# AQA (GCSE Notes)

## Chapter 5: Homeostasis and Response

**Q1. What is homeostasis and why is it important for cells in the human body?**
**Answer:** Homeostasis is the regulation of internal conditions of the body to maintain a stable internal environment. It keeps factors like temperature, water levels, and glucose concentration within the required limits. This is important because cells need the right conditions to function properly. If conditions like temperature or pH change too much, enzymes may stop working and cells can be damaged.

**Q2. Explain how homeostasis maintains optimal conditions for enzyme function.**
**Answer:** Enzymes work best at specific temperatures and pH levels. Homeostasis keeps these conditions constant, allowing enzymes to carry out chemical reactions effectively. If the internal environment becomes too hot, cold, or too acidic or alkaline, enzyme activity may decrease or stop altogether. By keeping the body environment steady, homeostasis ensures that enzymes can support all vital processes.

**Q3. What internal conditions must be controlled in the human body to maintain homeostasis?**
**Answer:** The main internal conditions that must be controlled include body temperature, blood glucose concentration, and water levels. Keeping these conditions within the right range is essential for the proper function of cells, enzymes, and organs. For example, too much glucose can damage tissues, and too little can lead to low energy supply.

**Q4. Describe the role of receptors in a control system.**
**Answer:** Receptors are special cells or groups of cells that detect changes in the environment, called stimuli. They can be found in sense organs like the skin, eyes, and ears. Receptors send information about these changes to the coordination centre, which processes the information and triggers a response to bring the body back to normal conditions.

**Q5. What is the function of coordination centres in the human body?**
**Answer:** Coordination centres receive and process information from receptors. They include the brain, spinal cord, and pancreas. After analysing the input from the receptors, coordination centres decide what response is needed and send signals to effectors such as muscles or glands to carry out the response and restore balance.

**Q6. How do effectors help maintain homeostasis?**
**Answer:** Effectors are muscles or glands that carry out the response to restore the body's internal conditions to normal. Muscles respond by contracting, and glands respond by releasing hormones. For example, if the body gets too hot, sweat glands release sweat to cool it down. If blood sugar is high, the pancreas releases insulin to lower it.

**Q7. Give an example of a chemical response involved in homeostasis.**
**Answer:** A good example is the release of insulin by the pancreas. When blood glucose levels are too high,

insulin is released into the blood. Insulin helps glucose move from the blood into body cells, where it can be used for energy or stored as glycogen in the liver and muscles. This helps return glucose levels to normal.

**Q8. Describe how the nervous system helps maintain body temperature.**
**Answer:** When receptors in the skin or the brain detect a change in body temperature, this information is sent to the thermoregulatory centre in the brain. If the temperature is too high, signals are sent to effectors to cool the body down through sweating and vasodilation. If it is too low, the body conserves heat by vasoconstriction and shivering.

**Q9. Explain what is meant by a stimulus and give an example.**
**Answer:** A stimulus is any change in the environment that is detected by receptors. This could be a change in light, temperature, sound, or pressure. For example, touching a hot object is a stimulus that triggers a reflex action to move your hand away quickly to avoid injury.

**Q10. Describe how information travels from a receptor to an effector in the nervous system.**
**Answer:** When a receptor detects a stimulus, it sends an electrical signal along a sensory neurone to the central nervous system. The CNS processes the information and sends a signal along a motor neurone to an effector, such as a muscle or gland, which then produces a response to deal with the stimulus.

**Q11. What is the role of the brain and spinal cord in the nervous system?**
**Answer:** The brain and spinal cord make up the central nervous system (CNS), which processes information from receptors and coordinates responses. The brain handles complex functions and decision-making, while the spinal cord can also coordinate simple reflex actions. Both help the body respond quickly and correctly to changes.

**Q12. How do neurones carry electrical impulses in the nervous system?**
**Answer:** Neurones are nerve cells that carry electrical signals called impulses. These impulses travel along the neurone's axon from one end to the other. The signal moves quickly, allowing the body to respond rapidly to stimuli. Neurones are adapted to transmit impulses over long distances with minimal delay.

**Q13. What is the central nervous system and what are its main parts?**
**Answer:** The central nervous system (CNS) is made up of the brain and the spinal cord. It is responsible for receiving information from receptors, processing it, and sending instructions to effectors. The CNS allows for fast and coordinated responses to internal and external changes in the body.

