

## Infectious diseases – AS 9700 Biology Nov 2022

### 1. Nov/2022/Paper\_11/No.38

Penicillin is an antibiotic used to treat infections caused by bacteria.

Which events explain how bacteria become resistant to penicillin?

- 1 The number of bacteria with the allele for resistance to penicillin increases.
- 2 Resistance to penicillin is the result of a mutation in a bacterium.
- 3 Bacteria with the allele for resistance to penicillin pass the allele to their daughter cells.
- 4 The mutation for resistance to penicillin is always caused by the presence of penicillin.

- A** 1, 2, 3 and 4  
**B** 1, 2 and 3 only  
**C** 1 and 4 only  
**D** 2 and 3 only

### 2. Nov/2022/Paper\_11/No.39

Which statements explain why some vaccines can be taken by mouth but tuberculosis (TB) vaccine has to be injected?

- 1 Macrophages present antigens in vaccines to stimulate an immune response.
- 2 The TB antigens necessary to produce an immune response are proteins which would be digested in the stomach and small intestine.
- 3 There are no B-lymphocytes and T-lymphocytes in the stomach.

- A** 1, 2 and 3    **B** 1 and 2 only    **C** 1 and 3 only    **D** 2 only

### 3. Nov/2022/Paper\_12/No.38

Cholera and tuberculosis are infectious diseases that can spread when people have to live in overcrowded conditions.

Which strategies would help control the spread of cholera **and** tuberculosis?

- 1 covering food to prevent flies landing on it
- 2 providing chlorinated drinking water
- 3 treating severe cases with antibiotics

- A** 1, 2 and 3    **B** 1 only    **C** 2 and 3 only    **D** 3 only

4. Nov/2022/Paper\_21/No.4(b)

(b) The glycoproteins haemagglutinin and neuraminidase are found in the influenza virus and in the virosomes used in a vaccine against the influenza virus.

Haemagglutinin binds to a receptor in the cell surface membrane of phagocytes.

Suggest why haemagglutinin is present in virosomes used in the vaccine for influenza.

.....  
.....  
.....  
.....  
.....  
..... [2]

5. Nov/2022/Paper\_21/No.5d(ii)

(ii) Malaria is another infectious disease that also involves an insect vector.

State the type of organism that causes malaria **and** name **one** organism that causes malaria in humans.

type of organism .....

name .....

[2]

(b) Fig. 2.2 shows the reported number of new cases of tuberculosis (TB) in the USA and the number of new cases per 100 000 of the population of the USA between 1993 and 2018.

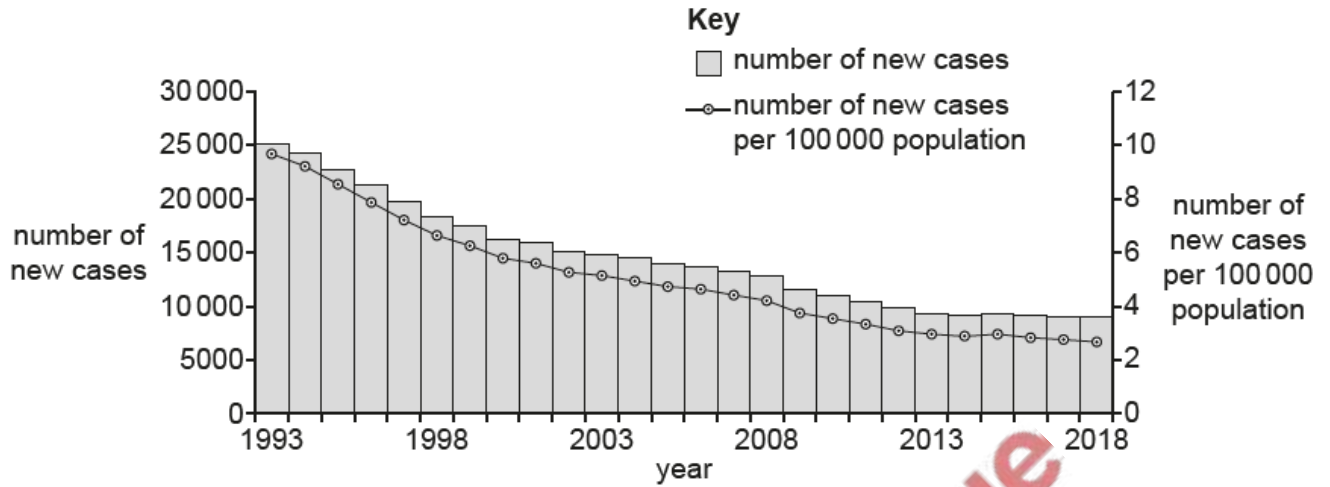


Fig. 2.2

(i) Calculate the percentage change in the number of new cases of TB in the USA between 1993 and 2018.

Show all your working.

answer ..... % [3]

(ii) Use Fig. 2.2 to describe the trend in the number of new cases of TB in the USA between 1993 and 2018.

.....

.....

.....

.....

.....

.....

..... [2]