

# Biomedical Admissions Test (BMAT)

## Section 2: Biology

### Questions by Topic

#### B9.5 - Disease and Body Defence

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## B9.5: Disease and Body Defence - Questions by Topic

*(Mark Scheme and explanations at the end)*

1 The following questions are about the diseases and body defence.

- 1 Communicable diseases are infectious and are caused by pathogens.
- 2 Communicable diseases are always caused by viruses, bacteria and fungi.
- 3 The virus causing AIDS is a retrovirus and therefore contains DNA as its genetic material.
- 4 Reverse transcriptase is an enzyme found specifically in HIV.
- 5 HIV can be transmitted through infected bodily fluids.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 3 and 4
- D 2, 3 and 4
- E 1, 4 and 5
- F 2 and 4
- G 1 and 5
- H 2 and 5

2 The following statements are about disease and body defence.

- 1 A person is HIV+ if they have the virus that causes it.
- 2 HIV is always sexually transmitted disease.
- 3 The HIV virus infects all white blood cells in the blood.
- 4 Using any type of contraception is protection against HIV.
- 5 To prevent transfusion of HIV infected blood, blood is screened.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 2 and 4
- D 1, 2 and 5
- E 1, 3 and 5
- F 1 and 5
- G 2 and 5
- H 3 and 5





3 The following statements are about disease and body defence.

- 1 The lymphocyte continues circulating once HIV is released into the blood.
- 2 Once HIV infects lymphocytes it replicates to make more HIV.
- 3 An individual with HIV does not have a compromised immune system.
- 4 Drugs given for HIV treatment prevent reverse transcriptase from working.
- 5 If an HIV infected mother breastfeeds her baby, the baby will not be infected.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 4 and 5
- C 1, 2 and 4
- D 1, 3 and 4
- E 2, 4 and 5
- F 2 and 4
- G 1 and 4
- H 2 and 4

4 The following statements are about disease and body defence.

- 1 Influenza is caused by the influenza virus.
- 2 Influenza can be transmitted through airborne droplets and contact.
- 3 Influenza does not cause an individual to have a fever.
- 4 Influenza symptoms should subside within 1 week.
- 5 Frequent hand washing reduces transfer of influenza from surface to surface.

Which of these statements are correct?

- A 1, 2, 4 and 5
- B 1, 2 and 4
- C 2, 3 and 4
- D 2, 4 and 5
- E 3 and 5
- F 1 and 4
- G 3 only



**5** The following statements are about disease and body defence.

- 1** Individuals with a weakened immune system can get vaccinated for influenza.
- 2** The influenza vaccine always uses an inactive virus.
- 3** Pandemics of influenza can be avoided through vaccination.
- 4** Antiviral drugs can always be used to treat influenza.
- 5** The influenza virus causes symptoms within a few hours in infection.

Which of these statements are correct?

- A** 1, 2, 3 and 4
- B** 1, 2 and 4
- C** 2, 4 and 5
- D** 3 and 4
- E** 3 and 5
- F** 1 and 3
- G** 2 and 5
- H** 3 and 5

**6** The following are all statements about disease and body defence.

- 1** Measles is a non-communicable disease.
- 2** Measles is caused by the Morbillivirus.
- 3** Measles can be spread through direct contact and airborne droplets.
- 4** A symptom of measles that is always seen is sensitivity to light.
- 5** Measles causes a reddish blotchy rash that can cover all of the skin.

Which of these statements are correct?

- A** 1, 2, 3 and 5
- B** 1, 2 and 4
- C** 2, 3 and 4
- D** 2, 3 and 5
- E** 3 and 5
- F** 1 and 4
- G** 2 and 4



7 The following questions are about disease and body defence.

- 1 Reverse transcriptase is an enzyme used in converting RNA to DNA.
- 2 A HIV+ individual is said to have AIDS when they have a reduced white blood cell count.
- 3 Measles can be prevented by the MMR vaccine.
- 4 The measles vaccine uses an inactive virus.
- 5 Treatment is always given for measles.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 2 and 3
- D 1, 4 and 5
- E 2, 4 and 5
- F 1 and 3
- G 1 and 4
- H 2 and 5

