Pearson Edexcel

Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE
In Biology (4BI1) Paper 1B

Question Number	Answer	Mark
1(a)(i)	C cytoplasm *A is not correct as cellulose is not found in the bacterium* *B is not correct as chitin is not found in the bacterium* *D is not correct as a nucleus is not found in the bacterium*	**1 comp**

Question Number	Answer	Mark
1(a)(ii)	C 7 *A is not correct because 1 is not neutral pH* *B is not correct because 2 is not neutral pH* *D is not correct because 12 is not neutral pH*	**1 comp**

Question Number	Answer	additional guidance	Mark
1(a)(iii)	An explanation that makes reference the following points: • mutation (1) • variation (1) • <u>survive</u> (1) • reproduce / breed / offspring (1) • pass on allele / gene (1)		**4 exp**

Question Number	Answer	Mark
1(b)	An answer that makes reference the following points: • probiotic / cranberry / both / treatments (better than control) reduce (bacteria) /eq(1) • more reduction if taken together / eq (1) • cranberry (alone) reduces more than probiotic (alone) / eq(1)	**2 grad**

Total 8 marks

Question Number	Answer	Mark
2	• sexual (1) • pollen (1) • anther (1) • stigma (1) • bees / moths / flies (1) • large / big / scented / (sweet) smelling (1) • style (1) • fertilisation (1)	**8 grad**

Total 8 marks

Question Number	Answer	Mark
3(a)	• nucleus	**1 cler**

Question Number	Answer	Additional guidance	Mark
3(b)	convert length into μm 60 mm = 60 000 μm (1) division 60 000 ÷ 6 = ×10 000 (1)	award full marks for correct numerical answer without working 1 mark for 60 000 or dividing by 6	**2 exp**

Question Number	Answer	Mark
3(c)(i)	A 0.33 *B is not correct as 3 is not the mean* *C is not correct as 10 000 is not the mean* *D is not correct as 75 000 000 is not the mean*	**1 comp**

Question Number	Answer	additional guidance	Mark
3(c)(ii)	An answer that makes reference to the following: • sperm smaller / sperm is small cell / eq (1) • fewer (total) mitochondria (per cell) (1) • more mitochondria per volume / per μm^3 (1) • uses <u>energy</u> to swim / move / get to /eq (1) • fertilise egg (1)	**allow converse for egg** larger more fewer does not move egg is fertilised	**3 exp**

Total 7 marks

Question Number	Answer	Mark
4(a)(i)	C primary consumer *A is not correct as krill is not a predator* *B is not correct as prey is not a trophic level* *D is not correct as krill is not a secondary consumer*	**1 comp**

Question Number	Answer	additional guidance	Mark
4(a)(ii)	A sketch that shows the following points: • upright pyramid shape (1) • names in correct order: plants at bottom, krill in middle. whale at top (1)	 ignore names ignore shape	**2 grad**

Question Number	Answer	Additional guidance	Mark
4(b)	division 10 000 ÷ 1.6 = 6 250 s division ÷ 60 = 104.17 / 100 / 104 / 104.16 recurring or 1.6 x 60 = 96 cm^2 per minute 10 000 ÷ 96 = 104.17 / 100 / 104 / 104.2 / / 104.167 104.16 recurring	award full marks for correct numerical answer without working allow 100 mins as 2 sig figs allow 1 mark for dividing by 1.6 or dividing by 96	**2 exp**

Question Number	Answer	Mark
4(c)	An answer that makes reference to the following points: • use container of sea water (1) • add same / stated number/ amount/ count number / mass of microscopic plants (1) • add stated number / mass of krill (1) • leave for same / stated time / measure time taken to (1) • (re)measure number / amount/mass / percentage change in plants(1) • repeat /eq (1)	**4 exp**

Question Number	Answer	Mark
4(d)	An explanation that makes reference the four of the following points: • fewer whales / whales die / migrate (1) • ice melts (1) • no / less surface for microscopic plants (1) • so fewer microscopic plants (available) (1) • fewer krill / krill die / migrate (1) • carbon dioxide causes acidification (1) • could affect krill (eggs) (1)	**4 exp**

Total = 13 marks

Question Number	Answer	Mark
5(a)	A description that makes reference to three of the following points: • (same) restriction enzyme to cut / remove / open /eq (1) • plasmid / vector <u>and</u> target gene / gene for making poison / eq (1) • ligase enzyme to join / stick / insert /eq (1) • complementary shapes / sticky ends /eq (1)	**3 exp**

