Mark schemes

1

(a) 1. Contents of phloem vessel pushed into insect's mouth by high pressure;

2. (High pressure in phloem vessel) caused by loading of sugars into phloem in leaf;

3. And (resulting) entry of water by osmosis.

3

(b) 1. Polysaccharides are insoluble;

2. So do not affect water potential of gut.

2

(c) 1. (Only few bacteria passed from parent, so) only a few (copies of) genes passed on (inbacteria);

2. May not / does not include all alleles (of genes, so diversity reduced)
OR
Small number of bacteria transmitted means unrepresentative sample.

2

(d) 1. Number / mass / density of insects per plant;

2. Stage of development / size of plants / insects;
Ignore any abiotic factor

2

(e) Draw around leaf on graph paper **and** count squares;

1

[10] (a)   Binary fission;

2

Reject mitosis

1

(b) 1. Keep lid on Petri dish
OR
Open lid of Petri dish as little as possible.

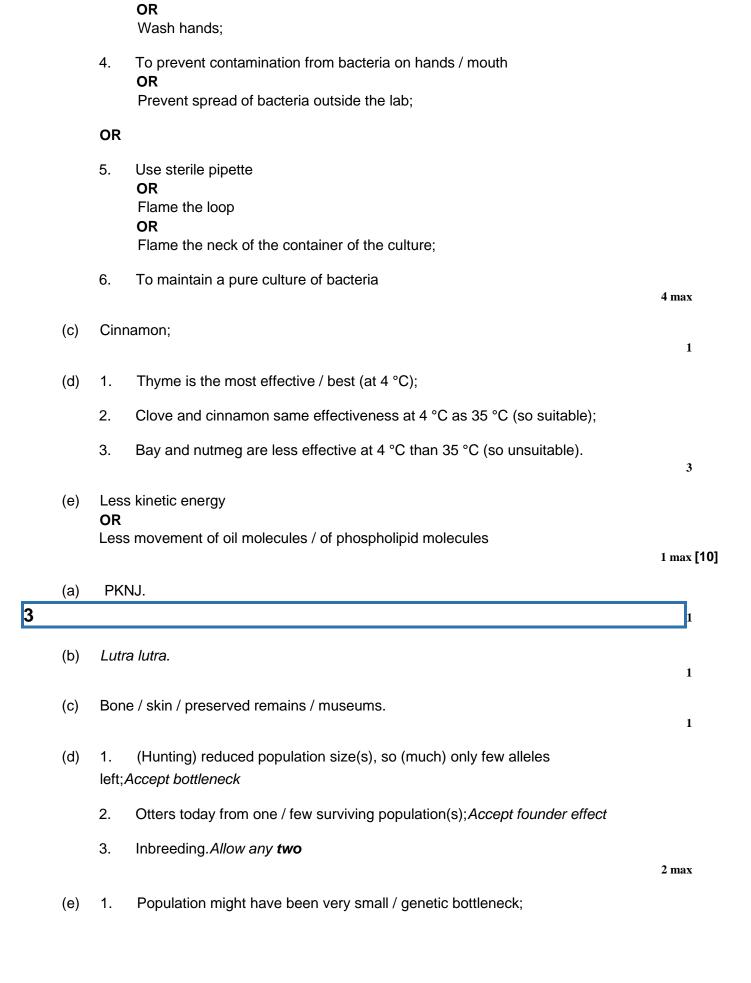2. To prevent unwanted bacteria contaminating the dish.
OR
L. monocytogenes may be dangerous / may get out.

OR

3. Wear gloves
OR
Wear mask

OR
Wash hands;

4.	To prevent contamination from bacteria on hands / mouth
OR
Prevent spread of bacteria outside the lab;

OR

5.	Use sterile pipette
OR
Flame the loop
OR
Flame the neck of the container of the culture;

6.	To maintain a pure culture of bacteria

4 max

(c)	Cinnamon;

1

(d)	1.	Thyme is the most effective / best (at 4 °C);

2.	Clove and cinnamon same effectiveness at 4 °C as 35 °C (so suitable);

3.	Bay and nutmeg are less effective at 4 °C than 35 °C (so unsuitable).

3

(e)	Less kinetic energy
OR
Less movement of oil molecules / of phospholipid molecules

1 max [10]

(a)	PKNJ.

