

## **AQA (GCSE Notes)**

### **Chapter 3: Infection and Response**

- Q1.** What are pathogens and how do they cause disease in animals and plants?
- Q2.** How do viruses reproduce inside the human body?
- Q3.** Explain how bacteria make us feel ill once they enter the body.
- Q4.** What is the difference between how viruses and bacteria cause harm in the body?
- Q5.** How can pathogens be spread from one organism to another?
- Q6.** Why is it important to reduce contact with pathogens?
- Q7.** How can clean water supplies help prevent the spread of communicable diseases?
- Q8.** In what ways can air be a method for spreading pathogens?
- Q9.** Describe how direct contact spreads infectious diseases in humans.
- Q10.** How do plants become infected by pathogens in their environment?
- Q11.** What role do toxins play in bacterial infections?
- Q12.** Why is damaging tissues a problem when infected by pathogens?
- Q13.** How does the immune system respond when a pathogen enters the body?
- Q14.** What happens if the immune system cannot destroy a pathogen?
- Q15.** What is the purpose of vaccinations in preventing diseases?
- Q16.** How do vaccines prepare the immune system to fight pathogens?
- Q17.** Why are young children often vaccinated against measles?
- Q18.** Describe the main symptoms of measles.
- Q19.** How is the measles virus transmitted between individuals?
- Q20.** Why can measles be a life-threatening disease?
- Q21.** What causes the immune system to become weak in people with untreated HIV?

- Q22.** How is HIV spread from one person to another?
- Q23.** What are the early symptoms of HIV infection?
- Q24.** Why are antiretroviral drugs important in managing HIV?
- Q25.** What is AIDS and how does it develop from HIV?
- Q26.** What is meant by late-stage HIV infection?
- Q27.** Explain how sharing needles can spread HIV.
- Q28.** Why does HIV make people more vulnerable to other infections?
- Q29.** Describe the symptoms of tobacco mosaic virus in plants.
- Q30.** How does TMV affect the growth of a plant?
- Q31.** What is the link between TMV and photosynthesis in plants?
- Q32.** Why does TMV cause a 'mosaic' pattern on leaves?
- Q33.** How can TMV spread from plant to plant?
- Q34.** Why is TMV a serious issue for crop production?
- Q35.** Why do viruses often spread quickly once inside a host?
- Q36.** How do viral infections damage the cells of the host?
- Q37.** What are the main differences between bacterial and viral reproduction?
- Q38.** Why is it difficult to treat diseases caused by viruses?
- Q39.** How has antibiotic resistance affected the treatment of bacterial infections?
- Q40.** What factors contribute to bacteria becoming resistant to antibiotics?
- Q41.** Why is it important to develop new antibiotics?
- Q42.** How does the overuse of antibiotics increase resistance?
- Q43.** What can individuals do to help prevent antibiotic resistance?
- Q44.** Why is it important to complete a full course of antibiotics?
- Q45.** How can good hygiene reduce the spread of pathogens?

- Q46.** What barriers does the human body use to keep pathogens out?
- Q47.** How does the skin protect the body from infections?
- Q48.** What role do white blood cells play in fighting diseases?
- Q49.** Why do some pathogens only infect plants and not animals?
- Q50.** What can farmers do to prevent the spread of plant diseases like TMV?
- Q51.** What type of microorganism causes salmonella food poisoning?
- Q52.** How is salmonella food poisoning commonly spread to humans?
- Q53.** What are the symptoms of salmonella infection in the human body?
- Q54.** How do the toxins from salmonella bacteria cause illness?
- Q55.** Why are poultry in the UK vaccinated against salmonella?
- Q56.** What steps can be taken in food preparation to reduce the risk of salmonella infection?
- Q57.** How can personal hygiene help prevent the spread of salmonella?
- Q58.** What type of disease is gonorrhoea and what causes it?
- Q59.** Describe the symptoms of gonorrhoea in infected individuals.
- Q60.** How is gonorrhoea transmitted from one person to another?
- Q61.** What is the role of antibiotics in the treatment of gonorrhoea?
- Q62.** Why is it now harder to treat gonorrhoea with penicillin?
- Q63.** What is antibiotic resistance and how has it affected the treatment of gonorrhoea?
- Q64.** How can barrier methods help reduce the spread of gonorrhoea?
- Q65.** Why is it important to diagnose and treat gonorrhoea early?
- Q66.** What long-term health problems can gonorrhoea cause if left untreated?
- Q67.** How can public awareness campaigns help control the spread of bacterial STDs?
- Q68.** What is rose black spot and what type of organism causes it?
- Q69.** Describe the visible effects of rose black spot on a plant.

