A Level Biology B

H422/02 Scientific literacy in biology

Question Set 11

1. **(a)** **(i)** The NHS has published the following advice about tuberculosis (TB) on its website:

> If you're diagnosed with active pulmonary TB (TB that affects your lungs and causes symptoms), you will be given a six-month course of a combination of antibiotics. The usual course of treatment is:
>
> - two antibiotics (isoniazid and rifampicin) for six months
> - two additional antibiotics (pyrazinamide and ethambutol) for the first two months
>
> It is important to take some basic precautions to stop TB spreading to your family and friends. You should:
>
> - always cover your mouth – preferably with a disposable tissue – when coughing, sneezing or laughing
> - open windows when possible to ensure a good supply of fresh air in the areas where you spend time
> - not sleep in the same room as other people.

State the name of one organism that causes TB. **[1]**

(ii) Explain why patients with pulmonary TB are advised to cover their mouths whencoughing, to open windows when possible and not sleep in the same room as other people. **[2]**

(iii) Most bacterial infections are treated with a single antibiotic for 7–10 days.

Explain why TB requires treatment with a combination of antibiotics for a much longer period. **[2]**

(b) **(i)** Fig. 3 shows the structure of the human immunodeficiency virus (HIV).

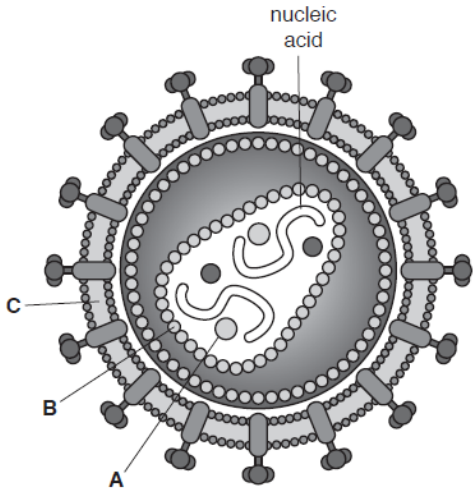

Fig. 3

State the type of nucleic acid that forms the genetic material of HIV. **[1]**

(ii) Identify the structures labelled **B** and **C** in Fig. 3. **[1]**

(iii) State the name **and** describe the function of the enzyme labelled **A** in Fig. 3. **[2]**

(c) Acquired immunodeficiency syndrome (AIDS) refers to a series of symptoms and illnesses caused by HIV.

Describe how the life cycle and method of infection of HIV explains the following features of HIV/AIDS:

(i) There can be a long period (up to ten years) between infection and the onset of symptoms.

[2]

(ii) A person infected with HIV becomes more susceptible to infections such as candidiasis,pneumonia and TB.

[2]

(d) Studies have shown that HIV might increase the probability of clots forming inside blood vessels.

A student wrote the following notes about the process of blood clotting.

Complete the gaps in the student's notes using the most appropriate word or term.

Most clotting factors are …… that convert an inactive clotting factor into an active clotting factor. For example, ……converts prothrombin to thrombin, which then hydrolyses ……to form the protein fibrin. Because fibrin is a ..... protein the molecules become entangled with red blood cells and form a clot.

[4]

Total Marks for Question Set 11: 17