3

1

(b)	*Lutra lutra.*

1

(c)	Bone / skin / preserved remains / museums.

1

(d)	1.	(Hunting) reduced population size(s), so (much) only few alleles left;*Accept bottleneck*

2.	Otters today from one / few surviving population(s);*Accept founder effect*

3.	Inbreeding.*Allow any **two***

2 max

(e)	1.	Population might have been very small / genetic bottleneck;

2. Population might have started with small number of individuals / by one pregnant female / founder effect; 3. Inbreeding. *Allow any* ***two***

2 max

[7] (a) (No – no mark)

4

Graph / bar chart only shows number of species, not the name of the species.

1

(c) (No – no mark)
1. Mutations are spontaneous / random;
2. Only the rate of mutation is affected by environment;
3. Different species do not interbreed / do not produce fertile offspring; 4. So mutation / gene / allele cannot be passed from one species to another.

> *Ignore references to correlation does not prove causation*

4

(d) 1. Initially one / few insects with favourable mutation / allele;
2. Individuals with (favourable) mutation / allele will have more offspring;
3. Takes many generations for (favourable) mutation / allele to become the mostcommon allele (of this gene).

3

[8] (a) 1. Kingdom, Phylum, Class, Order, Family;

5

2. *Luscinia svecica.*

> *1 mark for each correct column*
>
> *Allow Genus and Species if both placed in box for species but not if both placed in genus box*

2

(b) Number of different alleles of each gene.

> *Accept number of different base sequences (found) in each gene*

1

(c) 1. Has greater proportion of genes / percentage of genes showing diversity; 2. Percentage is 35% compared with 28% / proportion is 0.35 compared with 0.28.

> *Allow correct figures that are not rounded up, i.e., 34.9% / 0.349 and 27.8% / 0.278*

2 [5]

(a) 0.32.

6

> *Correct answer = 2 marks*
> *Accept 32% for 1 mark max*
> *Incorrect answer but identifying 2pq as heterozygous = 1 mark*

2

(b) 1. Mutation produced *KDR minus* / resistance allele;

2. DDT use provides selection pressure;
3. Mosquitoes with *KDR minus* allele more likely (to survive) to reproduce; 4. Leading to increase in *KDR minus* allele in population.

4

(c) 1. Neurones remain depolarised;
2. So no action potentials / no impulse transmission.

2

(e) 1. (Mutation) changes shape of sodium ion channel (protein) / of receptor(protein);
2. DDT no longer complementary / no longer able to bind.

2

[10]

7 (a) 1. Size of cotton swab;

2. Dampness of cotton swab;

3. Size of area of skin;

4. Time rubbed on skin;

5. Part of the body / skin sampled;

6. Volume of agar / nutrient concentration of agar;

7. Incubation time;

8. Incubation temperature;

3 max

(b) 99.8;

OR

57 271;

1 mark for writing out correct calculation: (401.6 – 0.7)/401.6 × 100
OR *(401.6 – 0.7)/0.7 x 100*
1 mark max for incorrect rounding
Accept answers to any number of significant figures as long as rounding is correct

2

(c) 1. Spread here greater above the mean than below;

2. Some / many Petri dishes had no colonies;
Accept idea that data are not normally distributed / is skewed.

1 max

(d) 1. Treatment **C** / treatment normally used at the time;

2.   (Because) using untreated / soap and water / treatment **A** / treatment **B** would have too great a risk of infection;

>   *Accept C has least / lower risk of infection*

>   *Accept description of 'infection'*

2

[8]

(a)   Hydrolysis (reaction);

8   **1**

(b)   1.   (Phosphate required) to make RNA;
2.   (Phosphate required) to make DNA;

>   *1 and 2. If neither DNA or RNA are named allow one mark for nucleotide/nucleic acid/phosphodiester bonds/sugar-phosphate backbone.*

