Name of the Student:_____
Max. Marks : 29 Marks **Time : 29 Minutes**

Mark Schemes

Q1.

(a) any **four** from:

- bacterial cell is smaller (than a plant cell)
  allow converse statements 'it' refers to bacteria
- bacterial cell does **not** have chloroplasts (plant cell does)
  ignore chlorophyll
- bacterial cell does **not** have its DNA / genetic material inside a nucleus (plant cell does)
  *allow bacterial cell does **not** have a nucleus (plant cell does)*
  allow bacterial cell has DNA / genetic material in a ring / loop (plant cell does not)
  allow bacterial cell has DNA / genetic material free in cytoplasm
- bacterial cell (may) have plasmids (plant cell does not)
- bacterial cell does **not** have mitochondria (plant cell does)
- cell wall in bacterial cells is **not** made of cellulose (cell wall in plant cells is)
- bacterial cell does **not** have a large / permanent vacuole (plant cell does)
- bacterial cell has smaller ribosomes (than plant cells)
  *do **not** accept idea that bacterial cells do not have ribosomes*
  allow bacterial cell (may) have a flagellum (plant cells do not)
  allow bacterial cell (may) have a slime capsule (plant cell does not)

4

(b) any **four** from:

- dead / inactive / weakened form of pathogen / bacterium / microorganism is introduced / injected
  allow introduce / inject antigen(s) from the pathogen
  allow dead / inactive / weakened form of Gonorrhoea (bacteria) introduced / injected
  *do **not** accept inject Gonorrhoea disease*
- white blood cells stimulated to produce antibodies

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*do **not** accept incorrect white blood cell, eg phagocyte*

- reference to memory cells made or remain
- on re-exposure specific / correct antibodies are made (very) quickly

  allow on re-exposure specific / correct antibodies are produced in large quantities
- bacteria / pathogens / microorganisms killed and do not produce a large enough population to cause the disease

  allow bacteria / pathogens / microorganisms killed and do not produce a large enough population to produce toxins

4

(c) fewer bacteria / pathogens in chicken / eggs / food

ignore references to immunity unqualified

allow fewer chickens / eggs will carry the bacteria / pathogens ignore chickens do not get disease / infected

1

(so) fewer bacteria are ingested (by humans)

allow idea of fewer bacteria being passed on to humans in food

or

fewer bacteria / pathogens ingested (by humans) (1)

(so) fewer toxins produced (1)

allow idea of fewer bacteria being passed on to humans in food (1)

1

(d) wash hands before preparing food

ignore wash hands unqualified

allow good food hygiene

wash hands after using the toilet

allow clean areas where a person has been ill

allow do not shake hands (with someone who has food poisoning)

1

(e) warmer weather so bacteria reproduce / increase faster

ignore bacteria are killed at low temperatures

allow food not cooked properly on barbeques

1

[12]

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Q2.

(a) protist

1

(b) any **two** methods with reason from:

1 mark for method and 1 mark for a correctly linked reason

- Method: insecticides
  Reason: to kill mosquitos / vector
  ignore kill insects unqualified

- Method: (mosquito) nets
  Reason: to avoid being bitten
  allow long clothing
  ignore acts as a physical barrier

- Method: insect repellents
  Reason: less likely to be bitten
  allow DEET or named insect repellent

- Method: vaccination
  Reason: so people are immune (to malaria)

- Method: anti-malaria tablets
  allow named anti-malarial e.g. Larium / Malarone
  allow antibiotics

- Reason: kills the pathogen / protist
  allow ecf from part (a)
  ignore kills malaria
  allow
  Method: drain swampy ground
  or
  remove pots of water
  or
  put oil on water / pond
  Reason: fewer breeding grounds for mosquitos

  allow
  Method: release GM / sterile mosquitos
  Reason: prevent / reduce reproduction

  *if no other marks awarded allow **1** mark for kill mosquitos*

4

(c) any **two** from:
(bacterial cell):

does not have a nucleus
allow DNA is free in cytoplasm
allow has a single loop of DNA
allow has a single strand of DNA

has plasmids
allow description, e.g. (small) ring(s) of DNA

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is smaller

allow bacterial cells do not have mitochondria or do not have membrane bound organelles

allow bacteria have smaller ribosomes

ignore bacterial cells do not have chloroplasts

2

(d) to allow air / oxygen in for bacteria to respire

allow to allow carbon dioxide produced in respiration to escape

or

so bacteria can respire aerobically

1

(e) (A)

(no change in population size) because no / limited cell division / reproduction

allow (no change in population size) because bacteria / cells adjusting to environment / culture conditions

ignore reference to growth unqualified

1

(B)

(rapid increase in population size) as cells dividing rapidly as (plentiful) supply of nutrients / food

allow rapid binary fission as (plentiful) supply of nutrients / food

1

(C)

(population size stays the same) as rate of cell death equals rate of cell division

1

(D)

(population size decreasing) as cells dying due to nutrients running out

or

(population size decreasing) as cells dying due to toxins / carbon dioxide / cell wastes building up (in solution)

1

(f)

*a ratio of 30 000:1 for **X** and 0.55:1 for **Y** scores **3** marks*

(SA: vol ratio of **X** =)

2.4 × 10-7 : 8 × 10^{-12}

1

or

0.000 000 24 : 0.000 000 000 008

(SA: vol ratio of **Y** =) 726:1331

conversion to same scale: 30 000:1 **and** 0.55:1

if no other calculation marks awarded allow 1 mark for calculation of SA for X and Y

or

*calculation of volume for **X** and **Y***

1

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or

*calculation of SA and volume for one **or** both cubes if not given as a ratio*

1

(so) diffusion distance is longer in multicellular organism

allow converse

or

(so) volume supplied by each unit of surface area is greater in multicellular organism

allow converse

allow idea that some cells will have no surfaces exposed to outside in multicellular organism

1

(so) diffusion rate per unit volume is slower in a multicellular organism

allow converse

1

[17]

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