



BIOLOGY 2020

Unit 2

Key Topic Test 1 – The cell cycle, asexual and sexual reproduction

Recommended writing time*: 45 minutes

Total number of marks available: 45 marks

SOLUTIONS

SECTION A: Multiple-choice questions (1 mark each)

Question 1

Answer: C

Explanation: Option A is what the complex is called after it is condensed. Options B and D are parts of a duplicating chromosome. Chromatin condenses to become visible as a chromosome during cell replication, option C.

Question 2

Answer: B

Explanation: Option A is how bacteria reproduce. Option C is the process to produce gametes and option D is the division of the cytoplasm at the end of the cell cycle. New eukaryotic cells are produced by mitosis, option B.

Question 3

Answer: B

Explanation: Only option B lists the stages in the correct order.

Question 4

Answer: A

Explanation: Bacteria divide into two at each division, so options C and D are incorrect. Bacteria do not breed, they divide, so option B is incorrect. Option A is correct as they double in number very quickly.

Question 5

Answer: B

Explanation: Option A is the opposite to the correct solution which is option B. DNA must be duplicated during the cell cycle in prokaryotes and eukaryotes, so option C is incorrect. Option D refers to clones, but this is also the case for eukaryotes and so this is also an incorrect option.

Question 6

Answer: A

Explanation: Options B, C and D are all advantages of sexual reproduction. Option A does not occur in asexual reproduction and so is not an advantage of sexual reproduction and is the correct solution.

Question 7

Answer: A

Explanation: Crossing over occurs in meiosis, not mitosis and so option B is incorrect. The division of chromatids does not contribute to genetic diversity, so option C is incorrect. There is no anaphase II of mitosis, so option D is incorrect.

Question 8

Answer: C

Explanation: Option A is an alteration in a single nucleotide and would not be caused by the chromatids not separating and is incorrect. Twins are caused by the division of the fertilised egg, so option B is incorrect. Option D is incorrect as there are no gametes formed in asexual reproduction.

Question 9

Answer: B

Explanation: There are no gametes involved in asexual reproduction, so option B is the correct solution. Options A, C and D are all words associated with asexual reproduction and would not be out of place in the presentation.

Question 10

Answer: C

Explanation: Options A, B and D are all true of cloning and so option C is a correct solution.

SECTION B: Short-answer questions

Question 1

a.



- i. Centromere
- ii. Chromatid (either or both)
- iii. The loci of a gene (must show on both chromatids)
- iv. Another diagram identical to the one shown

1 + 1 + 1 + 1 = 4 marks

- b. The main **difference between chromatin and chromosome** is that **chromatin** consists of the unraveled structure of DNA * whereas **chromosome** consists of condensed chromatin *

2 marks

Total 6 marks

Question 2

- a. The correct order for these stages is: R, S, U, W, V, T (all need to be correct)

1 mark

- b. W represents the stage of metaphase

1 mark

- c. Mitosis is necessary to produce two identical daughter cells from a single cell* for the purposes of growth or repair*.

2 marks

Total 4 marks

Question 3

a. One mark for each name and one mark for each description:

- i. G1 phase or first growth stage* – the cell produces new proteins and grows. Stage stops when DNA begins to replicate*.
- ii. S phase or synthesis stage* – exact duplicates of DNA are formed*.
- iii. G2 phase or second growth stage* – the cell prepares for cell division*.
- iv. M phase or mitosis* – the cell divides into two daughter cells*.

