



EXAM PAPERS PRACTICE

Boost your performance and confidence with these topic-based exam questions

Practice questions created by actual examiners and assessment experts

Detailed mark scheme

Suitable for all boards

Designed to test your ability and thoroughly prepare you

2002

XVIII

1583

Time allowed

50 Minutes

Score

/40

Percentage

%

Biology

**AQA
AS & A LEVEL**

Mark Scheme

3.2 Cells

www.exampaperspractice.co.uk



1 (a) 1. Antibody has tertiary structure;
2. Complementary to binding site on protein. 2

(b) 1. Prevents false negative results;
2. (Since) shows antibody **A** has moved up strip / has not bound to any *Plasmodium* protein. 2

(c) 1. Person is infected with *Plasmodium* / has malaria;
2. Infected with (*Plasmodium*) *vivax*;
3. Coloured dye where antibody **C** present;
4. That only binds to protein from *vivax* / no reaction with antibody for *falciparum*.
Person is infected with P. vivax / Plasmodium vivax = 2 marks (MP1 and MP2) 4

[8]

- 2 (a) 1. Outside of virus has antigens / proteins;
2. With complementary shape to receptor / protein in membrane of cells;
3. (Receptor / protein) found only on membrane of nerve cells.
Accept converse argument 3
- (b) 1. No more (nerve) cells infected / no more cold sores form;
2. (Because) virus is not replicating. 2
- (c) Prevents replication of virus. 1
- (d) MicroRNA binds to cell's mRNA (no mark)
1. (Binds) by specific base pairing;
2. (So) prevents mRNA being read by ribosomes;
3. (So) prevents translation / production of proteins;
4. (Proteins) that cause cell death. 4
- [10]



- 3 (a) (i) 1. (Tumour suppressor) gene inactivated / not able to control / slow down cell division;
Ignore: references to growth
2. Rate of cell division too fast / out of control.
1 and 2 Accept: mitosis
1 and 2 Reject: meiosis

2

- (ii) 1. (Genetic) code degenerate;
Accept: codon for triplet
Accept description of degenerate code, e.g. another triplet codes for the same amino acid
2. Mutation in intron.
Accept: mutation in non-coding DNA

1 max

- (b) 1. Antibody has specific tertiary structure / binding site / variable region;
Do not accept explanations involving undefined antigen
2. Complementary (shape / fit) to receptor protein / GF / binds to receptor protein / to GF;
Ignore: same shape as receptor protein / GF
3. Prevents GF binding (to receptor).

3

[6]



4 (a) Regulator protein.

Accept regulator protein antigen
Reject regulator protein receptor
Ignore regular protein

1

- (b) 1. Lipid soluble / hydrophobic
2. Enters through (phospholipid) bilayer

OR

3. (Protein part of) LDL attaches to receptor
4. Goes through carrier / channel protein.
4. Accept by facilitated diffusion or active transport
4. Reject active transport through channel protein

2

(c) Any **two** from:

1. (Monoclonal antibody) has a specific tertiary structure / variable region / is complementary to regulator protein
Do not award MP1 if reference to active site.
2. Binds to / forms complex with (regulator protein)
"It" refers to monoclonal antibody in MP1 and MP2
3. (So regulator protein) would not fit / bind to the receptor / is not complementary to receptor
3. Reject receptor on LDL

2 max

- (d) 1. Injection with salt solution
1. Accept inject placebo in salt solution
2. Otherwise treated the same.

2

[7]



- 5 (a) Any **two** from:
1. (Decrease linked to) few(er) cases of whooping cough;
 2. (Decrease linked to) risk of / fear of side effects;
 3. Insufficient vaccine available / too expensive to produce / distribute.
3. Too expensive unqualified is insufficient for mark

2 max

- (b)
1. Vaccination rate increases;
 2. Fewer people to spread the disease / whooping cough / more people immune / fewer susceptible.
2. Neutral – greater herd effect
2. Allow description of immune
Q Reject 'resistant'.

2

- (c)
1. More people are immune / fewer people carry the pathogen;
If neither point 1 or 2 awarded
Herd immunity = 1 mark

Unvaccinated does not mean infected

1. Q Do not accept disease for pathogen

2. So susceptible / unvaccinated people less likely to contact infected people.

2

[6]



- 6 (a) 1. (Releases) toxins;
2. Kills cells / tissues.
*2. Accept any reference to cell / tissue damage
Ignore infecting / invading cells*

2

- (b) 1. Water potential in (bacterial) cells higher (than in honey) / water potential in honey lower (than in bacterial cells);
*Q candidates must express themselves clearly
1. Must be comparative e.g. high WP in cell and low WP in honey*
2. Water leaves bacteria / cells by osmosis;
3. (Loss of water) stops (metabolic) reactions.
3. Needs a reason why lack of water kills the cell

3

[5]