



Pearson
Edexcel

Mark Scheme (Results)

Summer 2021

Pearson Edexcel International GCSE
In Science (Single Award) (4SS0) Paper 1B

Question Number	Answer	Mark
1(a)	A nucleus (1)	2
	B mitochondrion / a (1)	

Question Number	Answer	Mark
1(b)(i)	An answer that includes two of the following points: <ul style="list-style-type: none"> • chloroplast (1) • cell wall (1) • starch grain (1) 	2

Question Number	Answer	Mark
1(b)(ii)	<ul style="list-style-type: none"> • not multicellular / are single-celled / can move from one place to another / has flagella (1) 	1

Question Number	Answer	Mark
1(c)	An explanation that makes reference to two of the following points <ul style="list-style-type: none"> • light captured / absorbed by chloroplast / chlorophyll (1) • in photosynthesis (1) 	2

Question Number	Answer	Mark
1(d)	<ul style="list-style-type: none"> • move / propel / swim / eq (1) 	1

Question Number	Answer	Additional guidance	Mark
1(e)	<p>measure size of line on diagram (= 44 mm 43-45) (1)</p> <p>×1000 convert mm into μm (1)</p> <p>Magnification = size of line in μm ÷ 15 μm</p> <p>44000 ÷ 15 = 2933</p> <p>allow 2 marks for any mag between 2667 and 3000</p>	<p>40-45mm</p> <p>1 mark for ×1000</p> <p>if measured in cm allow 1 for × 10000</p>	2

total 10 marks

Question Number	Answer	Mark
2(a)	The only correct answer is D oxygen A is not correct as carbon dioxide is not given off B is not correct as carbon monoxide is not given off C is not correct as methane is not given off	1

Question Number	Answer	Mark
2(b)(i)	<ul style="list-style-type: none"> light intensity / distance / eq (1) 	1

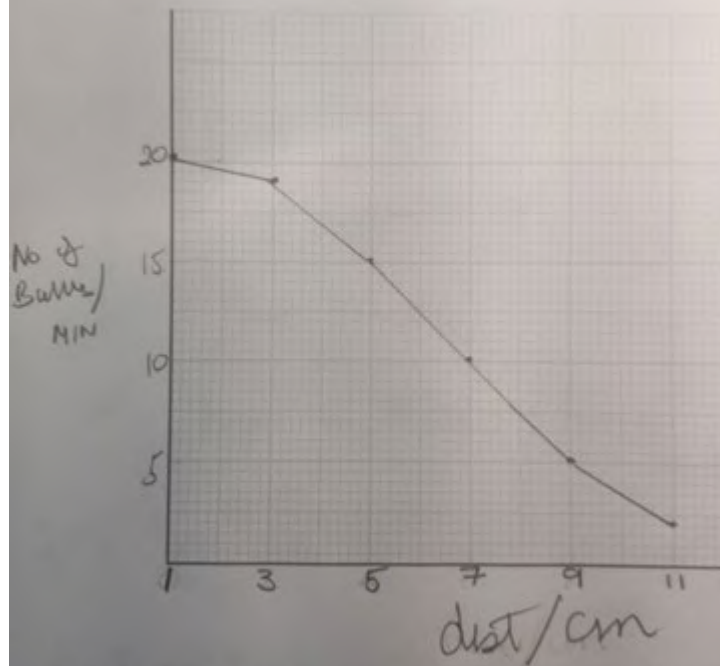
Question Number	Answer	additional guidance	Mark
2(b)(ii)	<ul style="list-style-type: none"> temperature / concentration of carbon dioxide (1) 	allow colour / wavelength of light allow pH/eq	1

Question Number	Answer	Mark
2(c)(i)	<ul style="list-style-type: none"> 15/ 15.3 / 15.33 (1) Clip with 2 (c) (ii) and with table 	1

Question Number	Answer	additional guidance	Mark
2(c)(ii)	<ul style="list-style-type: none"> An answer that includes : Clip with 2 (c) (i) and table S scales linear and half of page (1) L straight lines joining points (1) A1 axes correct way around (1) A2 labelled (number of) bubbles per minute and distance in cm (1) P points correctly plotted within 1 small square (1) 	bar chart loses L	5

(ii) Plot a line graph to show the relationship between distance of lamp from beaker and mean number of bubbles released.