Question Number	Answer	additional guidance	Mark
5(b)	An answer that makes reference to six of the following points: Good decision to use GM: • GM plants are specific / kill specific insects / pesticides kill other insects / plants / pesticide kills non-specific insects (1) • GM plants reduce need for pesticide (1) • pesticide needs reapplication / do not last long (1) • insects can become resistant to pesticide (1) • pesticides can enter food chains / bioaccumulation (1) • pesticides can lead to health problems / affect human health /eq (1) eg: organophosphates and nervous system Poor decision to use GM: • pesticides are quick to kill (1) • GM plants could result in cross pollination of other species (1) • GM pollen may kill insect pollinators (1) • insects may develop resistance to poison produced by GM crops (1) • customers may not buy GM crops (1) • patents mean farmers become dependent on companies for their seed (1)	ignore harmful unqualified pollution allow poisons humans	**6 exp**

Total 9 marks

Question Number	Answer	Mark
6(a)	D $C_6H_{12}O_6 + 6O_2 \longrightarrow 6CO_2 + 6H_2O$ *A is not the correct equation for aerobic respiration* *B is not the correct equation for aerobic respiration* *C is not the correct equation for aerobic respiration*	**1 comp**

Question Number	Answer	additional guidance	Mark
6(b)(i)	An explanation that makes reference to two of the following points: • moves left / towards locust (1) • carbon dioxide produced by insect absorbed by KOH / filter paper (1) • oxygen (used by insect) (1) • in respiration (1)	ignore air ignore breathing /inhaling/eq	**2 Expert**

Question Number	Answer	additional guidance	Mark
6(b)(ii)	An answer that makes reference to six of the following points: • size / mass /(of locusts)/eq (1) • (more cells) (more) respiration (1) or • movement / size of flask /eq (1) • more room for movement means more respiration (1) or • volume / concentration of KOH / size of filter paper (1) • affects carbon dioxide absorption /eq (1) or • temperature (1) • affects enzymes / increase kinetic energy / particle movement /eq (1) or • time / duration (1) • more time to respire / more oxygen absorbed (1)	mark 3 variables to maximise score ignore amount but allow stated volume ignore time of day / light / oxygen / humidity etc	**6 exp**

Question Number	Answer	Mark
6(c)(i)	• 5.3 or 5.27 or 5.267 or 5.26 recurring	**1 grad**

Question Number	Answer	Mark
6(c)(ii)	An answer that makes reference to the following points: • not reliable / reliability can be increased /eq (1) • not enough repeats / only three results / needs to be repeated (1) • one result is <u>anomalous</u> / male 3 result is <u>anomalous</u> (1) • more variation within sex than between sexes / eq (1)	**3 exp** ignore not repeated

Total 13 marks

Question Number	Answer	additional guidance	Mark
7(a)	A description that makes reference to two the following: • biuret (1) • deepest / darker / intensity purple contains most protein (1) • reference to same volume of milk / biuret (1)	allow other quantitative methods such as solidify the milk protein by denaturing (1) mass of the protein (1)	**2 exp**

Question Number	Answer	additional guidance	Mark
7(b)	An explanation that makes reference to two of the following points: • prevent infection / disease (1) • (by destroying / due to) virus / bacteria / pathogen (1) • provides immunity / eq (1)	ignore illness	**2 exp**

Question Number	Answer	additional guidance	Mark
7(c)	An answer that includes two of • use as a source of / for energy / respiration (1) • use as store of energy (1) • insulation / myelin sheath / protection fat around organs/ eq(1)	ignore for warmth	**2 grad**

Question Number	Answer	Mark
7(d)(i)	lactose	**1 cler**

Question Number	Answer	Mark
7(d)(ii)	*Lactobacillus / Streptococcus* Allow species names	**1 cler**

Question Number	Answer	Mark
7(d)(iii)	An explanation that makes reference to two of the following points • sterilise milk / pasteurise (1) • kill bacteria / pathogen / microorganisms (1) • prevent competition (for carbohydrate / sugar) (1)	**2 exp**

Total 10 marks

Question Number	Answer	Mark
8(a)(i)	D testis *A is incorrect as meiosis does not occur in kidney* *B is incorrect as meiosis does not occur in penis* *C is incorrect as meiosis does not occur in skin*	**1 comp**

Question Number	Answer	Mark
8(a)(ii)	C root tip *A is incorrect as mitosis is not observed in anther* *B is incorrect as mitosis is not observed in cotyledon* *D is incorrect as mitosis is not observed in xylem*	**1 comp**