**Q14. Explain how the structure of the nervous system is adapted to allow fast responses.**
**Answer:** The nervous system includes long neurones that can carry impulses quickly across the body. The neurones are insulated with a fatty layer called the myelin sheath, which speeds up impulse transmission. Connections between neurones are also organised efficiently, allowing messages to pass rapidly through the body.

**Q15. What is a reflex action and how is it different from a normal response?**
**Answer:** A reflex action is an automatic and rapid response to a stimulus that does not involve conscious

thought. It helps protect the body from harm. Normal responses involve the brain and conscious decision-making, whereas reflexes bypass the brain by going through the spinal cord for quicker action.

**Q16. Describe the pathway of a reflex arc using all the correct components.**
**Answer:** A reflex arc starts with a stimulus detected by a receptor. The signal travels along a sensory neurone to the spinal cord. In the spinal cord, the signal is passed to a relay neurone, which then sends it to a motor neurone. The motor neurone carries the signal to an effector, such as a muscle, which responds.

**Q17. What is the function of the sensory neurone in a reflex arc?**
**Answer:** The sensory neurone carries electrical impulses from the receptor that detected the stimulus to the spinal cord or brain. It is the first part of the reflex arc and helps start the process that leads to a quick, protective response.

**Q18. What is the role of the relay neurone in the spinal cord?**
**Answer:** The relay neurone receives the signal from the sensory neurone in the spinal cord and passes it on to the motor neurone. It acts as a link in the reflex arc, allowing the message to be quickly redirected without needing to involve the brain.

**Q19. How do synapses work to pass impulses between neurones?**
**Answer:** A synapse is the tiny gap between two neurones. When an electrical impulse reaches the end of a neurone, it triggers the release of chemicals called neurotransmitters. These chemicals cross the synapse and bind to receptors on the next neurone, starting a new electrical impulse.

**Q20. What is the role of a motor neurone in a reflex action?**
**Answer:** The motor neurone carries the electrical impulse from the spinal cord to an effector, such as a muscle or gland. The effector then produces a response, like pulling away from a hot object. This helps protect the body from harm.

**Q21. Why are reflex actions important for survival?**
**Answer:** Reflex actions are fast and automatic, which means they can protect the body from danger without delay. For example, pulling your hand away from something hot happens without thinking and prevents serious burns or injury. They allow quick reactions in dangerous situations.

**Q22. Give an example of a reflex action and explain its benefit.**
**Answer:** One example is blinking when something comes close to your eyes. This reflex protects the eyes from dust, bright light, or physical damage. It happens quickly without conscious thought, which is important for preventing injury to a very sensitive part of the body.

**Q23. Describe the difference between voluntary and involuntary responses.**
**Answer:** Voluntary responses are actions that you decide to do, such as picking up a cup. They involve the conscious part of the brain. Involuntary responses, like reflexes, happen automatically without you thinking about them. They are controlled by the spinal cord and happen much faster.

**Q24. What happens at a synapse when an electrical impulse reaches it?**
**Answer:** When an electrical impulse reaches the end of a neurone at a synapse, it triggers the release of chemical messengers called neurotransmitters. These chemicals cross the gap and attach to receptors on the next neurone, starting a new electrical impulse so the signal continues.

**Q25. How does the body respond when blood glucose concentration becomes too high?**
**Answer:** When blood glucose levels rise too high, the pancreas detects this and releases the hormone insulin into the blood. Insulin helps glucose move from the blood into body cells. In the liver and muscles, excess glucose is stored as glycogen. This lowers blood glucose levels back to normal.

**Q26. What happens to the body if internal conditions are not kept within narrow limits?**
**Answer:** If internal conditions such as temperature, water level, or blood sugar go too far from the ideal range, the body's cells and enzymes may not work properly. This can cause cells to become damaged or die, leading to illness. For example, high temperature can denature enzymes, while low glucose levels can cause fainting due to lack of energy.

**Q27. How does the nervous system coordinate the contraction of a muscle?**
**Answer:** When a stimulus is detected, a signal travels through a sensory neurone to the central nervous system. The brain or spinal cord processes the signal and sends a message via a motor neurone to the muscle, which contracts. This contraction is the response to the original stimulus.

