Name of the Student:_____
Max. Marks : 23 Marks **Time : 23 Minutes**

Mark Schemes

Q1.

1. Depolarisation of presynaptic membrane;
   Accept action potential for depolarisation.

2. Calcium channels open and calcium ions enter (synaptic knob);
   Accept Ca^{2+}.

3. (Calcium ions cause) synaptic vesicles move to/fuse with presynaptic membrane **and** release acetylcholine/neurotransmitter;
   Accept abbreviations for acetylcholine as term is in the question.

4. Acetylcholine/neurotransmitter diffuses across (synaptic cleft);
   Accept abbreviations for acetylcholine as term is in the question.

5. (Acetylcholine attaches) to receptors on the postsynaptic membrane;

6. Sodium ions enter (postsynaptic neurone) leading to depolarisation;
   Accept Na^{+}.
   Accept 'action potential' or 'generator potential' for depolarisation.

5 max

[5]

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Q2.

(a) 1. Affects/damages basement membrane

OR

More protein channels/carriers in basement membrane;

2. Proteins can pass into the (glomerular) filtrate/tubule;

Ignore nephron.

2

(b) Box 4 The non-homologous section of an X chromosome

1

(c) 1. Effective as D has lower protein (than B/C);

Accept descriptions of each group e.g. A = wild type mice. B = AS mice. C = AS mice that received AS stem cells. D = mice that received wild type stem cells.

Accept 'healthy' or 'without AS' for 'wild type'.

2. Not fully effective as D has higher protein than A;

3. Do not know all results for other mice in D

OR

Only shows results for 68% of mice;

4. Some of D mice may have been cured

OR

Some of D may have died;

5. Do not know actual/numerical quantity of protein;

6. (Investigation) only on mice

OR

(Investigation) not on humans;

Accept 'rats' for 'mice'.

7. Rejection may occur;

Accept 'immune response' for rejection.

8. Only shows results for 20 weeks/short-time period

OR

Long-term effects not known;

Ignore answers relating to sample size or statistical test.

4 max

(d) 1. (Transplanted stem cells) differentiate/specialise;

2. Reduce loss of protein at the glomerulus

OR

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Prevents protein moving into filtrate;

Accept Bowman's/renal capsule.

2

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Q3.

(a) 1. (Attaches to receptors on target cells and) activates/stimulates enzymes;
Reject 'produces enzymes'.

2. Glycerol/amino acids/fatty acids into glucose;
Reject 'glucagon converts' as context suggests enzyme action.
Ignore lipids/fats/proteins but reject glycogen.
Reject occurs in pancreas.

2

(b) 1. Correct answer of 3.24 = **2 marks**;;

2. Incorrect but multiplies by 34 (with decimal point in any position) = **1 mark**
OR
Incorrect but shows sequence 324 = **1 mark**
OR
3.2 = **1 mark**;

2

(c) 1. (More) insulin binds to receptors;

2. (Stimulates) uptake of glucose by channel/transport <u>proteins</u>
OR
Activates enzymes which convert glucose to glycogen;
Accept activates enzymes for glycogenesis.
Reject active transport.
Accept carrier proteins or GLUT 4 for channel proteins.
Accept insulin stimulates addition of channel proteins in membranes.

2

(d) 1. Less/no ATP is converted to cyclic AMP/cAMP;

2. Less/no kinase is activated;

3. Less/no glycogen is converted to glucose
OR
Less/no glycogenolysis;
*If no indication of less/no for any of the mark points award **max 2 marks**.*
Accept all marks in context of adrenaline.
Ignore gluconeogenesis.

3

[9]

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