

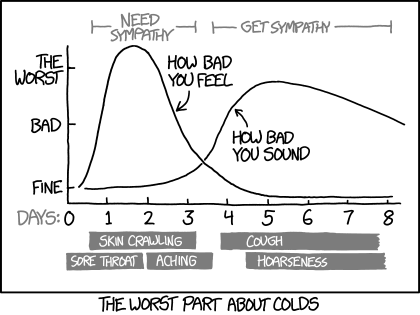
Year 12 Biology

Disease Test

Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Teacher:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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|  | Marks Received | Marks Available |
| Multiple Choice |  | 10 |
| Short Answer |  | 31 |
| Extended Answer |  | 6 |
| Total |  | 50 |



Weighting: 5% Time: 55 minutes

**Multiple Choice Section (10 marks)**

1. Tuberculosis, or TB, is a contagious bacterial disease that usually occurs as an infection of the lungs. The symptoms of this disease include persistent coughing, fever, fatigue, night sweats, and unexplained weight loss. TB can be treated with antibiotics. Tuberculosis is most likely transmitted:
2. through the air.
3. by mosquito bites.
4. by blood transfusions.
5. through water.
6. Scurvy was a disease associated with sailors in the early days of long distant sailing ships. They eventually discovered that it was due to the lack of vitamin C and could be avoided if plenty of fruit was taken along on each journey.

Which of the following would be a correct statement concerning scurvy ?

1. Scurvy is an infectious disease.
2. Scurvy could also be cured with the help of antibiotics.
3. Scurvy is a non-infectious disease.
4. It is impossible to contract scurvy today.
5. The Sabin vaccine is a liquid containing weakened polio viruses. Vaccinated individuals become protected against polio because the weakened viruses:
6. prevent further viral invasion.
7. promote production of antibodies.
8. induce an inflammatory response.
9. are too weak to cause illness.
10. Which of the following require a host cell because they are not able to make proteins on their own ?
11. Fungi.
12. Bacteria.
13. Protozoans.
14. Viruses.
15. Why does it take a few days after vaccination for the concentration of antibodies in the blood to reach its maximum level ?
16. It takes time for the white blood cells to produce the antibodies.
17. Microorganisms are increasing rapidly in the blood.
18. Platelets destroy antibodies.
19. Toxins are being produced to destroy poisons.
20. Malaria is a disease caused by a sporozoan which releases poisonous substances in an infected host and destroys:
21. The vector.
22. The mosquito.
23. Red blood cells.
24. The thyroid gland.
25. The following information is an extract from a Biology textbook on the feeding behaviour of the mosquito.

"......their mouthparts consist of a sharp proboscis which can pierce the skin and through which fluid is drawn by suctorial action of the pharynx. In the mosquito the proboscis consists of a sucking tube surrounded by a group of sharp stylets whose cutting action helps the proboscis to pierce the skin. Having gained entrance, saliva flows down into the blood which is then sucked up into the pharynx. The saliva contains a chemical (enzyme) which prevents the blood from clotting and keeps it in a fluid state .."

It would NOT be practical to control mosquitoes by:

1. controlling their breeding place using kerosene.
2. draining bodies of stagnant water such as swamps.
3. using sprays of the aerosol type to kill adult mosquitoes.
4. poisoning the main food sources.
5. A zoonotic disease is best described as a disease that
6. has only been found within the confines of a zoo.
7. requires a host to complete its lifecycle.
8. only affects organisms within Kingdom Animalia.
9. can be transmitted between animals and humans.
10. The mosquito borne Zika virus has rapidly spread throughout South America, causing severe illness and malformation of unborn babies. Which of the following control measures should be used to reduce the connection between the source of infection and susceptible individuals?
11. Quarantine infected individuals and carriers of the disease.
12. Destroy the animal reservoir of infection.
13. Destroy vectors through widespread spraying of insecticides.
14. Treat sewage to reduce the spread of disease through contaminated water.
15. The Amphibian Chytrid Fungus Disease has caused the decline and even extinction of many frog species in Australia. The Chytrid fungus can cause death in amphibians because it
16. infects a frog’s snout and mouth, making it difficult to breathe.
17. infects the surface skin layers causing problems with water balance and respiration.
18. invades a frog’s lungs, reducing the surface area for the diffusion of gases.
19. causes the over-production of keratin in skin cells, preventing oxygen from permeating into the bloodstream.
20. Chicken pox is an airborne, highly contagious disease that will spread quickly throughout a population when the:
21. Herd immunity is low
22. Herd immunity is high
23. Population density is low and herd immunity is high
24. Population density is high and herd immunity is low
25. The **reservoir** hosts for Ross River virus are:
26. Crop plants
27. Marsupials (kangaroos and wallabies)
28. Ticks
29. Mosquitoes
30. Tuberculosis is an infectious disease caused by a:
31. Virus
32. Fungi
33. Bacterium
34. Protest
35. Epidemiology is the study of:
36. Bacteria
37. Endemic organisms
38. Viruses
39. The spread of disease
40. The diagram below shows a bacterium.



The structure labelled X is a:

1. Plasmid
2. Nucleus
3. Nucleoid
4. Genophore

**Short Answer Section (30 marks)**

1. Differentiate between the terms the following terms:
2. Infectivity and virulence. (2 marks)

• Infectivity is how easily a pathogen spreads from one host to another

• Virulence is how damaging the pathogen is to the host’s body systems

1. Endemic, epidemic and pandemic (3 marks)

• An endemic is when a disease occurs within a population at a steady rate.