**Q28. What is meant by coordination in terms of the nervous system?**
**Answer:** Coordination means the nervous system collects information from receptors, processes it in the brain or spinal cord, and sends signals to effectors like muscles or glands to bring about a response. This ensures the body reacts properly to changes inside or outside the body.

**Q29. How can a gland act as an effector in a nervous response?**
**Answer:** Glands are effectors because they respond to nervous signals by releasing hormones or other chemicals. For example, when you are scared, nerves tell your adrenal glands to release adrenaline, which prepares your body to act quickly.

**Q30. Explain how the nervous system detects and responds to changes in the environment.**
**Answer:** Receptors detect changes (stimuli) in the environment and send electrical impulses through sensory neurones to the central nervous system. The brain or spinal cord processes the information and sends impulses through motor neurones to effectors, which then produce the correct response.

**Q31. What is the difference in speed between nervous and hormonal responses, and why?**
**Answer:** Nervous responses are faster because they use electrical impulses that travel quickly through neurones. Hormonal responses are slower because hormones move through the bloodstream, which takes more time. However, hormones usually have longer-lasting effects.

**Q32. What is meant by an automatic control system?**
**Answer:** An automatic control system is a system that works without us thinking about it. It keeps conditions

in the body stable using receptors, coordination centres, and effectors. Examples include systems that control body temperature and blood sugar.

**Q33. Why is it necessary for control systems to respond to both internal and external changes?**
**Answer:** Both internal and external changes can affect the body's balance. For example, outside temperature can affect body heat, and eating can affect blood glucose. The control systems must respond to these changes to keep the body working properly and safely.

**Q34. What role does the spinal cord play in reflex actions?**
**Answer:** The spinal cord acts as a coordination centre in reflex actions. It processes signals from sensory neurones and quickly sends a response signal through motor neurones without involving the brain, which makes the reaction fast.

**Q35. Describe how the structure of a sensory neurone helps it carry impulses.**
**Answer:** A sensory neurone has a long axon to carry impulses over long distances and is insulated by a myelin sheath, which speeds up impulse transmission. It also has dendrites to connect with receptors and other neurones, allowing it to send signals efficiently.

**Q36. What is the role of the myelin sheath in neurones?**
**Answer:** The myelin sheath is a fatty layer that surrounds the axon of a neurone. It helps to insulate the axon and allows electrical impulses to travel faster and more efficiently along the nerve cell, speeding up communication in the nervous system.

**Q37. Explain why impulses in reflex arcs do not involve the conscious brain.**
**Answer:** Reflex arcs are designed for speed. They bypass the conscious part of the brain and go through the spinal cord instead. This makes the response much faster, which is important for protecting the body from danger, like pulling your hand away from something hot.

**Q38. What happens when a receptor detects a change in the environment?**
**Answer:** When a receptor detects a stimulus, it sends an electrical impulse through a sensory neurone to the central nervous system. The CNS processes this and sends a signal through a motor neurone to an effector, which then brings about the needed response.

**Q39. How can data about reaction times help us understand how the nervous system works?**
**Answer:** Reaction time data shows how fast the nervous system can detect a stimulus, process the information, and produce a response. By measuring and comparing reaction times, we can study how different factors affect nervous system speed and function.

**Q40. How can reaction time be measured practically in a lab?**
**Answer:** One common method is the ruler drop test. A person tries to catch a falling ruler as quickly as possible after seeing it dropped. The distance it falls before being caught can be used to calculate reaction time. The test is simple and can be repeated easily.

**Q41. Why is it useful to repeat measurements when investigating reaction times?**
**Answer:** Repeating measurements improves reliability by reducing the effect of any unusual results. It also helps identify patterns and increases confidence in the findings. Taking the average of several trials gives a more accurate result.

**Q42. Describe one factor that might affect a person's reaction time.**
**Answer:** Tiredness can slow down reaction time because the brain processes signals more slowly when the body is fatigued. Other factors include age, distractions, alcohol, drugs, and practice. These all affect how quickly a person can respond to a stimulus.