- Q70.** How does rose black spot affect the process of photosynthesis?
- Q71.** What environmental conditions help the spread of rose black spot?
- Q72.** How can rose black spot be spread from one plant to another?
- Q73.** What are two main methods used to treat or control rose black spot?
- Q74.** Why is it important to remove and destroy leaves infected with rose black spot?
- Q75.** How does reducing photosynthesis affect a plant's growth?
- Q76.** How does the spread of rose black spot affect garden plants and crops?
- Q77.** What is malaria and what type of microorganism causes it?
- Q78.** What is a vector and how is it involved in the transmission of malaria?
- Q79.** Describe the life cycle of the malarial protist involving mosquitoes.
- Q80.** What symptoms are typically caused by malaria?
- Q81.** Why can malaria be fatal if left untreated?
- Q82.** How do mosquito nets help reduce the spread of malaria?
- Q83.** Why is preventing mosquito breeding important in controlling malaria?
- Q84.** What are some common places where mosquito vectors can breed?
- Q85.** How can local communities help reduce mosquito populations?
- Q86.** What role do antimalarial drugs play in treating malaria?
- Q87.** Why does malaria cause repeated episodes of fever?
- Q88.** What challenges exist in completely eradicating malaria?
- Q89.** How can education and awareness help reduce malaria infections?
- Q90.** What are the advantages of using both nets and insect sprays in malaria prevention?
- Q91.** Why is malaria more common in some parts of the world than others?
- Q92.** How might climate affect the spread of diseases like malaria?
- Q93.** What are the main differences between fungal, bacterial, and protist infections?

- Q94.** How does the method of transmission differ between salmonella and malaria?
- Q95.** How do treatments for fungal diseases differ from treatments for bacterial diseases?
- Q96.** What are the public health risks of not treating communicable diseases like gonorrhoea?
- Q97.** How can monitoring disease outbreaks help reduce the spread of infectious diseases?
- Q98.** What steps can be taken to reduce the spread of fungal diseases in plants?
- Q99.** Why is it important for farmers and gardeners to identify rose black spot early?
- Q100.** How does international travel increase the risk of spreading diseases like malaria?
- Q101.** How does the skin act as a barrier to prevent the entry of pathogens?
- Q102.** What role do tiny hairs and mucus in the nose play in protecting the body from infection?
- Q103.** Describe how the trachea and bronchi help prevent pathogens from reaching the lungs.
- Q104.** How does stomach acid protect the body from harmful microorganisms?
- Q105.** What is meant by a non-specific defence system in the human body?
- Q106.** How does phagocytosis help defend the body against pathogens?
- Q107.** What are antibodies and how do they help protect the body from disease?
- Q108.** What is the function of antitoxins in the immune response?
- Q109.** How does the immune system respond when a pathogen enters the body?
- Q110.** Why is the immune system considered a specific defence mechanism?
- Q111.** What is vaccination and how does it help prevent disease?
- Q112.** Why is only a small amount of dead or inactive pathogen needed in a vaccine?
- Q113.** How does the body respond when the same pathogen enters again after vaccination?
- Q114.** Why does vaccination help to protect people who are not immunised?
- Q115.** What is meant by herd immunity and how is it achieved?
- Q116.** Why do vaccinated individuals not become ill when exposed to the real pathogen?
- Q117.** Why is it important to vaccinate a large part of the population?

