

## Mark schemes

- 1.** (a) any **two** from:
- regular hand washing
  - or**
  - use hand sanitiser / alcohol gel
  - 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)  $(4.8 + 10.4) \div 2 \div 100 \times 1500$
- or**
- $(4.8 \div 100 \times 750) + (10.4 \div 100 \times 750)$
- 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

1  
[12]

2.

(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]

3.

(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]