3.   (Phosphate required) to make ATP/ADP;
4.   (Phosphate required) to make membranes;

>   *Ignore: phospholipids without reference to membranes.*

5.   (Phosphates required) for phosphorylation;

>   *Accept: as additional mark points any named biological molecule containing phosphate e.g. NADP, AMP, RuBP.*

2 max

(c)   Accept answer in range from 3.7 : 1 to 4.1 : 1; *Reject any ratio not : 1.*

1

(d)   1.   Seeds/embryo remain dormant/inactive in winter/cold
OR
Growth/development of seed/embryo during winter/cold;

>   *Ignore: hibernate.*

>   *Accept: 'seed survives winter/cold'.*

>   *Reject: plant develops or seed germinates during winter/cold.*

2.   Seeds/plants develop in spring/summer
OR
Seeds/plants develop when temperature/light increases;

>   *Accept: seeds/plants develop when more light or when temperature is higher.*

>   *Accept: seed germinates/'sprouts' during spring/summer or when temp/light increases.*

3.   Plant photosynthesise (in spring/when warm);
4.   Produce (more) seeds/offspring in spring/growing season;

3 max

[7] (a)   1.   Change in <u>DNA</u> base/nucleotide (sequence);

9

>   *Accept: mutation in <u>DNA</u> base (sequence).*

>   *Accept: deletion/substitution/addition of a <u>DNA</u> base/nucleotide.*

2. Change in amino acid (sequence)/primary structure; *Reject: different amino acid formed.*
    Ignore: change in code for amino acid.
3. Alters (position of) hydrogen/ionic/disulfide bonds;
4. Change in <u>tertiary</u> structure (of receptor); *Reject: any reference to active site.*
    Ignore: 3°.

4

(b) 1. (Receptor) is not <u>complementary</u>
     OR
     (HIV) cannot bind/attach <u>and</u> enter/infect (helper) T cell;
        Accept: 'complimentary'.
        Accept: invade as alternative to infect.
     2. No replication (of virus)
     OR
     No destruction of (helper) T cell;
        Accept: reproduction (of virus).

2

(c) 1. Low/lower exposure to HIV (in Europe)
     OR
     Low/lower number of HIV/AIDS (infections/cases);
        Accept: converse.
     2. (HIV) has only been present for a short time period
     OR
     (HIV relatively) recently evolved;
     3. Mutation/CCR5 has been around for many years;
        Accept: frequency of mutation has always been high.
     4. Mutation/CCR5 is advantageous (for something else);

2 max

[8] (a) Bacteria killed;

10

Ignore: no growth or growth of bacteria prevented.
Accept: bacteria destroyed.
Accept: no living bacteria.

1

(b) Clear zone would be too large
     OR
     Clear zones would overlap/merge
     OR
     Could kill all bacteria (on the plate);
        Must convey idea of too large.

1

(c) 1. (Same) size;

Accept: any measure of size e.g. thickness, area, diameter.

Ignore: 'same shape' as shape shown on the diagram.

2.　(Same) material/absorbency;

3.　In solution for same time period;

Ignore: reference to volume of disinfectant.

2 max

(d)　Any number between 2.5 to 3.2 = **two** marks;;

*Allow **one** mark for an incorrect answer but shows method of calculating how many times more effective D is than B e.g. 22 divided by 13/14 or 11 divided by 6.5/7 or 1.57/1.6/1.69/1.7.*

2

[6] (a)　Locus;

Accept: loci

1

(b)　Differences in DNA / differences in base sequence of DNA;

Accept: number of different alleles / size/variation in gene pool

Reject: genes

1

(c)　1.　Jack Russell (genetic) diversity is (significantly) greatest;

2.　Bull terrier (genetic) diversity is (significantly) smallest / is mostinbred;

3.　Miniature terrier and Airedale terriers are similar;

1-3: do not credit just a list of values

4.　Standard deviations do not overlap / do overlap with correct ref tosignificance;

Reference to significance must be relevant to examples given

Max 3

(d)　1.　(Bull terrier) breeding has included a genetic bottleneck/ smallpopulation/more inbreeding/ greater selection (pressure);