**Q43. What is the difference between the central nervous system and the peripheral nervous system?**
**Answer:** The central nervous system (CNS) includes the brain and spinal cord. It processes information and coordinates responses. The peripheral nervous system includes all the nerves outside the CNS. It carries signals between the CNS and the rest of the body.

**Q44. How can a graph be used to show changes in reaction times?**
**Answer:** A graph can plot reaction time on the y-axis and different conditions or trials on the x-axis. This shows how reaction time changes depending on factors like time of day, practice, or other variables. It makes it easier to see trends or patterns.

**Q45. What can charts and tables tell us about the nervous system's function?**
**Answer:** Charts and tables can show how fast the nervous system reacts under different conditions. For example, they can display average reaction times for different people or activities. This helps researchers understand what affects nervous system speed and reliability.

**Q46. Why is it important that signals in the nervous system travel quickly?**
**Answer:** Fast signals allow the body to respond quickly to danger or change. This protects the body from harm and helps it adapt to different situations. For example, quick reflexes can prevent injuries from hot surfaces or falling objects.

**Q47. How does the structure of a motor neurone relate to its function?**
**Answer:** A motor neurone has a long axon to carry impulses quickly to effectors. The axon is covered by a myelin sheath to speed up signal transmission. It also has branches to connect to many muscle fibres, allowing it to control multiple responses at once.

**Q48. Explain how a stimulus leads to a response in a reflex arc.**
**Answer:** A stimulus is detected by a receptor, which sends an impulse along a sensory neurone to the spinal cord. The spinal cord processes the signal and sends it through a motor neurone to an effector, like a muscle, which then produces the response quickly.

**Q49. What would happen if the relay neurone was damaged in a reflex pathway?**
**Answer:** If the relay neurone is damaged, the message may not reach the motor neurone. This would stop the reflex from happening. The body would not respond quickly to the stimulus, increasing the risk of injury because the protective response is lost.

**Q50. Why are reflex actions considered protective mechanisms?**
**Answer:** Reflex actions help protect the body from harm by allowing it to respond quickly without thinking. They are automatic and fast, so they prevent injury. For example, blinking protects the eyes, and pulling your hand away protects you from burns.

**Q51. What is the main role of the brain in the human body?**
**Answer:** The brain is the control centre of the body. It receives information from sense organs, processes this information, makes decisions, and sends instructions to the body through the nervous system. It controls thoughts, emotions, memory, movement, and many automatic functions like breathing and heartbeat.

**Q52. Describe the function of the cerebral cortex in the brain.**
**Answer:** The cerebral cortex is the outer layer of the brain. It is responsible for thinking, memory, language, problem-solving, and consciousness. It also processes information from the senses and helps make decisions. It plays a key role in voluntary movement and awareness.

**Q53. What is the role of the cerebellum in the brain?**
**Answer:** The cerebellum controls balance, posture, and coordination of movement. It allows smooth, precise movements by receiving information from muscles and the inner ear. It helps maintain stability during activities such as walking, running, and writing.

**Q54. Explain the function of the medulla in controlling body processes.**
**Answer:** The medulla controls automatic and life-supporting functions like heart rate, breathing, digestion, and reflex actions like sneezing or swallowing. It works without conscious thought and keeps vital functions going all the time.

**Q55. Why is the brain described as a complex organ?**
**Answer:** The brain is complex because it has billions of interconnected neurones that work together to carry out many different tasks at the same time. It controls both simple and complicated activities, including emotions, memory, reasoning, and automatic body functions.

**Q56. What is the benefit of having billions of interconnected neurones in the brain?**
**Answer:** Having billions of interconnected neurones allows the brain to quickly send and process signals from different parts of the body. It helps with learning, storing memories, solving problems, and reacting to the environment in a coordinated and intelligent way.

**Q57. Identify three main regions of the brain and state their functions.**
**Answer:** The cerebral cortex controls thinking, memory, and senses. The cerebellum coordinates movement and balance. The medulla manages automatic functions like heartbeat and breathing. Each region plays a key role in keeping the body working properly.

**Q58. How does the structure of the cerebral cortex help in its function?**
**Answer:** The cerebral cortex has a folded structure, which increases its surface area and allows more neurones to be packed in. This makes it more efficient at processing complex information such as speech, memory, and decision-making.

