# Cloning 2 MS

**QUESTION 1**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a) | 1 egg<br>2 embryo<br>3 nucleus<br>4 skin cell | | 4 |
| b) | the child created by cloning would not have been able to give permission | extra boxes ticked cancels the mark | 1 |
| Total marks | | | 5 |

**QUESTION 2**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a) | characteristics<br>genes<br>clones<br>asexual | | 1<br>1<br>1<br>1 |
| b)i) | tissue culture | accept other asexual methods eg runners / plantlets / dividing<br>accept use of (named) organ e.g. root / leaf<br>ignore cloning / asexual / stem cuttings / reproduction / genetic engineering<br>do not accept seeds / sexual reproduction | 1 |
| b)ii) | embryo transplant / splitting<br>or<br>(adult cell / fusion) cloning | ignore asexual<br><br>do not accept clones<br>do not accept sexual reproduction<br>ignore genetic engineering | 1 |
| Total marks | | | 6 |

**QUESTION 3**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a)i) | egg cell | | 1 |
| a)ii) | nucleus | | 1 |
| a)iii) | given an electric shock | | 1 |
| a)iv) | womb | | 1 |
| b) | has mammoth genes / chromosomes | accept genetic information / DNA / alleles / nucleus<br>accept converse | 1 |
| Total marks | | | 5 |

**QUESTION 4**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a)i) | gamete(s) | ignore reproductive cells | 1 |
| a)ii) | womb / uterus | allow phonetic spellings | 1 |
| b)i) | are formed from the same original embryo | | 1 |
| b)ii) | embryo transplantation | | 1 |
| b)iii) | any one from:<br>• (calves will have some) genes / DNA from bull / sperm<br>• idea that sexual reproduction produces variation | allow not all genes from the cow<br><br><br><br>allow may be male<br>allow idea that gene for low fat milk may not be passed on | 1 |
| Total marks | | | 5 |

**QUESTION 5**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a) | part of a chromosome<br><br>controls a characteristic | allow piece of DNA<br>allow parts of chromosomes<br>allow controls characteristics<br>allow codes for (or controls production of) protein / enzyme<br>ignore examples of characteristics | 1<br><br>1 |
| b) | (iPS method)<br><br>similarities<br><br>• (both) use of skin / body cell<br>• (both) ref to (formation of) | max 3 similarities or differences<br>allow converse if clearly referring to adult cell cloning | 4 |

| | | | |
|---|---|---|---|
| | embryo<br>• (both) transfer (embryo) into womb / uterus<br>• (both) use surrogate mothers differences<br>• (iPS) uses sexual reproduction<br>• (iPS) surrogate mother is different species<br>• (iPS) no nucleus transfer / removal<br>• (iPS) offspring genetically different from parent<br>• (iPS) no electric shock | allow ref to egg and sperm or gametes or fertilisation<br><br>allow not a clone | |
| c) | any one from:<br>• idea of retaining biodiversity<br>• may be (economically) useful (in the future)<br>• idea of maintaining food chain / ecosystem | | 1 |
| Total marks | | | 7 |

**QUESTION 6**

| QUESTION | ANSWER | EXTRA INFORMATION | MARKS |
|---|---|---|---|
| a)i) | Taking cuttings from plants | | 1 |
| b)i) | Adult cell cloning | | 1 |
| b)ii) | an egg cell | | 1 |
| b)iii) | nucleus | | 1 |
| b)iv) | an electric shock | | 1 |
| b)v) | uterus / womb | accept phonetic spelling | 1 |
| c) | any two from:<br>• unethical / immoral<br>• cloned child would have to give up a kidney<br>• possible operation complications | allow 'rights' of the cloned child<br>allow against religious teachings<br>allow illegal<br>allow parents may not want another child<br>allow a long time to wait (for the kidney) | 2 |
| Total marks | | | 8 |