8 The following statements are about disease and body defence.

- 1 Tobacco mosaic virus (TMV) can be transmitted to plants via direct contact or insects.
- 2 TMV can result in tobacco leaves becoming wrinkled and different shades of green.
- 3 The milder strain of TMV is like a vaccine for the plant.
- 4 Tobacco mosaic disease can be prevented through genetic modification.
- 5 The virus cannot survive in the soil.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 2 and 4
- D 2, 3 and 4
- E 3, 4 and 5
- F 2 and 4
- G 1 and 4
- H 1 and 5





9 The following are statements about disease and body defence.

- 1 Bacterial diseases can be treated using antibiotics.
- 2 All antibiotics will kill the bacteria present in the body that is causing the disease.
- 3 Salmonella bacteria survives in the low pH in the stomach.
- 4 Salmonella bacteria reproduce in the stomach.
- 5 Most people require treatment to recover from salmonella.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 2 and 4
- D 1, 4 and 5
- E 2, 4 and 5
- F 1 and 3
- G 3 and 4
- H 2 and 5

10 The following are statements about disease and body defence.

- 1 Protists are single celled organisms that do not have a nucleus.
- 2 Malaria is caused by a protist called Plasmodium.
- 3 Once the protist causing malaria has infected a human being it matures in the liver.
- 4 The protist causing malaria reproduces in the liver.
- 5 Malaria can be prevented by sleeping in mosquito nets.

Which of these statements are correct?

- A 1, 2, 3 and 4
- B 1, 2, 3 and 5
- C 1, 2 and 4
- D 2, 3 and 4
- E 2, 3 and 5
- F 2 and 4
- G 1 and 4
- H 2 and 5



## Answers and Explanations

### 1 The correct answer is G

- 1 is correct - it is true that communicable diseases are diseases that are caught, therefore are **infectious**. Communicable diseases are caused by **pathogens**, which are organisms that can cause disease.
- 2 is incorrect - it is true that communicable diseases are caused by **viruses, bacteria and fungi**. However these are not the only pathogens that cause communicable diseases, **protists** are also pathogens that can cause communicable disease.
- 3 is incorrect - it is true that AIDS is caused by a **retrovirus**, however the retrovirus that causes AIDS contains **RNA** for its genetic material.
- 4 is incorrect - this is because **reverse transcriptase** is an enzyme that is found in retroviruses, it is true that HIV is a retrovirus however reverse transcriptase is **specific to retroviruses** not HIV.
- 5 is correct - it is true that HIV can be transmitted through **infected bodily fluids**, these infected bodily fluids will **contain the virus**.

Since **2** and **5** are the only correct statements, **G** must be the correct answer.



## 2 The correct answer is F

- 1 is correct - it is true that **HIV+** means the individual has the **virus**, as they are **HIV positive**.
- 2 is incorrect - it is true that **HIV+** means the individual has the **virus**, as they are **HIV positive**. it is true that HIV can be a **sexually transmitted disease**, as the virus can be passed on through **semen or vaginal fluid**. However this is not the only way it can be passed from one person to another. HIV can also be transmitted through **breast milk and infected blood**.
- 3 is incorrect - this is because HIV **does not infect all the white blood cells** in the body. HIV only infects one type of white blood cell: **lymphocytes**.
- 4 is incorrect - this is because there are many types of contraception, such as the pill, using condoms, the coil or the implant. However in order to protect against HIV it is essential that the contraception **prevents the transfer of semen and vaginal fluid**. Therefore the only method of contraception that will prevent HIV is by using **condoms**. The other forms of contraception do not prevent the transfer of bodily fluids.
- 5 is correct - it is true that in order to **prevent the transmission of HIV** through blood transfusions, the **blood is screened** beforehand to see if the virus is present.

Since **1** and **5** are the only correct statements, **F** must be the correct answer.





### 3 The correct answer is H

- 1 is incorrect - it is true that HIV **infects the lymphocyte** in the body, however once the virus has been released into the bloodstream the **lymphocyte gets destroyed**.
- 2 is correct - it is true that once the human immunodeficiency virus **infects the lymphocyte** it causes the **white blood cell** to **produce new HIV**.
- 3 is incorrect - this is because HIV infects lymphocytes, these are **involved in the immune system** therefore an individual can have a **reduced white blood cell count** if lots of lymphocytes are destroyed. When an individual has reached this stage they have a weakened immune system, therefore their **immunity is compromised**.
- 4 is correct - there is **no cure for HIV** however treatment can be given. The drugs that are given work by **stopping the enzyme reverse transcriptase** that is present in HIV. Preventing reverse transcriptase from working means **new human immunodeficiency virus cannot be produced**, and therefore we can **control the increase** of HIV in the body.
- 5 is incorrect - this is because HIV is **spread through infected bodily fluids**. If in the body HIV will also be **present in breast milk**, therefore a mother with HIV **cannot breast feed** her baby and **must bottle feed**.

