Exampro A-level Biology (7401/7402)

Name:

Class:

Mitosis QP

Author:

Date:

Time: 63

Marks: 44

Comments: **These questions mix the different styles of questions. Short answers, practical techniques, experimental data analysis, extended answer and comprehension Work through these, the more you do the better you will become with your exam technique.**

M1.(a) 1. Push hard – spread / squash tissue;

2. Not push sideways – avoid rolling cells together / breaking chromosomes;

Neutral – to see cells clearly

2

(b) No (no mark)

Yes (no mark)

1. Chromosomes / chromatids are (in two groups) at poles of spindle / at ends of spindle;

Do not accept 'ends of cell'

2. V-shape shows that (sister) chromatids have been pulled apart at their centromeres / that centromeres of (sister) chromatids have been pulled apart;

2

(c) 28.8 / 29;

If incorrect, allow:

$\frac{6}{200} \times 960$ *= 1 mark*

2

[6]

M2. (a) (i) prophase;
chromosomes thickening / becoming visible;

2

(ii) anaphase;
chromatids / chromosomes moving to opposite poles / ends of spindles;

2

(b) DNA replication;
synthesis or proteins / build-up of energy stores / growth / increase in cytoplasm;
replication of organelles / named example;

2 max

[6]

M3. (a) (i) Spindle formed / chromosome / centromere / chromatids attaches to spindle;

Chromosomes / chromatids line up / move to middle / equator (of cell);

Do not award second mark for answers referring to chromosomes 'pairing up'.

Ignore reference to homologous chromosomes unless context suggests pairing which negates second mark.

Neutral: Details on nuclear membrane.

Accept: Diagram for second marking point.

2

(ii) Chromosome / centromere splits / chromatids / 'chromosomes' separate / pulled apart;

To (opposite) sides / poles / centrioles (of cell);

Reject: Homologous chromosomes separate for first marking point.

Accept: Diagram for second marking point.

Chromatids / 'chromosomes' move to poles / sides / centrioles = 2 marks.

2

(b) (i) Form / replace cells quickly / rapidly / divide / multiply / replicate rapidly;

Neutral: Repair cells.

Answers must convey idea of 'speed'.

1

(Ii) Correct answer = 774 minutes / 12 hours 54mins = 2 marks;;

Incorrect answer but indicates 3 cell cycles involved = one mark;

2

(c) Prevents / slows DNA replication / doubling / prevents / slows mitosis;

New strand not formed / nucleotides (of new strand) not joined together / sugar-phosphate bonds not formed;

First marking point must be in context of DNA replication not cell replication.

Do not negate first marking point if role of DNA polymerase is described incorrectly e.g. Reject: 'joins bases / strands together'.

Role of DNA polymerase must be correct for last marking point.

2

[9]

M4. (a) (i) where mitosis / division / growing / occurs
(reject growing cells)

1

(ii) to distinguish chromosomes / chromosomes not visible without stain;

1

(iii) to let light through / thin layer;

1

(b) (i) 74 + 18 / 982;
= 9.4% / 9%;

2

(allow 1 mark for identifying prophase & metaphase i.e.92 or correct method using wrong figures)

(ii) genetic differences / different types of garlic;
time of day;
chance;
age of root tip;
water availability;
temperature;
nutrient availability;

(environmental factors = 1 but cannot be awarded in addition to a named environmental factor)

2 max

[7]

M5.(a) Variable that is changed;

Reject 'the variable that changes'.

1

(b) 1. Idea of a confounding variable;

2. (So) genetically similar;

2. Do not accept 'genetically identical / same DNA'.

3. (So) have similar salt tolerance / response to salt water / response to watering treatment;

4. (So) have similar yield / mass of seeds;

Do not accept 'amount / number of seeds' or 'growth rate'.

2 max

(c) Mitosis;

Ignore cell division

1

(d) 1. Irrigation with sea water / **C** / **D** increased yield compared with no irrigation / **A**;

For 'yield' accept 'mass of seed' throughout.

2. Yield was lower when irrigated with sea water / **C** / **D** compared with fresh water / **B**;

Only penalise once for use of 'amount / number of seeds'.

3. Yield was lower when watered with sea water throughout growth and seed formation / **C** than when watered with sea water just at seed formation / **D**;

Accept use of figures from table.

'It' refers to watering with seawater / mixture.

2 max

(e) 1. Irrigation with sea water / **C** / **D** increases concentration of salt in soil;

Ignore reference to standard deviation / quality of the data.

2. Lower water potential in the soil linked to reduced uptake of water;

3. Salt concentration in the soil might / might not increase in the future;

Mark point 3 includes the principle for mark point 1 so mp3 gains 2 marks (for mp1 and mp3)

4. Might decrease plant growth / yield in the future;

5. Less food / fewer seeds for future planting;

Mp 3 and 4. Allow 'further' for the idea of 'in the future'.

3 max

[9]

M6. (a) genetically identical cells / individuals;

1

(b) mitosis;

1

(c) no differentiation at this stage / same genes being expressed;

1

(d) brown - genes / DNA / genetic 'information' from the nucleus (expressed);

1

(e) embryo cell diploid, egg cell haploid;
contain different alleles / forms of the colour gene;

2

(f) damage to nucleus / cells during transfer;

1

[7]