

Name of the Student: _____

Max. Marks : 26 Marks

Time : 26 Minutes

Mark Schemes

Q1.

- (a) any **one** from:
- plasmid
*do **not** accept nucleus*
 - chromosome
 - DNA / genes
allow alleles
allow genetic material
- 1
- (b) no clear area (around C and E)
- 1
- (so) no bacteria killed (by antibiotic)
allow (so) antibiotic did not work
- 1
- if no letters are given assume they are referring to antibiotics C and E*
- (c) increased the concentration of antibiotic
allow increased the dose of antibiotic
ignore increased the volume of antibiotic
ignore left it longer
ignore used a different temperature
ignore used a different sized disc
- 1
- clear area seen (around disc)
or
bacteria (around disc) killed
mark dependent on describing a change to the method
- 1
- (d) the treatment injected around the implant
- 1
- (e) any **one** from:
- ignore reference to cost*
- (stem cells from fat tissue)
- easier to obtain
allow quicker to obtain
 - less invasive

allow fewer side effects
allow less painful
ignore reference to rejection

1

- (f) by diffusion
no marks if incorrect process selected

1

concentration of antibiotic lower inside cells than in solution
or
concentration of antibiotic higher in solution than inside cells
allow 'it' for antibiotic
allow correct reference to concentration gradient

1

- (g) 0.09 to 0.31
allow 0.31 to 0.09

1

- (h) any **two** from:
Pros:
stem cells containing antibiotic had:
 - smallest area of infection (: total tissue area)
 - small(est) range of results
 - no overlap with unreactive solution (suggesting significant effect)

2

any **two** from:
Cons:

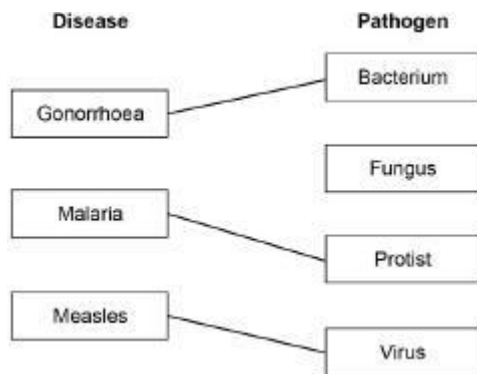
- only tested on 5 patients
allow small sample size
- some results for antibiotic treatment similar to stem cells containing antibiotic
- some results for stem cell treatment similar to stem cells containing antibiotic
- age / health of patients not controlled
- only tested on one type of bacterium
ignore only tested on one infection
- only tested on one type of implant
- only collected results after 7 days
- may lead to antibiotic resistance (in *S. aureus* bacteria)
- rejection of stem cells
- need donors for stem cells
- allergic reaction to antibiotic
ignore cost
ignore religion
ignore use of embryonic stem cells
ignore references to viruses
ignore side effects unqualified

2

[14]

Q2.

(a)



do **not** accept more than one line from a box on the left

1
1
1

(b) reduces breeding / reproduction (in mosquitos)

allow fewer (mosquito) eggs fertilised

allow no offspring produced (by sterile mosquitos)

1

(so) fewer mosquitos to bite people

or

(so) fewer mosquitos to pass on pathogen / protist

allow (so) less likely to be bitten by mosquitos

ignore fewer mosquitos to pass on malaria / disease

1

(c) electron microscope

ignore microscope unqualified

ignore scanning / transmission

*do **not** accept light microscope*

1

(d) (fungal spore)

(16 μm $\Rightarrow$) 1.6×10^{-5} m

or

(virus)

(2.5×10^{-7} m $\Rightarrow$) 0.25 μm

1

$$\frac{1.6 \times 10^{-5}}{2.5 \times 10^{-7}}$$

or

$$\frac{16}{0.25}$$

allow $\frac{0.000\ 016}{0.000\ 000\ 25}$

*allow incorrect attempt at conversion or not converted
value for length correctly substituted*

1

($\Rightarrow$) 64

allow a correctly calculated value using an incorrectly or
not converted value for length

allow **1** mark **only** for $\frac{16}{2.5} = 6.4$

1

(e) discolouration in leaves

or

less chlorophyll in leaves

the idea of less is only needed once

ignore mosaic pattern of leaves unqualified

1

(so) reduced photosynthesis

allow less light absorbed

1

(so) less glucose produced so less amino acids / proteins / cellulose made

*allow (so) less glucose so less energy for synthesis of
chemicals*

or

*allow (so) less glucose for respiration (so) less energy
transferred for growth*

1

[12]