**Q59. What types of activities are controlled by the cerebellum?**
**Answer:** The cerebellum controls activities like walking, writing, balancing, and catching a ball. It helps fine-tune movements, allowing them to be smooth and accurate. It also plays a role in learning physical tasks and correcting errors in movement.

**Q60. Explain how the medulla controls unconscious activities.**
**Answer:** The medulla receives information from the body and sends out automatic signals to organs. It keeps essential functions like breathing, heart rate, and blood pressure steady without us thinking about them. This helps the body survive even during sleep or injury.

**Q61. What are the challenges of studying brain function?**
**Answer:** The brain is difficult to study because it is delicate, protected inside the skull, and complex. Damaging one small area can cause serious problems, and it's hard to see how all parts work together. Also, every brain is slightly different, which adds to the challenge.

**Q62. Why is it difficult to treat brain damage or brain diseases?**
**Answer:** Treating brain damage is hard because surgery can be risky, and brain tissue doesn't repair easily. Damage may affect thinking, movement, or personality. Medicines must cross the blood-brain barrier, and doctors must avoid harming healthy parts during treatment.

**Q63. What is one method used by neuroscientists to map brain function?**
**Answer:** One method is studying patients with brain damage. By seeing what functions are lost, scientists can work out which part of the brain was responsible for them. This helps them link certain brain areas to specific roles like movement or speech.

**Q64. How does electrical stimulation help scientists understand the brain?**
**Answer:** By sending a small electric current to different parts of the brain during surgery, doctors can see what movements or feelings are triggered. This helps identify what each area does and is useful in mapping brain functions.

**Q65. Describe how MRI scanning can be used to study the brain.**
**Answer:** MRI scans use strong magnets and radio waves to create detailed images of the brain. Scientists can see which parts of the brain are active during certain tasks by watching where blood flows. This helps link brain activity to behaviour or thought processes.

**Q66. What are the risks of carrying out procedures on the brain?**
**Answer:** Brain procedures can cause infection, bleeding, or damage to healthy tissue. This may lead to problems with movement, memory, or speech. There's also a risk of long-term side effects, such as personality changes or loss of certain abilities.

**Q67. What are the benefits of brain surgery for treating certain conditions?**
**Answer:** Brain surgery can remove tumours, stop seizures, or fix problems like bleeding. It can improve the quality of life or even save a person's life. In some cases, it helps restore lost functions or reduce symptoms of diseases like epilepsy.

**Q68. Why is the brain difficult to study safely?**
**Answer:** The brain is protected by the skull, making it hard to reach. Its tissue is soft and sensitive, and damage can cause permanent effects. Also, the functions are tightly linked, so disturbing one part may affect others, making safe study and treatment difficult.

**Q69. How can studying patients with brain damage help understand brain function?**
**Answer:** If a patient loses a certain ability, such as speech or movement, and has damage in a specific brain area, scientists can link that part to the lost function. This helps map out what different brain parts do, which is useful for diagnosis and treatment.

**Q70. Why must doctors be careful when performing surgery on the brain?**
**Answer:** The brain controls many important body functions. Damaging the wrong area can cause serious or permanent harm, like memory loss or loss of movement. Doctors must plan carefully and use accurate tools to avoid affecting healthy brain tissue.

**Q71. What ethical considerations are involved in brain research?**
**Answer:** Brain research raises questions about safety, consent, and privacy. People must fully understand the risks before taking part. Also, studying mental health or behaviour involves personal information that must be handled carefully and respectfully.

**Q72. How might research into the brain help people with mental health conditions?**
**Answer:** Research can show how certain brain areas or chemicals affect mood and behaviour. This helps scientists develop better treatments, such as medicines or therapies, to manage conditions like depression, anxiety, and schizophrenia more effectively.

**Q73. What is the role of the eye in the nervous system?**
**Answer:** The eye is a sense organ that detects light and sends signals to the brain through the optic nerve. It helps the body respond to changes in light and surroundings by allowing us to see and process visual information in the environment.

**Q74. What is the function of the retina?**
**Answer:** The retina is the light-sensitive layer at the back of the eye. It contains receptor cells called rods and cones. These detect light and colour and convert the light into electrical impulses, which are sent to the brain for processing.