Use a ruler to join your points with straight lines.



(iii) Explain the relationship between distance and mean number of bubbles released.

Question Number	Answer	additional guidance	Mark
2(c)(iii)	<p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • as distance increases production of bubbles decreases / eq (1) • as less light / energy (1) • for photosynthesis (1) 	<p>allow converse for mp1-3</p>	3

Question Number	Answer	additional guidance	Mark
2(d)	<p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • temperature (1) • enzymes have more KE / move faster / more collisions / eq (1) <p>Or</p> <ul style="list-style-type: none"> • carbon dioxide (1) • increases rate as a reactant /required for/ raw material / substrate for photosynthesis (1) <p>Or</p> <ul style="list-style-type: none"> • colour of / wavelength of light (1) • not all colours/ wavelengths absorbed /eq (1) 	<p>allow converse</p> <p>lower temp less KE etc</p> <p>allow temp increase above optimum (1)</p> <p>enzymes denature(1)</p> <p>more to combine / react with enzyme</p> <ul style="list-style-type: none"> • allow pH / eq / (1) • enzyme action (1) <p>allow only red / blue light absorbed = 2 marks</p>	2

Total 14 marks

Question Number	Answer	Mark
3 (a)(i)	<p>The only correct answer is A plasma</p> <p>B is not correct as it is not platelets</p> <p>C is not correct as it is not red cells</p> <p>D is not correct as it is not white cells</p>	1

Question Number	Answer	Mark
3(a)(ii)	<p>The only correct answer is C P 55% Q 5% R 40%</p> <p>A is not correct as it is not P 5% Q 40% R 55%</p> <p>B is not correct as it is not P 40% Q 55% R 5%</p> <p>D is not correct as it is not P 55% Q 40% R 5%</p>	1

Question Number	Answer	Mark
3(a)(iii)	<p>An answer that makes reference to one of the following points</p> <ul style="list-style-type: none"> • fewer red blood cells / eq (1) • smaller or lower percentage of layer R / less of layer R /eq (1) 	1

Question Number	Answer	additional guidance	Mark
3(b)	<p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • <u>phagocytes</u> (1) • (phagocytes) engulf bacteria / viruses / pathogens /eq (1) • <u>lymphocytes</u> (1) • (lymphocytes) produce antibodies (1) • (antibodies) specific to the pathogen (1) 	<p>phagocytes produce antibodies scores mp 1 but not mp 4</p> <p>allow wbc engulf = 1 mark</p> <p>allow wbc produce antibodies =1 mark</p> <p>if no other mp credited allow 1 mark for wbc destroy / kill pathogens/ bacteria/ virus /eq</p>	4

Question Number	Answer	Mark
3(c)	An answer that includes two of the following: <ul style="list-style-type: none">• antibodies (1)• hormone /named hormone (1)• ion / named ion / mineral / eq (1)• digested / food (1)• protein / named protein (1)• amino acid / named amino acid (1)• glucose (1)• carbon dioxide / CO₂ (1)• vitamin /named vitamin (1)• urea (1)• cholesterol / fatty acids / glycerol / eq (1)	2

Total 9 marks

Question Number	Answer	Mark
4(a)	The only correct answer is B anther to stigma A is not correct as it is not anther to petal C is not correct as it is not filament to ovary D is not correct as it is not stigma to the style	1

Question Number	Answer	Mark
4(b)(i)	<ul style="list-style-type: none"> enclose stamens and stigma in bag / cut off anthers and pollinate by hand / eq (1) 	1

