AQA GCSE BIOLOGY (HIGHER) · 8461

# BIOLOGY



## MARK SCHEME

### 4.3.2 MONOCLONAL ANTIBODIES

| SCORE | PERCENTAGE |
| --- | --- |
| /30 | % |

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## Q1.

(a) (mouthpiece) has pierced / entered the phloem
**or**
(the aphid) has been feeding from the phloem

**1**

(b) yellow leaves due to lack of chlorophyll

*ignore 'chloroplasts'*
*ignore magnesium is needed to make chlorophyll*

**1**

(therefore) less / no light absorbed (by chlorophyll)

**1**

(therefore) lower rate of / no photosynthesis

*do **not** allow 'energy is produced by photosynthesis'*

**1**

(therefore) plant makes less / no sugar / glucose

**1**

(therefore) plant converts less / no sugar / glucose into protein (for growth, so growth is stunted)

*allow less glucose / sugar converted into cellulose (cell wall)*
*allow less energy for protein synthesis*

**1**

(c) inject the protein / it into a mouse

**1**

combine lymphocytes with tumour / cancer cells to make hybridoma (cells)

*ignore white blood cells*
*allow T or B lymphocytes*
*ignore tumour unqualified*

**1**

find a hybridoma which makes a monoclonal antibody specific to PVY

**1**

(the scientist) clones (the hybridoma) to produce many cells (to make the antibody)

*do **not** allow cloning of original stem cells*
*allow many rounds of cloning / mitosis*

**1**

**[10]**

## Q2.

(a) any **two** from:

- regular hand washing
  **or**
  use hand sanitiser / alcohol gel



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- cover nose / mouth when coughing / sneezing

  *allow wear a face mask*
- put used tissues (straight) in the bin
- don't kiss uninfected people

  *allow isolate patient from others*

  **or**

  don't share cutlery / cups / drinks with uninfected people
- clean / disinfect / sterilise surfaces regularly

  *ignore responses referring to infected people*

**2**

(b) any **three** from:
- stimulate (mouse) lymphocytes to produce antibody

  *for marking points 1 and 2 lymphocyte must be used at least once*
- combine (mouse) lymphocyte with tumour cell

  **or**

  (create a) hybridoma
- clone (hybridoma) cell
- (hybridoma) divides rapidly **and** produces the antibody

**3**

(c) any **two** from:
- (monoclonal) antibody binds to virus **or** antibody binds to antigen on surface of virus
- (monoclonal) antibody is complementary (in shape) / specific to antigen (on surface of virus)
- white blood cells / phagocytes kill / engulf the virus(es)

**2**

(d) as a control

**or**

to see / compare the effects of the treatment (vs. no treatment)

**1**

(e) (4.8 + 10.4) ÷ 2 ÷ 100 × 1500

**or**

(4.8 ÷ 100 × 750) + (10.4 ÷ 100 × 750)

**1**

114

*an answer of 114 scores **2** marks*

*allow 228 for **1** mark*

**1**

(f) **(supports the conclusion because)**

over double the number / % of patients (in the trial) were hospitalised with the placebo (compared to MAB)

**1**

**(does not support the conclusion because)**

no information on patients not hospitalised / still unwell at home

**or**

other factors may have affected those admitted to hospital

*allow correct named factor e.g. age / gender / other illness*

**or**

don't know if it was a double blind trial



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1

**[12]**

## Q3.

(a) **A**

1

(b) any **one** from:

- identify / locate specific molecules / other hormones
- locate blood clots
- diagnose / treat some cancers

1

(c) (as) urine passes through reaction zone

1

HCG hormone binds to the mobile HCG antibody (in the reaction zone)

1

(passes up the stick) HCG hormone binds to the immobilised HCG antibodies in the results zone

1

(the other) antibodies which do not attach to HCG

1

bind to antibodies in control zone

1

blue dye appears in both control and results zones (to show positive result)

1

**[8]**



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