• An epidemic occurs when the disease begins to increase in the population above what is considered normal.

• A pandemic occurs when an epidemic spreads across many countries or continents throughout the world.

1. The development of vaccines has enabled highly contagious diseases to be eradicated from the global population.
2. Describe how immunisation programs have been successful in stopping the spread of virulent pathogens in a population. (4 marks)

• Individuals vaccinated are immune to the disease (1) and therefore cannot catch and therefore spread the disease (1)

• Once a significant amount of the population is vaccinated herd immunity is achieved (1)

• Those individuals not vaccinated have less chance of coming into contact with an infected person therefore are spread of the disease is reduced (1)

(b) Explain why herd immunity has been compromised in some communities around Australia. (2 marks)

• More people are choosing NOT to have their infants/children immunised due to fear of serious illness from side effects and misinformation. (1)

•The growing number of non-immunised individuals weakens the ‘herd immunity’ and certain diseases can be reintroduced into a population.(1)

1. Bacteria are the most abundant and diverse group of organisms on the planet. Much of their success can be attributed to adaptations and transmission.

Identify two adaptive characteristics of bacteria and explain how these characteristics increase a bacteria’s chance of survival. (4 marks)

Two adaptations from the following

•Flagellum (1)– helps to move around increasing spread. (1)

•Slimy bacterial capsule (1)– helps bacteria stick to surfaces like cells OR can also increase virulence by impeding immune response.(1)

• Endospore formation (1)– make bacteria resistant to extreme conditions allowing increased rate of dispersal.(1)

• High rate of reproduction (1) – mutations occur at a faster rate therefore better able to adapt to changing enviro conditions (antibiotic resistance) (1)

• Able to survive and reproduce outside host (1) – enables pathogen to infect host via fomite, increasing it’s chance of survival as a pathogen (1)

• Able to change genetic material between bacterium – changing plasmids between bacteria allow favourable genes to be passed to other individuals given them a survival advantage as well (1)

1. Avian influenza has been transmitted to humans numerous times over the last decade. The majority of cases are noted to occur in China.
2. Explain why particular disease is occurring in high incidence in this continent.

(2 marks)

**• China has a high population density (host population density is high) – greater chance on transmission of avian flu to humans**

**• Intensive farming practises – greater chance of avian flu transmission between chickens**

**• Due to these high population densities there is a greater chance the human and avian flu strains will come into contact and combine genetic material – becoming a zoonoses**

1. Explain why if the frequency of this disease significantly increases in China, it could quickly become a pandemic. (2 marks)

• Movement of host (humans) between continents highly likely as it is a business trading hub within the world

• Movement of poultry between countries – trade

• Duck species can be infected with the virus without experiencing fatal symptoms and may migrate to other countries spreading the disease

1. Plant crown gall and phytophthora dieback are both diseases that affect plants.
2. Describe one **other** similarity and one difference between these two plant diseases.

(3 marks)

**Similarity**: Both affect the water transport system in plants/ both invade the host through the root system/ both can be spread if infected soil is moved from one location to another

**Difference:**

* PCG is caused by a bacterial infection (1) while PD is caused by a protest pathogen (1).
* PCG is transmitted by direct contact with infected soil (1) while PD is transmitted by water in soil (1)

Extended Response Section (10 marks)

Australian Bat lyssavirus (ABLV) is one of twelve types of lyssavirus found worldwide. ABVL is the only type of lyssavirus found in Australia. Infection causes serious illness and death in humans.

1. Explain how Australian Bat lyssavirus is transmitted from bat to human. Outline the signs of infection, possible treatments

(4 marks)

1. Describe the management strategies that can reduce the spread of this disease. (4 marks)
2. **Transmission *(must have at least 1 mark)***

• Lyssavirus is usually transmitted via a bite or scratch from an infected bat or mammal. (1)

• Infection can also occur through contact with saliva via motuh, eyes, nose or broken skin (1)

**Signs of Infection: *(must have at least 1 mark)***

• Lyssavirus has a variable/long incubation period from weeks to months so symptoms of infection may not be obvious for some time. (1)

• First signs of disease/infection include fever, headache and fatigue. (1)

• The virus then infects the nervous system and causes paralysis, delirium, convulsions and eventually death (within a few weeks). (1)

**Possible Treatments: *(must have at least 1 mark)***

• If a person is scratched or bitten the wound should be washed/cleaned and applied with antiseptic or antiviral medication (like ethanol or iodine). (1)

• Directly after exposure to a bite or body fluids, the vaccine can be administered due to the long incubation period of lyssavirus. Must be vaccinated before illness begins. (1)

• The vaccine/s are the same as those used for Rabies. Injected at the site of injury and other soft tissue. (Follow up injections required.) (1)

1. **Management strategies**  ***(any 4 marks)***

Physical preventative measures:

* no contact with bats or touching injured bats,
* being trained to handle bats and wearing protective garments
* cover open wounds

• Vaccination for lyssavirus prior to contact/handling bats.

• Quarantine infected bats/people

•Administer antiviral medication to human/bat to kill pathogen

• Remove bat habitat near urban areas to reduce bat population density near human hosts

(cannot say cull/kill all bats as these are wild animals that are highly mobile – this would be very difficult and is not a practical management strategy)