2 + 2 + 2 + 2 = 8 marks

b. Interphase

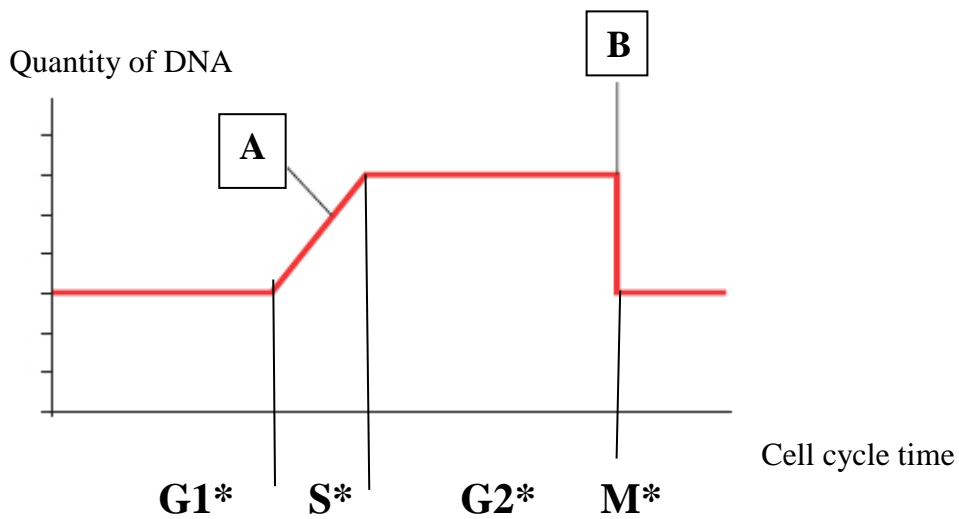
1 mark

Total 9 marks

Question 4

a. At A, the DNA is replicating*. At B mitosis occurs*.

2 marks



b. One mark each correctly marked and identified stage as above.

4 marks

Total 6 marks

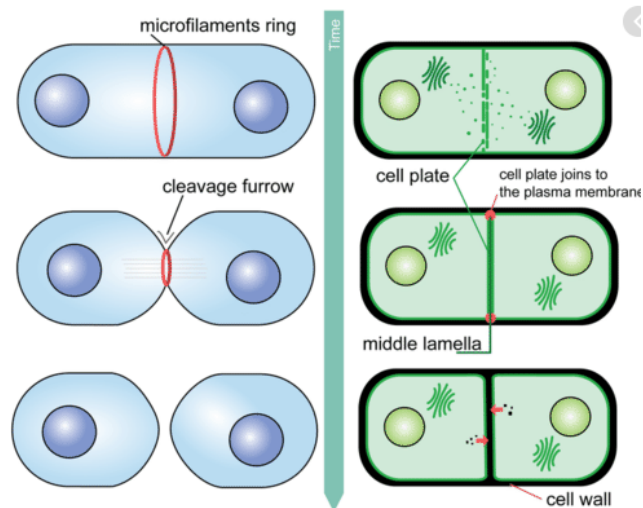
Question 5

Cytokinesis refers to the cytoplasmic division in the final stage of producing two identical daughter cells*.

Plant cells need to form a cell wall* but animal cells do not*.

Cytokinesis in plant cells involves the production of a structure called a cell plate*.

The plasma membrane of animal cells draws together around the middle of the cell and forms a cleavage furrow*.



Total 4 marks

Question 6

a. Other examples possible.

Organism	Type of asexual reproduction	Description
Bacteria	Binary fission	Parent cell nucleus divides by mitosis and cytoplasm divides to form two new cells
Hydra or yeast	Budding	An outgrowth on the parent organism will grow and eventually detach to form a new organism.
Strawberry or potato	Vegetative propagation	Part of a plant is stimulated to form another identical new plant
Fungi	Spore formation	Hardy self-contained capsules capable of producing a new organism.

½ mark each = 4 marks

b.

i. Advantage of asexual reproduction

Any one of:

- Only needs one parent so less resources needed
- Offspring identical to parent so likely to be well suited to conditions
- Large number of offspring produced quickly enabling rapid colonization.

ii. Disadvantage of asexual reproduction

Any one of:

- Many offspring put large demand on resources and leads to competition
- Lack of genetic diversity so less able to survive challenging conditions and susceptible to disease.

1 + 1 = 2 marks

Total 10 marks