Accept: founder effect

2.　Reduced number of different alleles/size of gene pool;

Reject: decrease in number of genes

Ignore ref to mutations

OR

3.　Miniature (terrier) breeding has included more outbreeding/lessselection (pressure);

4.　Increased number of different alleles/larger gene pool/more varietyof alleles;

Reject if genes used instead of alleles

Reject: lower frequency of alleles

Ignore ref to mutations

2

[7]

12   (a)   1.   Type of feed affects (antibiotic) <u>resistant</u> bacteria (in animals);

> *Accept: null hypotheses*
>
> *Accept predictions, for example*
>
> *More antibiotic resistant bacteria form in animals fed with antibiotics in their food*

2.   (Antibiotic) resistant <u>resistant</u> infect /are passed on to animals/farmer / resistant <u>resistant</u> are passed between animals;

> *Accept: bird to bird/bird to human/human to human*
>
> *Accept: a link (exists) between (antibiotic) resistance in animals and their keepers/farmers – as lowest level QWC*

3.   Incidence of (antibiotic) resistant <u>resistant</u> differs in chickens and turkeys;

> *Accept: a comparison, eg 'more resistant bacteria in chickens than turkeys'*

4.   Incidence of (antibiotic) resistant <u>resistant</u> differs in chicken farmers and turkey farmers;

> *Accept: a comparison, eg 'more resistant bacteria in chickens than turkeys'*

Max 2

(b)   (i)   1.   Large(r) percentage of <u>resistant</u> bacteria in turkeys/low(er) percentage of <u>resistant</u> bacteria in chickens;

> *Accept: E coli for bacteria*
>
> *Ignore: number, eg. ignore 'more'/'fewer' turkeys/chickens*

2.   Large(r) percentage of <u>resistant</u> bacteria in turkey farmers/low(er) percentage of <u>resistant</u> bacteria in chicken farmers;

2

(ii)   1.   (More) antibiotic in turkey feed kills (more) non-resistant bacteria / resistant bacteria survive; *Accept: antibiotic creates selection pressure*

> *Survive must be explicit, not implied by 'reproduce'*

2.   (Resistant bacteria) reproduce / pass on gene for resistance;

2

(c)   (Human) faeces contain pathogens;

> *Accept: harmful organisms*

1

(d)   1.   Large number of farms / farmers (surveyed) / 46;

> *'Reliable' is used in the question stem*

2.   So results are (likely to be) representative / can identify anomalous results;

Ignore: reproducible / accurate / valid / reliable

Accept valid explanation of replicates minimising effects of chance

2

(e)　1.　(DNA) hybridisation (of gene for resistance in bacteria takenfrom bird and farmer);

　　2.　(Identical) strands separate at high(est) temperature;

　　　　OR

　　3.　Compare base/nucleotide sequence (of gene for resistance inbacteria taken from bird and farmer);

　　4.　(Identical strains) have identical/same base sequences*Mark in pairs, do not mix and match.*

Accept: bacteria in bird and farmer/both types of bacteria have identical base sequences = 2 marks

2

(f)　1.　(Antibiotic use has) increased cases of bacterial resistance;

Accept: number

　　2.　Transfer/horizontal transmission of (resistance) gene topathogens/harmful bacteria;

Accept: conjugation

　　3.　(Antibiotic) resistant bacteria cause harm / medical treatments lesseffective;

Accept: superbug

　　4.　Avoids side effects on animals;

　　5.　Increased demand for organic food;

　　6.　Antibiotic/resistant bacteria could be present in human food;

　　7.　High cost of antibiotics;

　　8.　Legislation has controlled antibiotic use;*Accept: EU/government guidelines*

4 max

[15]

(a)　1.　Change / mutation in base / nucleotide sequence (of DNA / gene);

13

Q.

