Solar System the Milky Way was not thought to be the centre of the universe</i></p> <p><i>C is not correct because in Ptolemy's model of the Solar System the Moon was not thought to be the centre of the universe</i></p> <p><i>D is not correct because in Ptolemy's model of the Solar System the Sun was not thought to be the centre of the universe</i></p>	<p>(1)</p>
<p>32</p>	<p>32. The only correct answer is C</p> <p><i>A is not correct because the weight of an object of mass 9kg on Mars would be one third of its weight on Earth so would be one third of $(9 \times 10)N = \text{one third of } 90N = 30N$</i></p> <p><i>B is not correct because the weight of an object of mass 9kg on Mars would be one third of its weight on Earth so would be one third of $(9 \times 10)N = \text{one third of } 90N = 30N$</i></p> <p><i>D is not correct because the weight of an object of mass 9kg on Mars would be one third of its weight on Earth so would be one third of $(9 \times 10) N = \text{one third of } 90N = 30N$</i></p>	<p>(1)</p>
<p>33</p>	<p>33. The only correct answer is A</p> <p><i>B is not correct because the general word equation for the reaction between an acid and a metal carbonate is acid + metal carbonate → carbon dioxide + water + a salt</i></p> <p><i>C is not correct because the general word equation for the reaction between an acid and a metal carbonate is acid + metal carbonate → carbon dioxide + water + a salt</i></p> <p><i>D is not correct because the general word equation for the reaction between an acid and a metal carbonate is acid + metal carbonate → carbon dioxide + water + a salt</i></p>	<p>(1)</p>

<p>34</p>	<p>34. The only correct answer is D</p> <p><i>A is not correct because an object at the bottom of a swimming pool looks closer to the surface than it really is because of refraction.</i></p> <p><i>B is not correct because an object at the bottom of a swimming pool looks closer to the surface than it really is because of refraction.</i></p> <p><i>C is not correct because an object at the bottom of a swimming pool looks closer to the surface than it really is because of refraction.</i></p>	<p>(1)</p>
<p>35</p>	<p>35. The only correct answer is C</p> <p><i>A is not correct because magnesium ions are needed by plants to make chlorophyll</i></p> <p><i>B is not correct because magnesium ions are needed by plants to make chlorophyll</i></p> <p><i>D is not correct because magnesium ions are needed by plants to make chlorophyll</i></p>	<p>(1)</p>
<p>36</p>	<p>36. The only correct answer is D</p> <p><i>A is not correct because the correct equation for the reaction between magnesium and oxygen is $2Mg + O_2 \rightarrow 2MgO$</i></p> <p><i>B is not correct because the correct equation for the reaction between magnesium and oxygen is $2Mg + O_2 \rightarrow 2MgO$</i></p> <p><i>C is not correct because the correct equation for the reaction between magnesium and oxygen is $2Mg + O_2 \rightarrow 2MgO$</i></p>	<p>(1)</p>
<p>37</p>	<p>37. The only correct answer is A</p> <p><i>B is not correct because the most efficient electric light bulb is shown in the Sankey diagram in A which is $(40/50) \times 100 = 80\%$ efficient. B is 75%</i></p> <p><i>C is not correct because the most efficient electric light bulb is shown in the Sankey diagram A which is $(40/50) \times 100 = 80\%$ efficient, C is 60%</i></p> <p><i>D is not correct because the most efficient electric light bulb is shown in the Sankey diagram A which is $(40/50) \times 100 = 80\%$ efficient. D is 25%</i></p>	<p>(1)</p>
<p>Total marks</p>		<p>(10)</p>

Question	Acceptable answers	Additional guidance	Mark
38(a)	fizzing/bubbling/effervescing	Accept metal floats/ disappears/dissolves/gets smaller Allow forms colourless <u>solution</u> Ignore gas produced	(1)
38(b)	potassium bubbles faster/more vigorously/OWTTE/ bursts into flame/turns into a ball/melts	Allow potassium reacts faster Ignore potassium more reactive Ignore flame colour Accept reverse argument	(1)
38(c)	$2K + 2H_2O \rightarrow 2KOH + H_2$ All symbols/formulae correct (1) balancing correct (1)	Second mark dependent on first mark Accept multiples	(2)
Total for question			(4)

Question	Acceptable answers	Additional guidance	Mark
39(a)	the speed is (directly) proportional to the time (1)	Accept as time increases speed increases OWTTE Allow they (both) increase	(1)
39(b)(i)	10 (m/s) (1)	Reject incorrect unit	(1)
39(b)(i)(i)	(time =) 20 (s) (1) (distance = 10 x 20 =) 200 (m) (1)	Answer 200 with no working scores 2 marks ECF answer to b(i) x 20 Reject incorrect unit	(2)
Total for question			(4)

Question	Acceptable answers	Additional guidance	Mark
40(a)(i)	hh (1)		(1)
40(a)(i)(i)	genotype(s) (1)	Allow Hh is heterozygous AND hh is homozygous	(1)
40(b)	100 (%) (1)		(1)
Total for question			(3)

TOTAL FOR SECTION A = 60 MARKS

SECTION B

Question	Acceptable answers	Additional guidance	Mark
41(a)	(dependent) (%) vitamin C (independent) time	Allow min	(2)
41(b)	repeat (the experiment/investigation)	Ignore references to accuracy /precision	(1)
41(c)	linear scales on both axes (1) correct plotting of all six points (2)	Using at least half the grid lose 1 mark each error points within less than half a small square	(3)
41(d)	line from 5 minutes (to graph) OR line from curve at 5 minutes to y axis OR extra point on graph at 5 minutes (1) value from their graph (1)	Allow tolerance of +/- 1(%) Correct answer without working scores 2	(2)
Total for question			(8)

Question	Acceptable answers	Additional guidance	Mark
42(a)	the greater the rise in temperature OWTTE	Need a comparative Allow (the more reactive the metal is) the higher the temperature will be	(1)
42(b)	wear goggles/ <u>safety</u> glasses/ <u>safety</u> spectacles/ gloves (1) acid (could be) corrosive (1)	Ignore wear (gas) mask/face shields/safety shield/lab coat/clean up spillages Allow dangerous/harmful/burns /could damage eyes/skin /could cause blindness Ignore will protect eyes/skin/hands/ keep eyes safe	(2)

42(c)	Any two from: <ul style="list-style-type: none"> • concentration of acid • amount of metal/ amount of WXYZ • size of metal pieces/surface area of metal OWTTE 	Ignore volume of acid Allow mass/weight of metal Allow mass/weight of WXYZ Allow speed/amount of stirring Allow references to same room temperature /starting temperature (of acid)	(2)
42(d)	<u>measuring</u> cylinder	Allow burette/pipette	(1)
42(e)	18.8 and 76.2 (1) 57.4 (1)	Mark consequentially	(2)
42(f)	(quantitative means) has numerical values OWTTE	Allow (quantitative because written as a) decimal (number) OWTTE Allow has units	(1)
42(g)(i)	(metal X/it) does not react (with dilute hydrochloric acid)	Allow it is unreactive Ignore (metal X/it) is the least reactive	(1)
42(g)(i)(i)	(most to least reactive) W Y Z X (1)	Mark consequentially on temperature rise for W	(1)
42(h)	Any one from: <ul style="list-style-type: none"> • polystyrene (better) insulator (than glass) • less heat loss • lid prevents heat loss 		(1)
Total for question			(12)

TOTAL FOR SECTION B = 20 MARKS

TOTAL FOR PAPER = 80 MARKS

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