- Q118.** How do white blood cells respond to a vaccine?
- Q119.** Why is vaccination more effective before someone is exposed to a disease?
- Q120.** What are the benefits of global vaccination programmes?
- Q121.** How has vaccination helped reduce global cases of certain infectious diseases?
- Q122.** What challenges exist in ensuring global access to vaccines?
- Q123.** How can vaccines help prevent the spread of new or emerging diseases?
- Q124.** What is the difference between treating a disease and preventing it?
- Q125.** Why are antibiotics not effective against viruses?
- Q126.** How do antibiotics work to cure bacterial infections?
- Q127.** Why must specific antibiotics be used for specific bacterial infections?
- Q128.** What is antibiotic resistance and why is it a serious concern?
- Q129.** How can the overuse of antibiotics contribute to resistance?
- Q130.** What steps can be taken to reduce the development of antibiotic resistance?
- Q131.** Why is it important to complete a full course of antibiotics?
- Q132.** What are the dangers of using antibiotics for viral infections?
- Q133.** Why are painkillers not a cure for disease?
- Q134.** How do painkillers help during illness even though they do not remove pathogens?
- Q135.** What makes it difficult to develop antiviral drugs?
- Q136.** Why might a drug that kills a virus also harm human cells?
- Q137.** How do scientists test new drugs to make sure they are safe and effective?
- Q138.** What are the key differences between antibiotics and painkillers?
- Q139.** How have antibiotics improved public health?
- Q140.** Why is it important to discover new antibiotics?
- Q141.** What are the risks if bacteria become resistant to all known antibiotics?

- Q142.** What is the role of clinical trials in the development of medicines?
- Q143.** How does antibiotic resistance spread between bacteria?
- Q144.** What practices in farming can lead to antibiotic resistance?
- Q145.** Why should antibiotics only be prescribed when absolutely necessary?
- Q146.** What is the role of healthcare professionals in preventing antibiotic resistance?
- Q147.** Why is it a problem if people stop taking antibiotics early?
- Q148.** How can education reduce misuse of antibiotics?
- Q149.** Why is the use of vaccines important in reducing antibiotic use?
- Q150.** What strategies can be used to slow the development of drug-resistant bacteria?
- Q151.** What is the main purpose of drug testing before a new medicine is approved for use?
- Q152.** What are the three key factors new drugs are tested for during development?
- Q153.** What is meant by toxicity in drug testing?
- Q154.** Why is efficacy an important part of drug development?
- Q155.** What is meant by the dose of a drug and why must it be tested?
- Q156.** What is preclinical testing and what does it involve?
- Q157.** Why are cells and tissues used during early stages of drug testing?
- Q158.** Why are live animals sometimes used in preclinical testing?
- Q159.** What is clinical testing and who is involved in this stage?
- Q160.** Why are healthy volunteers used in the first phase of clinical trials?
- Q161.** What is the benefit of starting clinical trials with very low doses?
- Q162.** Why are patients used in later stages of clinical testing?
- Q163.** What is the purpose of finding the optimum dose in clinical trials?
- Q164.** What is a placebo and how is it used in drug trials?
- Q165.** What is the purpose of a double-blind trial?

- Q166.** How does a double-blind trial prevent bias?
- Q167.** What role does peer review play in drug development?
- Q168.** Why are drug trial results not released until after peer review?
- Q169.** What could happen if a drug was released without proper testing?
- Q170.** Why is it important for drug trials to be repeated and confirmed?
- Q171.** How does peer review improve the reliability of drug trial data?
- Q172.** Why might a promising drug in the lab fail during clinical trials?
- Q173.** Why are some medicines derived from plants?
- Q174.** What is the origin of the drug digitalis and what plant is it from?
- Q175.** From which plant was aspirin originally derived?
- Q176.** Who discovered penicillin and how was it found?
- Q177.** What type of microorganism produced the first antibiotic?
- Q178.** Why is the discovery of penicillin considered a major scientific achievement?
- Q179.** How do modern scientists use plants in drug discovery today?
- Q180.** Why are most new drugs now made by chemists rather than found in nature?
- Q181.** How might a chemical found in a plant be turned into a medicine?
- Q182.** What is the importance of synthetic drug production?
- Q183.** Why is it still useful to study natural sources for new drugs?
- Q184.** What are some examples of diseases that were treated with plant-based drugs?
- Q185.** How do scientists decide which chemicals are worth testing for drug use?
- Q186.** What safety checks must be passed before a drug can be used by the public?
- Q187.** How long can the full drug development process take from discovery to approval?
- Q188.** What are the risks of skipping steps in drug testing?
- Q189.** How does patient health affect clinical testing?