Ignore: references to changing base-pairing

Accept: affect for change, if in correct context

Accept: changes triplets / codons

　　2.　Change in amino acid sequence / primary structure (of enzyme);

Accept: different amino acid(s) coded for

***Q** Reject: different amino acids produced / formed / made*

　　3.　Change in hydrogen / ionic / disulfide bonds;*Accept: references to sulfur bonds*

　　4.　Change in the <u>tertiary</u> structure / shape;

Neutral: alters 3D structure / 3D shape

　　5.　Change in <u>active site</u>;

6. Substrate not complementary / cannot bind (to enzyme / active site) / no enzyme-substrate complexes form.

      Accept: no E S complexes form

6

(b) 1. Non-SR strain falls more / SR strain falls less / up to 10(µg / cm^{-3});

      Must include 10 but only required once in either MP1 or MP2

      Ignore: units or absence of

      This must be a comparative statement

2. Above 10(µg / cm^{-3}), SR strain levels out / off <u>and</u> non-SR strain continues to decrease;

3. Greater difference between strains with increasing concentration of antibiotic.

      This must be a comparative statement

2 max

(c) 1. Division stopped (of both strains by scientist); *Reject: references to mitosis stopping*

2. SR strain still more resistant / fewer die / none die (at higher concentrations of antibiotic).

      Accept: SR strain and non-SR strain would be similar if resistance is due to only stopping division

      Need some comparison with non-SR

2

(d) 1. Make a competitive / non-competitive inhibitor;

      Mark in pairs either MP1 <u>and</u> MP2 OR

      MP3 <u>and</u> MP4

2. Competitive competes with / blocks active site / non-competitive inhibitor affects / changes <u>active site</u>;

      Do not mix and match

OR

3. (Make a drug) that inhibits / denatures / destroys enzyme / stringent response; *Accept: drug that 'knocks out' / destroys enzyme*

4. Give at the same time as / before an antibiotic.

2 max

(e) (SR strain)

1. Fewer free radicals (than non-SR);

      Note: has to be comparative statement

2. Produces more catalase (than non-SR);

      Accept converse statements for non-SR.

3. Catalase (might be) linked to production of fewer free radicals / breaking down / removing free radicals.

Accept: hydrolysis of radicals by catalase.

3

[15]

14 (a) 1. Sugar-phosphate (backbone) / double stranded / helix **so** provides strength / stability

/ protects bases / protects hydrogen bonds;
Must be a direct link / obvious to get the mark
Neutral: reference to histones

2. Long / large molecule **so** can store lots of information;

3. Helix / coiled **so** compact;
Accept: can store in a small amount of space for 'compact'

4. Base sequence allows information to be stored / base sequence codes for amino acids / protein;
Accept: base sequence allows transcription

5. Double stranded **so** replication can occur semi-conservatively / strands can act as templates / complementary base pairing / A-T and G-C so accurate replication / identical copies can be made;

6. (Weak) hydrogen bonds **for** replication / unzipping / strand separation / many hydrogen bonds **so** stable / strong;
Accept: 'H-bonds' for 'hydrogen bonds'

6

(b) 1. (Mutation) in **E** produces highest risk / 1.78;

2. (Mutation) in **D** produces next highest risk / 1.45;

3. (Mutation) in **C** produces least risk / 1.30; *Must be stated directly and not implied*

E > **D** > **C** = *3 marks*
Accept: values of 0.78, 0.45 and 0.30 for MP1, MP2 and MP3 respectively
If no mark is awarded, a principle mark can be given for the idea that all mutant alleles increase the risk

3

(c) **180**;

1

(d) **(Similarities):**

1. Same / similar pattern / both decrease, stay the same then increase;

2. Number of cells stays the same for same length of time; *Ignore: wrong days stated*

(Differences):

(Per unit volume of blood)

3. Greater / faster decrease in number of healthy cells / more healthy cells killed /healthy cells killed faster;

Accept: converse for cancer cells

Accept: greater <u>percentage</u> decrease in number of cancer cells / greater <u>proportion</u> of cancer cells killed

4. Greater / faster increase in number of healthy cells / more healthy cellsreplaced / divide / healthy cells replaced / divide faster;