**Q75. Describe the role of the optic nerve in vision.**
**Answer:** The optic nerve carries electrical impulses from the retina to the brain. The brain interprets these impulses to create a visual image. Without the optic nerve, the brain would not receive visual information from the eye, making vision impossible.

**Q76. What is the sclera and what does it do?**
**Answer:** The sclera is the white, tough outer layer of the eye. It helps protect the eye from injury and gives the eye its shape. It also provides a surface for the muscles that move the eye to attach to, helping the eye to move in different directions.

**Q77. How does the cornea help focus light?**
**Answer:** The cornea is the transparent, curved front part of the eye. It bends or refracts the incoming light rays so that they begin to focus toward the retina. Most of the eye's focusing power comes from the cornea due to its curved shape and clarity.

**Q78. What does the iris do to control the amount of light entering the eye?**
**Answer:** The iris is the coloured part of the eye and controls the size of the pupil. In bright light, the iris makes the pupil smaller to reduce light entry. In dim light, it widens the pupil to allow more light in, helping to protect the retina and control vision clarity.

**Q79. Describe how the ciliary muscles and suspensory ligaments work together.**
**Answer:** The ciliary muscles and suspensory ligaments work to change the shape of the lens during focusing. When the ciliary muscles contract, the suspensory ligaments loosen, making the lens thicker for near vision. When the muscles relax, the ligaments tighten, making the lens thinner for distant vision.

**Q80. What is meant by accommodation in the eye?**
**Answer:** Accommodation is the process by which the eye changes the shape of the lens to focus on near or distant objects. This allows the eye to keep a clear image on the retina whether the object is close or far away.

**Q81. How does the eye focus on a near object?**
**Answer:** To focus on a near object, the ciliary muscles contract and the suspensory ligaments loosen. This allows the lens to become thicker and more curved, increasing its focusing power to bend light rays more strongly onto the retina.

**Q82. How does the eye adjust to focus on a distant object?**
**Answer:** When focusing on a distant object, the ciliary muscles relax and the suspensory ligaments pull tight. This causes the lens to become thinner and flatter, reducing its bending power so the light rays can be focused on the retina from far away.

**Q83. What changes take place in the lens when focusing on near objects?**
**Answer:** The lens becomes thicker and more rounded when focusing on near objects. This shape change is caused by the contraction of the ciliary muscles and the loosening of the suspensory ligaments, allowing the lens to bend light more strongly.

**Q84. What changes take place in the lens when focusing on distant objects?**
**Answer:** The lens becomes thinner and flatter when focusing on distant objects. This happens because the ciliary muscles relax and the suspensory ligaments become tight, pulling on the lens and reducing its curvature.

**Q85. What happens to the eye in dim light conditions?**
**Answer:** In dim light, the iris widens the pupil to let more light enter the eye. This allows more light to reach the retina, helping the person see better in low light. The circular muscles of the iris relax while the radial muscles contract.

**Q86. Why is it important for the eye to adapt to dim light?**
**Answer:** Adapting to dim light helps the eye collect as much light as possible so that vision remains clear even when light levels are low. This is important for activities like walking at night or seeing in dark environments.

**Q87. What causes myopia in the eye?**
**Answer:** Myopia, or short-sightedness, happens when the eyeball is too long or the cornea is too curved. This causes light rays to focus in front of the retina instead of on it, making distant objects appear blurry.

**Q88. What causes hyperopia in the eye?**
**Answer:** Hyperopia, or long-sightedness, is caused when the eyeball is too short or the lens is not curved enough. This results in light focusing behind the retina, so near objects appear blurry while distant objects remain clear.

**Q89. How can spectacle lenses help correct myopia?**
**Answer:** Myopia is corrected using concave lenses in spectacles. These lenses spread out the incoming light rays so they focus further back, directly onto the retina instead of in front of it, allowing the person to see distant objects clearly.

**Q90. How do spectacle lenses correct hyperopia?**
**Answer:** Hyperopia is corrected using convex lenses. These lenses converge the light rays slightly before they enter the eye, so the light can be focused onto the retina properly, making near objects appear clearer.