- Q190.** Why are side effects monitored during all phases of clinical trials?
- Q191.** How do scientists monitor whether a drug is working in a patient?
- Q192.** What happens if serious side effects are found during clinical trials?
- Q193.** Why is it important that patients do not know whether they are receiving a drug or placebo?
- Q194.** How is the final decision made to approve a new medicine?
- Q195.** What organisations or agencies regulate drug testing and approval?
- Q196.** Why might a drug be approved in one country but not in another?
- Q197.** How do clinical trials make sure that results are not biased?
- Q198.** What ethical considerations are involved in animal testing for new drugs?
- Q199.** What happens if a drug passes all trials but later causes problems in the wider population?
- Q200.** How has the process of drug discovery changed over the last 100 years?
- Q201.** What is meant by the term "monoclonal antibodies"?
- Q202.** Why are monoclonal antibodies specific to only one type of antigen?
- Q203.** What type of cells are used to produce monoclonal antibodies?
- Q204.** Why are mouse lymphocytes used in the production of monoclonal antibodies?
- Q205.** What is the role of tumour cells in producing monoclonal antibodies?
- Q206.** What is a hybridoma cell and how is it formed?
- Q207.** Why are hybridoma cells useful in antibody production?
- Q208.** How are hybridoma cells cloned to produce monoclonal antibodies?
- Q209.** Why is it important that hybridoma cells can divide and produce antibodies?
- Q210.** How is the monoclonal antibody purified once it has been produced?
- Q211.** Why are monoclonal antibodies useful in medical applications?
- Q212.** How can monoclonal antibodies be used in pregnancy testing?
- Q213.** What role do monoclonal antibodies play in measuring hormone levels in the blood?

- Q214.** How can monoclonal antibodies help detect pathogens in a sample?
- Q215.** How are monoclonal antibodies used in research to locate specific molecules in tissues?
- Q216.** Why is a fluorescent dye attached to monoclonal antibodies in some tests?
- Q217.** How can monoclonal antibodies be used to treat cancer?
- Q218.** What types of substances can be attached to monoclonal antibodies in cancer treatment?
- Q219.** Why do monoclonal antibodies only target specific cells like cancer cells?
- Q220.** How do monoclonal antibodies avoid damaging healthy cells during treatment?
- Q221.** Why were monoclonal antibodies once thought to be a breakthrough in medicine?
- Q222.** What are some side effects that have been linked to monoclonal antibody treatments?
- Q223.** Why are monoclonal antibodies not yet widely used in medicine?
- Q224.** What are the ethical concerns in using animals to produce monoclonal antibodies?
- Q225.** How can monoclonal antibodies improve early disease diagnosis?
- Q226.** Why might scientists choose monoclonal antibodies over traditional diagnostic tools?
- Q227.** What challenges exist in producing monoclonal antibodies on a large scale?
- Q228.** How can monoclonal antibodies be designed to bind to a specific protein?
- Q229.** Why is it important that monoclonal antibodies are identical?
- Q230.** In what way do monoclonal antibodies increase the accuracy of diagnostic tests?
- Q231.** How are monoclonal antibodies different from the antibodies produced naturally in the body?
- Q232.** Why is combining tumour cells with lymphocytes necessary in this process?
- Q233.** How do monoclonal antibodies contribute to personalised medicine?
- Q234.** Why might some patients respond better to monoclonal antibody treatment than others?
- Q235.** How can monoclonal antibodies be used to deliver drugs directly to infected or diseased cells?
- Q236.** What is the advantage of using monoclonal antibodies in targeted cancer therapy?
- Q237.** Why is it important to monitor the side effects of monoclonal antibody treatments?