Since **2** and **4** are the only correct statements, **H** must be the correct answer.

**Exam Tip** - it is essential to know the pathogen causing the disease, the mode of transmission, the ways of prevention for HIV and treatment:

- Pathogen that causes HIV: human immunodeficiency virus.
- Mode of transmission: bodily fluids infected with virus - across mucus membranes or broken skin.
- Methods of HIV prevention:
  - Vaccination.
  - Using condoms for contraception.
  - Mother infected with HIV bottle feeding her baby.
  - Screening blood before blood transfusion.
- Treatment for HIV: drugs to stop the enzyme reverse transcriptase.



#### 4 The correct answer is A

- 1 is correct - it is true that influenza (flu) is caused by the **influenza virus**.
- 2 is correct - it is true that influenza is transmitted through **airborne droplets of sputum** - such as by **sneezing or coughing**. Influenza can also be transmitted through **direct contact**.
- 3 is incorrect - this is because **fever** is one of the symptoms of influenza.
- 4 is correct - it is true that the symptoms of influenza should **subside within around a week**.
- 5 is correct - it is true that **frequent hand washing** will **reduce the transfer of influenza virus** from surfaces to an individual.

Since **1, 2, 4** and **5** are the only correct statements, **A** must be the correct answer.

#### 5 The correct answer is F

- 1 is correct - it is true that individuals who already have a **weakened immune system** can be at risk to influenza, therefore they can get **vaccinated against influenza**. Groups that are at risk of influenza include the **elderly, stroke patients or pregnant women**.
- 2 is incorrect - it is true that the influenza vaccine can use an **inactive virus**, however the vaccines can also be made using a **weakened virus**.
- 3 is correct - it is true that **pandemics** of influenza can be **avoided by vaccination**. A pandemic is the spread of a disease in a whole country or the whole world.
- 4 is incorrect - it is true that **antiviral drugs** can be used in **some cases of influenza** however they are not used all the time.
- 5 is incorrect - this is because the **influenza virus causes symptoms within a few days** after an infection, not in a few hours. This is known as the incubation period, the time period between which the individual gets infected and the symptoms appear. Therefore the incubation period for the influenza virus is a few days.

Since **1** and **3** are the only correct statements, **F** must be the correct answer.



**Exam Tip** - it is essential to know the pathogen causing the disease, the mode of transmission, the ways of prevention and treatment for influenza:

Causative pathogen	Mode of transmission	Methods of prevention	Treatment
Influenza virus.	Airborne droplets of sputum and direct contact.	<ul style="list-style-type: none"> <li>- Vaccination</li> <li>- Covering the mouth and nose when sneezing or coughing</li> <li>- Wear a mask if infected</li> <li>- Wash hands frequently</li> </ul>	Antiviral drugs can be used in some cases.

**6 The correct answer is D**

- 1 is incorrect - this is because measles is a **communicable disease**, this means it can be **spread from person to person**.
- 2 is correct - it is true that measles is caused by a **virus** called **Morbillivirus**.
- 3 is correct - it is true that measles can be spread from person to person through **direct contact** with an infected person, or through **airborne mucus droplets**.
- 4 is incorrect - it is true that **sensitivity to light** is a symptom of measles, however this symptom is only **seen sometimes** not in every case of measles.
- 5 is correct - it is true that measles causes a **reddish blotchy rash** that covers all the skin. The rash starts in the head and neck region, then continues to spread to the face and then the whole skin.



[www.nhs.uk/conditions/measles/symptoms/](http://www.nhs.uk/conditions/measles/symptoms/)

Since **2, 3** and **5** are the only correct statements, **D** must be the correct answer.



**Exam Tip** - it is essential to know the pathogen causing the disease, the mode of transmission, the ways of prevention and treatment for measles:

Causative pathogen	Mode of transmission	Methods of prevention	Treatment
Morbillivirus.	Airborne droplets of mucus and direct contact.	Vaccination.	No treatment generally given (individual will make full recovery).