Question Number	Answer	Additional guidance	Mark
4(b)(ii)	An answer that includes the following: <ul style="list-style-type: none"> parents genotypes Rr and Rr (1) gametes R or r (1) Offspring genotypes 1 RR 2 Rr and 1 rr phenotype of offspring / ratio 3 round : 1 wrinkled. 	allow TE for 2 max gametes and offspring genotypes / phenotypes	4

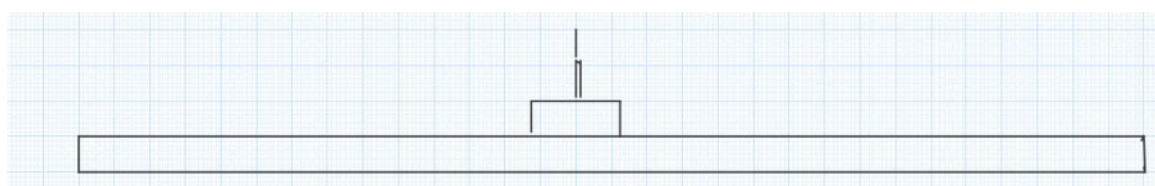
Question Number	Answer	additional guidance	Mark
4(c)	An answer that includes three of the following: <ul style="list-style-type: none"> gametes / haploid cells / requires two cells (1) fertilisation/ fusion (1) <u>genetic</u> variation (1) slower (1) 	allow converse for asexual one parent cell / no gametes /eq no fertilisation no <u>genetic</u> variation faster	3

Total 9 marks

Question Number	Answer	Mark
5(a)(i)	<ul style="list-style-type: none"> oak / (oak) leaves / oak tree / eq (1) 	1

Question Number	Answer	Mark
5(a)(ii)	<ul style="list-style-type: none"> sparrowhawk(s) / hawk(s) (1) 	1

Question Number	Answer	additional guidance	Mark
5(b)(i)	<p>An answer that makes includes:</p> <ul style="list-style-type: none"> pyramid shape / wider at bottom (1) order of oak caterpillar blue tits sparrowhawk (1) Relative width (oak to caterpillar approx 10 to 1 caterpillar to blue tit thin and very thin at top) (1) 	<p>ignore names</p> <p>ignore shape</p>	3



Question Number	Answer	Additional guidance	Mark
5(b)(iii)	<p>An answer that makes reference to five of the following points:</p> <p>yes because</p> <ul style="list-style-type: none"> • fewer insects (1) • fewer tits and thus fewer sparrowhawks (1) • build-up / bioaccumulation/ greatest effect in sparrowhawks (50%) / less effect in caterpillars (33%) eq (1) • no decrease in oak leaves / change in caterpillars not due to less food / eq (1) • fewer caterpillars not due to having more predators (fewer bluetits) /eq (1) <p>no because</p> <ul style="list-style-type: none"> • not repeated / only one sample / not reliable / eq (1) • no information on time of year / season / temperature/eq (1) • no direct measurement of chemical in organisms / environment /eq (1) • no information on other sources of food /food chains / other consumers / eq(1) • no reference to species of oak / caterpillar / eq (1) • may be fewer moths / caterpillars in the area poorly camouflaged /disease / eq (1) 		5

Total 10 marks

Question Number	Answer	additional guidance	Mark
6(a)	<p>An explanation that makes reference to the following points:</p> <ul style="list-style-type: none"> • restriction / endonuclease to cut DNA / gene/ plasmid (1) • ligase to join DNA / gene / plasmid (1) 	allow named restriction endonuclease	2

Question Number	Answer	Mark
6(b)	<p>An answer that makes reference to six of the following points:</p> <ul style="list-style-type: none"> • C with and without GM (1) • O same species / type / plant / age /eq (1) • R repeat (1) • M1 number / count/ yield /mass / height / eq (1) • M2 after same stated time / eq (1) • S1 same temperature / light / CO₂ / humidity / eq (1) • S2 same water / mineral / fertiliser /soil / pH / eq (1) 	6

Total 8 marks