Accept: converse for cancer cells

*For **differences**, statements made must be comparative*

3 max

(e)　1.　More / too many healthy cells killed;

2. (So) will take time to replace / increase in number;*Neutral: will take time to 'repair'*

3. Person may die / have side effects;

2 max

[15] (a)　250 000;

15

1

(b)　(i)　Loss of 3 bases / triplet = 2 marks;;

'Stop codon / code formed' = 1 mark max unless related to the last amino acid

Loss of base(s) = 1 mark; *eg triplet for last amino acid is changed to a stop codon / code = 2 marks*

3 bases / triplet forms an intron = 2 marks

Accept: descriptions for 'intron' eg non-coding DNA

'Loss of codon' = 2 marks

2

(ii)　1.　Change in tertiary structure / active site;

Neutral: change in 3D shape / structure

2. (So) faulty / non-functional protein / enzyme;

Accept: reference to examples of loss of function eg fewer E-S complexes formed

2

[5] (a)　1.　No interbreeding / gene pools are separate / <u>geographic(al)</u> isolation;

16

Accept: all marks if answer written in context of producing increased diversity of plants

1 Do not award this mark in context of new species being formed and then not interbreeding

1 Accept reproductive isolation as an alternative to no interbreeding

2. Mutation;

   2 Accept: genetic variation

3. Different selection pressures / different foods / niches / habitats;

   3 Accept: different environment / biotic / abiotic conditions or <u>named</u> condition

   3 Neutral: different climates

4. Adapted organisms survive and breed / differential reproductive success;

5. Change / increase in allele frequency / frequencies;

   5

(b) Similar / same environmental / abiotic / biotic factors / similar / same selection pressures / no isolation / gene flow can occur (within a species);

   Accept: same environment

   1

   [6]

17

(a) (i) (We should maintain biodiversity to)

   Prevent extinction / loss of populations / reduction in populations / loss of habitats / save organisms for future generations (idea of);

   Neutral: references to 'playing God' / animal rights

   1

(ii) A suitable example of how some species may be important financially e.g.

   1. medical / pharmaceutical uses;

   2. commercial products / example given;

   3. tourism;

   4. agriculture;

   5. saving local forest communities;

   1 max

(b) 1. Fewer plant species / decrease in plant diversity;

   Accept: converse arguments for islands with a high percentage of forest remaining 1. Neutral: fewer plants

2. Fewer habitats nesting sites / niches / food sources / varieties / less protection from predators / hunters / environment;

   2. Neutral: fewer homes

2. Neutral: less food

2

(c) 1. Number of (individuals / birds of) each species;

       1. Neutral: number of species

       2. Total number of individuals / birds of all species;

       2. Accept: 'total number of birds' as given context for 'all species' in the investigation

2

(d) 1. (Larger birds have) a low(er) SA:VOL;

       Neutral: reference to fat / feathers

   2. (So) less heat loss / more heat retained;

       MP2 is independent of MP1

2

[8]

(a) 2 of the following pairs:

18

       Mark for explanation must be paired with correct change in structure

   1. Larger leaves;

   2. Photosynthesis;

OR

       Accept converse descriptions of leaves, root and stem: longer root, taller stem, smaller leaves

   3. Larger / bigger / thicker root;

   4. Storage;

OR

   5. Stem shorter / absent;

       Accept converse correct explanation

   6. Less energy used in stem growth / more energy for producing sugar;

4 max

(b) Beet ready quicker / less time required / allows land to be used again / harvestedearlier;

       Allow more crops / many harvests. Ignore references to yield / profit

1

(c) 1. (Diversity) reduced / fewer different alleles / less variation / smaller gene pool;

   2. As <u>alleles</u> have been chosen / rejected;

2

19

			1

(ii) 1. Change in amino acid / (sequence of) amino acids / primary structure;

      1. Reject = different amino acids are 'formed'

    2. Change in hydrogen / ionic / disulphide bonds alters tertiary structure /active site (of enzyme);

      2. Alters 3D structure on its own is not enough for this markingpoint.

    3. Substrate not complementary / cannot bind (to enzyme / active site) / noenzyme- substrate complexes form;

      3

(b) 1. Lack of skin pigment / pale / light skin / albino;

    2. Lack of coordination / muscles action affected;

      2 max

(c) Founder effect / colonies split off / migration / interbreeding;

    Allow description of interbreeding e.g. reproduction between individuals from different populations

      1

[7] (a) (i) (Human cells) don't have a cell wall;

20

    Accept "they" refers to human cells.

