Mark Scheme (Results)

November 2020

Pearson Edexcel International GCSE In Biology (4BI1) Paper 2BR

Question Number	Answer	additional guidance	Mark
1(a)	• so semen contained sperm / (bull is) (sexually) mature / sperm in semen / gone through puberty / fully developed / eq	**accept converse** ignore cannot produce semen	**1 grad**

Question Number	Answer	additional guidance	Mark
1(b)	An explanation that includes two of the following points • collect semen / sperm from **penis** of bull (1) • insert **straw** into / inject semen (into cow) (1) • put (it / semen / sperm) in **vagina / uterus** /womb /cervix(1)	 semen injected into uterus scores m2 and mp3	**2 exp**

Question Number	Answer	additional guidance	Mark
1(c)(i)	• preserve (sperm)/ keep (sperm) alive / viable / prevent growth of microorganisms / slow down metabolism / eq	 allow last longer ignore denatured	**1 grad**

Question Number	Answer	Mark
1(c)(ii)	• provide females (produce milk) / will produce cows / eq	**1 grad**

Question Number	Answer	Additional guidance	Mark
1(d)	• 500 000 ÷ 2.4 million = 0.2083 • 0.2083 × 100 = **20.83% / 21.0% / 20.8%**	award full marks for correct numerical answer without working allow 1 mark for ÷ 2.4 million	**2 grad**

Question Number	Answer	Mark
1(e)	A description that makes reference to three of the following points • use semen (from each bull) to fertilise (many / similar) cows (1) • collect / measure milk yields / eq (1) • from each daughter / offspring of these cows / mother of bull (1) • select bull with highest (average) milk yield (across all daughters) (1)	**3 exp**

Question Number	Answer	Mark
1(f)	An explanation that makes reference to two of the following points: • (milk that contains) (most) fat (1) • (most) protein (1) • (most) vitamins (1) • (milk that contains) (most) calcium (1)	**2 exp**

Question Number	Answer	additional guidance	Mark
1(g)(i)	A description that makes reference to four of the following points: • nucleus from (**body) cell of bull** (1) • insert this nucleus into enucleated egg cell (1) • electric shock (1) • mitosis / cell division (1) • <u>embryo</u> into uterus / womb (1) • surrogate mother (1)	**reject from udder** **reject egg cell from bull**	**4 exp**

Question Number	Answer	Mark
1(g)(ii)	An explanation that makes reference to two of the following points • **genetically** identical / no **genetic** variation / same (combination of) alleles (1) • quicker process (1)	**2 exp**

Total =18 marks

Question Number	Answer	additional guidance	Mark
2(a)	An explanation that makes reference to four of the following points: • more (decomposition) /faster with warmer temperatures /eq (1) • enzymes (1) • more (decomposition)/ faster with cut material / eq (1) • more surface area (1) • fungi / bacteria (1)	 allow mass remains high in low temp mass remains high in uncut allow converse	**4 exp**

Question Number	Answer	Additional guidance	Mark
2(b)	6.0 – 3.6 = 2.4 2.4 ÷ 3 = 0.8 6.0 – 2.0 = 4.0 4.0 ÷ 3 = 1.3(3) 1.3(3) – 0.8 = 0.5(3) or could 4-2.4 = 1.6÷3 = or even 3.6-2 =1.6 ÷3 = **allow 0.5 or 0.53 or 0.533 etc for full marks**	award full marks for correct numerical answer without working allow 1 for 2.4 **and** 4.0 or 1.3 **and** 0.8 and allow 1 for dividing by 3 so can get 2 marks for (2.4 and 4.0) and dividing by 3	**3 exp**

Question Number	Answer	additional guidance	Mark
2(c)	An answer that makes reference to two of the following points: • species/ type / of leaves / plant (1) • age of plant / leaves (1) • same (number of) / type of decomposers / eq (1) • insects or organisms that might consume leaf /eq (1)	**ignore volume of leaves**	**2 grad**

Total = 9 marks

Question Number	Answer	Mark
3(a)	The only correct answer is **D** osmosis *A is not correct as it is not how plants absorb water* *B is not correct as it is not how plants absorb water* *C is not correct as it is not how plants absorb water*	**1 comp**

Question Number	Answer	Mark
3(b)	• xylem / xylem vessels	**1 cler**

Question Number	Answer	Mark
3(c)	• transpiration / evaporation / diffusion / evapotranspiration	**1 cler**

Question Number	Answer	Mark
3(d)	**C** low air temperature *A is not correct as it does not reduce the movement of water from the leaves into the air* *B is not correct as it does not reduce the movement of water from the leaves into the air* *D is not correct as it does not reduce the movement of water from the leaves into the air*	**1 comp**

