Mark schemes

Q1.

(a) 1. Extract DNA and add restriction endonucleases/restriction enzymes;

2. Separate fragments using electrophoresis;

3. (Treat DNA to) form single strands

OR

(Treat DNA to) expose bases;

Ignore method used to separate strands

4. The probe will bind to/hybridise/base pair with the *SUT1*/gene;

5. Use autoradiography (to show the bound probe);

Accept use photographic or X ray film (to show the bound probe)

X rays alone is not sufficient

4 max

(b) 1. Antisense mRNA is <u>complementary</u> to 'sense' mRNA;

2. Antisense mRNA would bind/base pair to (sense) mRNA;

OR

Double stranded (m)RNA forms;

3. Ribosomes would not be able to bind;

4. Preventing/less translation (of mRNA)

OR

Preventing/less production of SUT1 (protein);

Accept descriptions of translation

4

Q2.

(a) 1. (Short) single strand of DNA;

2. <u>Bases</u> complementary (with DNA/allele/gene);

2

(b) 1. <u>Restriction</u> endonuclease/enzyme;

2. (Cuts DNA at specific) base sequence
OR
(Breaks) phosphodiester <u>bonds</u>
OR

(Cuts DNA) at recognition/restriction site;
Accept palindromic sequence.

2

(c) (So DNA) probe binds/attaches/anneals;

1

(d) 1. (Lane 1 has DNA fragments) of known sizes/lengths;

2. Compare (position of viral fragment/s);

2

(e) 3, 4, 5 with these numbers in any sequence;
All three numbers required.
Reject if more than three numbers given.

1

[8]

Q3.

(a) (i) Does not code for amino acid/tRNA/rRNA;
Accept 'does not code for production of protein/polypeptide'
Reject 'that produces/makes amino acid'

1

(ii) Deletion mutation;
Accept 'deletion'
Ignore references to splicing

1

(b) (The) polymerase chain reaction;
Accept PCR

1

(c) 1. Probes are single stranded / have a specific base sequence;
2. Complementary base sequence on (specific) spacer

OR

3. Complementary/specific to (particular) spacer;
4. (In white squares probe) binds (to single-stranded spacer) and glows/produces light/fluoresce;
2. Need idea of complementary to spacer
3. Accept converse for dark squares

3

(d) 1. To see if strain is resistant to any antibiotics;
2. So can prescribe effective/right antibiotic;

OR

3. To see whether (any) vaccine works against this strain/ see which vaccine to use/ to produce specific vaccine;
4. (So) can vaccinate potential contacts/to stop spread;

OR

5. Can test other people to see if they have the same strain/ to trace where people caught TB;
6. Allowing control of spread of disease/vaccinate/treat contacts (of people with same strain) before they get TB;

Do not allow mix and match of points from different alternative pairs

2 max

[8]