



Pearson
Edexcel

Mark Scheme (Results)

November 2020

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

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

Autumn 2020

Publications Code 4B11_2BR_2011_MS

All the material in this publication is copyright

© Pearson Education Ltd 2020

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.

| Question Number | Answer | additional guidance | Mark |
|-----------------|---|--|---------------|
| 1(a) | <ul style="list-style-type: none"> so semen contained sperm / (bull is) (sexually) mature / sperm in semen / gone through puberty / fully developed / eq | <p>accept converse</p> <p>ignore cannot produce semen</p> | 1 grad |

| Question Number | Answer | additional guidance | Mark |
|-----------------|--|---|--------------|
| 1(b) | <p>An explanation that includes two of the following points</p> <ul style="list-style-type: none"> 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) | <p>semen injected into uterus scores m2 and mp3</p> | 2 exp |

| Question Number | Answer | additional guidance | Mark |
|-----------------|---|--|---------------|
| 1(c)(i) | <ul style="list-style-type: none"> preserve (sperm) / keep (sperm) alive / viable / prevent growth of microorganisms / slow down metabolism / eq | <p>allow last longer</p> <p>ignore denatured</p> | 1 grad |

| Question Number | Answer | Mark |
|-----------------|---|---------------|
| 1(c)(ii) | <ul style="list-style-type: none"> provide females (produce milk) / will produce cows / eq | 1 grad |

| Question Number | Answer | Additional guidance | Mark |
|-----------------|--|--|---------------|
| 1(d) | <ul style="list-style-type: none"> • $500\,000 \div 2.4 \text{ million} = 0.2083$ • $0.2083 \times 100 = \mathbf{20.83\% / 21.0\% / 20.8\%}$ | <p>award full marks for correct numerical answer without working</p> <p>allow 1 mark for $\div 2.4$ million</p> | 2 grad |

| Question Number | Answer | Mark |
|-----------------|---|--------------|
| 1(e) | <p>A description that makes reference to three of the following points</p> <ul style="list-style-type: none"> • 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) | <p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • (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) | <p>A description that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>reject from udder</p> <p>reject egg cell from bull</p> | 4 exp |

| Question Number | Answer | Mark |
|-----------------|---|--------------|
| 1(g)(ii) | <p>An explanation that makes reference to two of the following points</p> <ul style="list-style-type: none"> • 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) | <p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>allow mass remains high in low temp</p> <p>mass remains high in uncut</p> <p>allow converse</p> | 4 exp |

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

| Question Number | Answer | additional guidance | Mark |
|-----------------|---|--------------------------------|---------------|
| 2(c) | <p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>The only correct answer is D osmosis</p> <p><i>A is not correct as it is not how plants absorb water</i></p> <p><i>B is not correct as it is not how plants absorb water</i></p> <p><i>C is not correct as it is not how plants absorb water</i></p> | 1 comp |

| Question Number | Answer | Mark |
|-----------------|---|---------------|
| 3(b) | <ul style="list-style-type: none"> • xylem / xylem vessels | 1 cler |

| Question Number | Answer | Mark |
|-----------------|--|---------------|
| 3(c) | <ul style="list-style-type: none"> • transpiration / evaporation / diffusion / evapotranspiration | 1 cler |

| Question Number | Answer | Mark |
|-----------------|---|---------------|
| 3(d) | <p>C low air temperature</p> <p><i>A is not correct as it does not reduce the movement of water from the leaves into the air</i></p> <p><i>B is not correct as it does not reduce the movement of water from the leaves into the air</i></p> <p><i>D is not correct as it does not reduce the movement of water from the leaves into the air</i></p> | 1 comp |

| Question Number | Answer | additional guidance | Mark |
|-----------------|--|--|---------------|
| 3(e) | <p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • support / turgor / eq (1) • photosynthesis / eq (1) • cooling (1) • reactions / solvent / transport of mineral ions / named/mineral ion /eq (1) | <p>ignore transpiration</p> <p>for enzymes to work eq reactions</p> | 2 grad |

Total 6 marks

| Question Number | Answer | Mark |
|-----------------|---|---------------|
| 4(a) | <ul style="list-style-type: none"> no GH / water / saline / eq | 1 grad |

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

| Question Number | Answer | Mark |
|-----------------|---|--------------|
| 4(c) | <p>An answer that makes reference to two of the following points:</p> <ul style="list-style-type: none"> 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) | <p>An explanation that makes reference to two of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>An answer that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • (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) | <p>A description that makes reference to six of the following points:</p> <ul style="list-style-type: none"> • 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) • protocist / protozoa <i>Plasmodium</i> / microscopic single-celled (1) • malaria / eq (1) | <p>pathogen and description for first mark</p> <p>disease mark must match pathogen type</p> <p>allow plant disease eg TMV</p> <p>HIV / AIDS scores disease mark but not pathogen description mark</p> <p>Virus non-living causing cholera scores pathogen description but not disease mark</p> | 6 exp |

| Question Number | Answer | additional guidance | Mark |
|-----------------|---|-----------------------|--------------|
| 5(b) | <p>An explanation that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • dead / weakened / harmless / attenuated pathogen / eq (1) • produce memory cells / lymphocytes (1) • (secondary) immune response (1) • faster / more antibodies production (1) | allow weakened strain | 3 exp |

Total 9 marks

| Question Number | Answer | Mark |
|-----------------|---|---------------|
| 6(a) | <p>A asexual reproduction</p> <p><i>B is not correct as it increases genetic variation</i></p> <p><i>C is not correct as it increases genetic variation</i></p> <p><i>D is not correct as it increases genetic variation</i></p> | 1 comp |

| Question Number | Answer | additional guidance | Mark |
|-----------------|---|--|--------------|
| 6(b) | <p>An explanation that makes reference to five of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>An explanation that makes reference to four of the following points:</p> <ul style="list-style-type: none"> • 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) | <p>An answer that makes reference to the following points:</p> <ul style="list-style-type: none"> • 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) | <p>A description that makes reference to three of the following points:</p> <ul style="list-style-type: none"> • (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 CO₂ in dark / goes dark red/ red/ purple with reduced CO₂ in light /eq (1) | allow light and dark | 3 exp |

Total 8 marks

Pearson Education Limited. Registered company number 872828
with its registered office at 80 Strand, London, WC2R 0RL, United Kingdom