      1

(ii) (Affects) protein synthesis;

    Allow description e.g. 'amino acids not joined together / translation.
    Reject: affects transcription.

      1

(b) 1. Mutation present / occurs;

    Ignore antibiotic causes mutation.

    2. Resistance gene / allele;

    1. or 2.
    Reference to immunity disqualifies first credited marking point.

    3. Resistant bacteria (survive and) reproduce;

    Reference to mitosis negates marking point 3.

      2

[4] (a) Difference in DNA / base sequence / difference in alleles / genes / gene pool;

21

    Neutral: 'fewer alleles' unless qualified e.g. fewer different alleles.

      1

(b)   Environmental;

Accept: Environment

1

(c)   Reduced (genetic diversity);

As fewer different / varied alleles / genes / reduced gene pool;

2

[4] (a)   (i)   Antibiotics kill other bacteria / *Clostridium* is resistant;

22

Less / no competition so (*Clostridium*)
reproduces / replicates / multiplies / increases in number;

Reference to bacteria being 'immune' negates first marking point.

Reference to mitosis negates second marking point.

2

(ii)   Immune system less effective / more likely to have other
infections / been in hospital;

Accept: 'Weak / lower' immune system'.

1

(b)   Attaches to <u>active site</u> (of enzyme);
(Methicillin) is a competitive inhibitor / prevents monomers / substrate
attaching (to enzyme);

'Competes for active site' = 2 marks.

Neutral: 'Prevents monomers joining / attaching to each other'.

*Allow one mark max for answers relating to non-competitive
inhibitor changing active site / preventing substrate attaching. Do
not penalise Methicillin forms an enzyme / substrate complex.*

2

(c)   (i)   Have other illness / medical condition / 'weak' immune system / disease /infection;

*Reject: Due to 'other factors', 'are smokers', 'are obese' unless
related to disease or illness.*

1

(ii)   Increase up to 2006 / 20 (per 100 000) then decreases;

1

(iii)   Correct answer in range of 52 – 59.1% = two marks;

Incorrect answer but shows change as between 4.8 – 5.2 / shows
correct subtraction giving this change e.g. 14 – 9 = one mark.

2

[9] (a)   Same number of ryegrass seedlings in distilled water;

23

1

(b)   (i)   Produce null hypothesis;

Carry out Spearman Rank correlation test / find correlation coefficient;

Use values to show P < critical value / find probability of results being due to chance;

Accept valid example

E.g. There is no correlation between inhibition of germination and the concentration of the extract.

2 max

(ii) May be another factor / named factor (that also inhibits germination);

e.g. amount of water in extract

1

(c) (i) Extract inhibits ryegrass germination / extract stops ryegrass starting to grow;

Inhibition of root length / causes ryegrass to have shorter roots;

2

(ii) Scientists crushed plants to get extract;

Plants might not secrete substances in the extract into the soil;

These substances might get broken down in the soil;

Wheat and ryegrass might not grow at the same time / wheat plants might not produce substance when ryegrass is growing;

Concentration of extract in the soil might be different from that in solution;

3 max

[9

] (a) Banding pattern changes as cheetah gets older / difficult to judge as tail is short / fluffy;

24 **1**

(b) (i) Mean not (always) a whole number;
Standard deviation not (always) zero;

2

(ii) Movement of tail / angle of sight / confused it with another band / subjective estimation;

*Accept reference to **Figure 1***

E.g. Bands 2 and 3 have same thickness but look different

1

(c) Band width not the same on both sides of tail;

1

(d) Offspring of the same family will be more similar genetically;
As have same mother (and father) / parent;
Expect to see more differences in randomly chosen cheetahs;

3