- Q238.** How can researchers test the effectiveness of monoclonal antibodies in the lab?
- Q239.** Why is it useful to attach radioactive substances to monoclonal antibodies?
- Q240.** What does it mean for a monoclonal antibody to be highly specific?
- Q241.** How might monoclonal antibodies reduce the need for more general treatments like chemotherapy?
- Q242.** What limits the current use of monoclonal antibodies in clinical treatments?
- Q243.** How do monoclonal antibodies help scientists understand diseases at a molecular level?
- Q244.** What steps are involved in creating monoclonal antibodies in the lab?
- Q245.** Why is quality control important in the production of monoclonal antibodies?
- Q246.** How could monoclonal antibodies be used in responding to emerging infectious diseases?
- Q247.** What are the possible risks of relying too heavily on monoclonal antibody therapy?
- Q248.** What are the advantages of monoclonal antibodies compared to traditional treatments?
- Q249.** What factors must be considered when deciding to use monoclonal antibody treatment?
- Q250.** How could future developments improve the safety and effectiveness of monoclonal antibodies?
- Q251.** What are common visible symptoms that help detect disease in plants?
- Q252.** How does stunted growth indicate that a plant may be diseased?
- Q253.** What does the presence of leaf spots suggest about a plant's health?
- Q254.** How can areas of decay on a plant be used to identify disease?
- Q255.** Why might malformed stems or leaves be a sign of plant infection?
- Q256.** How does discolouration of leaves help in detecting plant disease?
- Q257.** What types of pests can be found on infected plants?
- Q258.** How can gardeners use manuals or websites to identify plant diseases?
- Q259.** Why might infected plants be sent to laboratories for analysis?
- Q260.** How can monoclonal antibody testing kits be used to detect plant disease?
- Q261.** What type of pathogen causes tobacco mosaic virus?

- Q262.** What are the symptoms of tobacco mosaic virus on plant leaves?
- Q263.** How does tobacco mosaic virus affect plant growth?
- Q264.** What type of pathogen causes rose black spot?
- Q265.** What are the symptoms of rose black spot?
- Q266.** How does rose black spot reduce a plant's ability to photosynthesise?
- Q267.** What are aphids and how do they damage plants?
- Q268.** How can aphid infestations be identified on plants?
- Q269.** What is nitrate deficiency and how does it affect plant growth?
- Q270.** Why are nitrate ions important for healthy plant development?
- Q271.** What is chlorosis and what causes it?
- Q272.** Why are magnesium ions needed by plants?
- Q273.** How do magnesium deficiencies affect photosynthesis?
- Q274.** What methods can be used to treat nitrate deficiency in soil?
- Q275.** How can understanding ion deficiencies improve farming practices?
- Q276.** How do cellulose cell walls help protect plants from pathogens?
- Q277.** What is the role of a waxy cuticle in plant defence?
- Q278.** How do layers of dead cells like bark protect plants?
- Q279.** Why is the shedding of bark useful in plant defence?
- Q280.** What are antibacterial chemicals and how do they protect plants?
- Q281.** How do plants use poisons to deter herbivores?
- Q282.** What are thorns and how do they help defend plants?
- Q283.** How do hairs on leaves and stems protect plants from animals?
- Q284.** Why do some plants curl or droop their leaves when touched?
- Q285.** How does mimicry help protect plants from being eaten?

- Q286.** What is the difference between physical and chemical plant defences?
- Q287.** Give one example of a physical barrier in plants and explain how it works.
- Q288.** How can chemical defences in plants be useful to humans?
- Q289.** How are mechanical defences different from physical barriers?
- Q290.** Why do scientists study plant defences against disease?
- Q291.** How can plant disease detection benefit crop production?
- Q292.** What is the benefit of using monoclonal antibodies over visual inspection in plant diagnosis?
- Q293.** Why is early detection of plant disease important for farmers?
- Q294.** What can be done if a plant is diagnosed with rose black spot?
- Q295.** How can controlling aphids help reduce the spread of disease?
- Q296.** How do gardening manuals support home growers in diagnosing plant problems?
- Q297.** What are the signs that a plant has a nutrient deficiency rather than a pathogen?
- Q298.** Why do some plants develop poisons as a defence strategy?
- Q299.** How does a strong waxy cuticle reduce the risk of infection?
- Q300.** In what ways can scientific knowledge about plant disease be applied in agriculture?