Question Number	Answer	additional guidance	Mark
3(e)	An answer that makes reference to two of the following points: • support / turgor / eq (1) • photosynthesis / eq (1) • cooling (1) • reactions / solvent / transport of mineral ions /named/mineral ion /eq (1)	**ignore** transpiration for enzymes to work eq reactions	**2 grad**

Total 6 marks

Question Number	Answer	Mark
4(a)	• no GH / water / saline / eq	**1 grad**

Question Number	Answer	Additional guidance	Mark
4(b)	increase in mass between 100 and 500 days divide by 400 = g per day 485-230 = 255 ÷ 400 = 0.6375 / 0.638 / 0.64 **allow any answer between 0.6375 and 0.65**	award full marks for correct numerical answer allow 1 mark for ÷ 400	**2 grad**

Question Number	Answer	Mark
4(c)	An answer that makes reference to two of the following points: • temperature (1) • (mass of) food / diet / type of food /eq (1) • water (1) • size of cage (1) • time (1) • volume of solution/eq (1)	**2 exp**

Question Number	Answer	Mark
4(d)	An explanation that makes reference to two of the following points: • avoids making wrong conclusion based on one / few result(s) / conclusion is valid / eq(1) • can calculate mean / average (1) • results are <u>reliable</u> / increase <u>reliability</u> (1) • anomalous results recognised / eq(1)	**2 exp**

Question Number	Answer	additional guidance	Mark
4(e)	An answer that makes reference to three of the following points: • (more) mRNA made (1) • (more) translation (1) • (more) proteins / polypeptides made (1) • enzymes / muscle / tissue (1)	**ignore more cells**	**3 exp**

Total 10 marks

Question Number	Answer	additional guidance	Mark
5(a)	A description that makes reference to six of the following points: • **virus** non-living organisms / small particles / protein coat / capsid / relies on other organisms for reproduction/ eq (1) • AIDS / eq (1) • **bacteria** microscopic single-celled / prokaryotic / no nucleus / have nucleoid / plasmids (1) • pneumonia / eq (1) • **fungus** not able to carry out photosynthesis / saprotrophic / single-celled / hyphae / cell wall chitin/eq (1) • athlete's foot / eq (1) • **protoctist / protozoa** *Plasmodium* / microscopic single-celled (1) • malaria / eq (1)	pathogen **and** description for first mark disease mark must **match pathogen** type allow plant disease eg TMV HIV / AIDS scores disease mark but not pathogen description mark Virus non-living causing cholera scores pathogen description but not disease mark	**6 exp**

Question Number	Answer	additional guidance	Mark
5(b)	An explanation that makes reference to three of the following points: • dead / weakened / harmless / attenuated pathogen / eq (1) • produce memory cells / lymphocytes (1) • (secondary) immune response (1) • **<u>faster / more</u>** antibodies production (1)	allow weakened strain	**3 exp**

Total 9 marks

Question Number	Answer	Mark
6(a)	**A** asexual reproduction *B is not correct as it increases genetic variation* *C is not correct as it increases genetic variation* *D is not correct as it increases genetic variation*	**1 comp**

Question Number	Answer	additional guidance	Mark
6(b)	An explanation that makes reference to five of the following points: • different (sequence of) <u>bases</u> in DNA / eq (1) • changes mRNA / codons (1) • transcription (1) • change tRNA / anticodons /(sequence of)amino acids (1) • translation (1) • changes <u>structure / shape</u> of protein /eq (1) • changes active site (1) • enzyme not functional / no binding / no enzyme substrate complex formed/ eq (1)	changes shape of active site = 2 marks	**5 exp**

Question Number	Answer	Mark
6(c)	An explanation that makes reference to four of the following points: • as some triplets / codons code for same amino acid / degenerative /eq (1) • no change in protein / polypeptide / enzyme produced (1) • active site not changed /affected (1) • mutation / allele may be recessive (1) • so not expressed in phenotype / if heterozygous / dominant allele present / eq (1) • mutation may occur in a non-coding sequence of DNA /eq (1)	**4 exp**

Total 10 marks

Question Number	Answer	additional guidance	Mark
7(a)	An answer that makes reference to the following points: • carbohydrate / named carbohydrate (1) • oxygen (1) • higher / greater / more (1) • carbon dioxide (1) • equal / the same / balanced (1)	**allow** carbohydrate / named carbohydrate	**5 grad**

Question Number	Answer	additional guidance	Mark
7(b)	A description that makes reference to three of the following points: • (how light intensity is varied)foil / muslin / move lamp / eq (1) • leaf in test tube with bung / use flask with delivery tube/eq (1) • (look for colour change after) same/ stated time (1) • same size / species / type / surface area /eq (1) • same temperature / same <u>volume</u> of indicator (1) • correct colour change so goes yellow with increased CO_2 in dark / goes dark red/ red/ purple with reduced CO_2 in light /eq (1)	allow light and dark	**3 exp**

Total 8 marks