**7 The correct answer is C**

- 1 is correct - it is true that the **enzyme reverse transcriptase** is used to **catalyse the conversion of RNA to DNA**. Reverse transcriptase is **only found in retroviruses**.
- 2 is correct - it is true that when an individual with HIV reaches the stage when the **number of white blood cells have reduced** they are said to have **AIDS**, this is when their **immune system is weakened**.
- 3 is correct - it is true that measles can be prevented by the **MMR (measles, mumps and rubella) vaccine**.
- 4 is incorrect - this is because the MMR vaccine is made using **live weakened viruses** for measles, mumps and rubella. It is not made using inactive viruses. Live weakened viruses contain the **live pathogen** that causes the disease, however the pathogen is **weakened**. A vaccine containing an **inactive virus** will contain a **killed pathogen** that causes the disease.
- 5 is incorrect - this is because **generally there is no treatment for measles**, and the individual who is infected usually makes a full recovery.

Since **1, 2, 3** are the only correct statements, **C** must be the correct answer.



## 8 The correct answer is H

- 1 is correct - it is true that the tobacco mosaic virus (TMV) is transmitted from one plant to another by **direct contact** or by an **insect e.g. an aphid**.
- 2 is correct - it is true that when the tobacco mosaic virus infects a tobacco plant it can cause the plant leaves to be **wrinkled** and have different **light and dark green areas** (it looks mosaic).
- 3 is correct - it is true that the **milder strain of tobacco mosaic virus** can be like a **vaccine** for the plant, as it prevents the more damaging strain from infecting the plant.
- 4 is correct - it is true that tobacco mosaic disease can be prevented from **genetically modifying the plant**, thus making it **resistant to the disease**.
- 5 is incorrect - this is because the tobacco mosaic virus can **survive in the soil** for some time.

Since **1, 2, 3** and **4** are the only correct statements, **A** must be the correct answer.

**Exam Tip** - it is essential to know the pathogen causing the disease, the mode of transmission, the ways of prevention and treatment for tobacco mosaic disease:

Causative pathogen	Mode of transmission	Methods of prevention	Treatment
Tobacco mosaic virus.	Direct contact and insects.	<ul style="list-style-type: none"> <li>- Remove infected plants</li> <li>- Washing hands after touching infected plants</li> <li>- Washing hands after crop rotation</li> <li>- Genetically modifying plants</li> </ul>	Drugs to stop enzyme reverse transcriptase.



9 **F**

- 1 is correct - it is true that **many bacterial diseases** can be treated using **antibiotics**.
- 2 is incorrect - it is true that antibiotics work by **killing the bacteria** causing the disease, however this is **not the way all antibiotics work**, it is just one of the ways in which antibiotics work. Some antibiotics can work by **stopping the bacteria from reproducing**, or by **giving the immune system time** to destroy the bacteria present in the body.
- 3 is correct - it is true that the bacterium salmonella can **survive the very low pH** in the **stomach**.
- 4 is incorrect - it is true that the **salmonella bacteria reproduce in the body**, however they **reproduce in the small intestine**, not the stomach, and cause **inflammation** here.
- 5 is incorrect - this is because **most people can recover from salmonella without treatment**. However some people can be given oral rehydration supplements to replace any lost electrolytes.

Since **1** and **3** are the only correct statements, **F** must be the correct answer.

10 **The correct answer is E**

- 1 is incorrect - it is true that protists are **unicellular organisms** however they **have a nucleus**.
- 2 is correct - it is true that malaria is caused by a **protist called Plasmodium**.
- 3 is correct - it is true that once the protist causing malaria has infected a human being it goes into the **liver** and **matures there**.
- 4 is incorrect - this is because the protist that causes malaria enters the human body and moves it **to reproduce in the red blood cells**. The **liver is the place where the protist matures**, it does not reproduce there.
- 5 is correct - it is true that one of the ways in which catching malaria can be prevented is **sleeping in mosquito nets** which prevents mosquitoes from biting.

Since **2**, **3** and **5** are the only correct statements, **E** must be the correct answer.





**Exam Tip** - it is essential to know the pathogen causing the disease, the mode of transmission, the ways of prevention and treatment for malaria:

Causative pathogen	Mode of transmission	Methods of prevention	Treatment
Plasmodium (protist)	Mosquitos infected with plasmodium.	<ul style="list-style-type: none"><li>- Sleeping with mosquito nets</li><li>- Use skin lotion with mosquito repellent</li><li>- Anti-malaria tablets before travelling to regions with malaria</li><li>- Reduce mosquitos present - add fish to eat larvae and drain areas with stagnant water</li></ul>	Drugs.