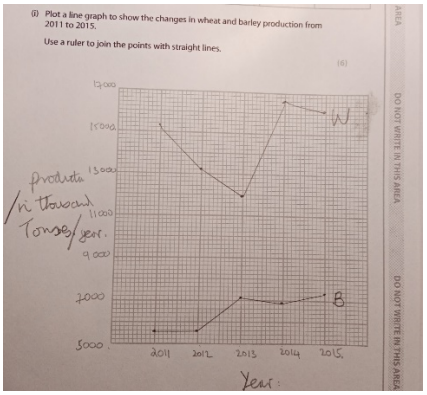
Question Number	Answer	Mark
8(b)		**6 Grad** 1 mark for each row

Feature	**Meiosis**	**Mitosis**
number of chromosomes in each original cell	46	**46**
number of daughter cells produced from each original cell	**4**	2
number of chromosomes in each daughter cell	**23**	**46**
ploidy level of daughter cells produced	**haploid**	diploid
genetic differences in daughter cells	present	**absent /none/identical /eq**
type of cell produced	**gamete / sperm / egg / sex cell**	body cell

Question Number	Answer	Mark
8(c) (i)	A description that makes reference to the following • random mating (1) • random fertilisation / gametes received/ eq (1) • environment (1) • mutation (1)	**3 exp**

Question Number	Answer	Mark
8(c) (ii)	An explanation to the following points • little / no genetic variation / have same genotype / alleles (1) • no genotype environment interaction / respond to drugs in same way /eq (1)	**2 exp**

Total 13 marks

Question Number	Answer	additional guidance	Mark
9(a) (i)	An answer that includes • S scale linear and at least half axis (1) • L straight lines through points (1) • A axis labelled with crop production and year and correct way round (1) • P points accurately plotted (1) • U units thousand tonnes (and years) (1) • K labelled or key to show barley and wheat (1)	bar chart lose L only No L for extrapolation  within one small square	**6 exp**

Question Number	Answer	Mark
9(a)(ii)	A description that makes reference to the following • wheat decreases to 2013/ eq **and** then increases (1) • barley constant **and** then increases to 2013 / eq (then fluctuates) (1)	**2 grad**

Question Number	Answer	Additional guidance	Mark
9(a)(iii)	percentage change in wheat = 16 100 – 15 300 ÷ 15 300 × 100 = 5.23% allow 5.2%/ 5%/eq (1) percentage change in barley = 7 300 – 5 500 ÷ 5 500 × 100 = 32.73% allow 32.7/ 33% barley greater (1)	allow one mark for greater change in barley allow 105% /eq allow 133% /eq allow one mark for each correct percentage	**3 exp**

Question Number	Answer	Additional guidance	Mark
9(b)	25 000 kg per 10 000 m^2 25 000 ÷ 10 000 = 2.5 kg per m^2 per year 2.5 kg = 2500 g ÷ 365 = 6.85 g	allow full credit for correct answer no working one mark for dividing by 365 or 365.25 allow 6.9 also allow for leap year 2500 / 365.25 so 6.84 g allow 6.8g	**2 exp**

Total = 13 marks

Question Number	Answer	Mark
10 (a)(i)	• A sensory / afferent (1) • B relay / association (1) • C motor / efferent (1)	**3 grad**

Question Number	Answer		Mark
10(a)(ii)	An explanation that makes reference to the following points • neurone A / sensory / afferent (+ impulse) (from receptor) to CNS / spinal cord / relay neurone / neurone B (1) • (synapses with) neurone B / relay / association / (+ impulse) (from receptor neurone A) to motor / efferent / neurone C • neurone C / motor / efferent (+ impulse) to effector / muscle	must have impulse once to score 3 marks allow signal message for 2 max	**3 exp**

Question Number	Answer	additional guidance	Mark
10(b)(i)	An explanation that makes reference to two of the following points • measure the distance (from hand to spinal cord and or brain to other hand) (1) • for each student / all students in ring (1) • measure time taken (for student A to feel hand being squeezed / eq) (1) • divide distance by time (1)	ignore count number of students allow 'how long it took'	**2 exp**

Question Number	Answer	Mark
10(b)(ii)	An explanation that makes reference to two of the following points • may be underestimate / too slow / method adds time / delay / eq (1) • not a reflex so need to allow decision making / role of brain / reaction time /eq (1) • as delay occurs at each synapse (1)	**2 exp**

Total 10 marks

Question Number	Answer	Mark
11	An answer that makes reference to six of the following points: • C shampoo with oil and without oil / shampoo with oil and no shampoo (1) • O hair from same person / same hair length / width / age / sex/ same hair type / dry hair same way (1) • R test many different hairs / repeat (1) • M1 add weights / masses to hairs (1) • M2 measure mass / g / pressure / weight / force /N that causes hair to break (1) • S1 same volume / concentration of shampoo / same type of shampoo with and without oil (1) • S2 wash for same time / frequency / same temperature of water (1)	**6 exp** ignore amount

Total 6 marks