**Q91. What is the difference between hard and soft contact lenses?**
**Answer:** Hard contact lenses are made of a rigid material and keep their shape on the eye, offering sharp vision and long life. Soft lenses are made from flexible materials that fit more comfortably but may need to be replaced more often.

**Q92. How does laser eye surgery correct vision problems?**
**Answer:** Laser eye surgery reshapes the cornea using a laser so that it bends light correctly onto the retina. For myopia, the cornea is flattened slightly. For hyperopia, it's made steeper. This change improves the focus without the need for glasses or lenses.

**Q93. What are the risks of using contact lenses?**
**Answer:** Contact lenses can cause eye infections if not cleaned properly. They can also lead to irritation, dryness, or even damage to the cornea if used incorrectly or worn too long. In rare cases, they may affect vision permanently if problems go untreated.

**Q94. How can replacement lenses help treat eye defects?**
**Answer:** Replacement lenses are artificial lenses that are implanted in the eye to correct focusing problems. They can be used in cases where glasses or laser surgery are not suitable. These lenses help restore clear vision by replacing the eye's natural lens.

**Q95. Why must eye treatments be done with great care?**
**Answer:** Eye treatments must be done carefully because the eye is delicate and important for vision. Any mistake can lead to infection, damage, or loss of sight. Precision is required to avoid harming sensitive structures like the cornea, retina, or optic nerve.

**Q96. How can a ray diagram show the defect of myopia?**
**Answer:** In a ray diagram for myopia, the light rays from a distant object converge in front of the retina instead of on it. The diagram shows that without correction, the image forms too early, causing blurry distant vision.

**Q97. How can a ray diagram show the defect of hyperopia?**
**Answer:** In a ray diagram for hyperopia, the light rays from a near object are shown focusing behind the retina. This illustrates how the eye cannot bend the light enough, leading to a blurry image for nearby objects.

**Q98. How do convex lenses help in correcting hyperopia?**
**Answer:** Convex lenses bend light rays inward before they enter the eye. This helps focus the light directly onto the retina instead of behind it. As a result, people with hyperopia can see near objects more clearly.

**Q99. How do concave lenses help in correcting myopia?**
**Answer:** Concave lenses spread out light rays before they enter the eye. This moves the focus point back so that the light rays land on the retina instead of in front of it. This correction makes distant objects clearer for people with myopia.

**Q100. What is the advantage of using laser surgery over glasses or contact lenses?**
**Answer:** Laser surgery offers a long-term solution without needing to wear glasses or contacts daily. It can permanently improve vision by reshaping the cornea, which means fewer daily hassles and ongoing costs. It's especially helpful for people with active lifestyles.

**Q101. What is the function of the thermoregulatory centre in the brain?**
**Answer:** The thermoregulatory centre in the brain, which is located in the hypothalamus, is responsible for monitoring and controlling body temperature. It helps to keep the internal body temperature around 37°C. This centre receives information from temperature receptors in the skin and from its own internal receptors and then triggers responses to maintain the body's temperature within a safe and stable range.

**Q102. How does the thermoregulatory centre detect changes in body temperature?**
**Answer:** The thermoregulatory centre detects changes in body temperature through two main sources. It has receptors that monitor the temperature of the blood flowing through the brain (core body temperature) and it also receives nerve impulses from temperature receptors in the skin. These two sources allow it to detect whether the body is too hot or too cold and respond appropriately.

**Q103. What role do skin receptors play in temperature control?**
**Answer:** Skin receptors detect changes in the external temperature. They are sensitive to heat or cold and send nerve impulses to the thermoregulatory centre in the brain. This helps the body to respond quickly to

changes in the environment by initiating actions such as sweating or shivering to maintain a constant internal body temperature.

**Q104. How is information about skin temperature sent to the brain?**
**Answer:** Information about skin temperature is sent to the brain through sensory neurons. The temperature receptors in the skin detect changes and send electrical signals via the nervous system to the thermoregulatory centre in the hypothalamus. This allows the brain to assess the external temperature and take action to keep the internal environment stable.

**Q105. What is vasodilation and when does it occur?**
**Answer:** Vasodilation is the widening of blood vessels near the surface of the skin. It occurs when the body is too hot. This process allows more blood to flow through the capillaries close to the skin's surface so that heat can be lost more easily to the environment, helping to cool the body down.

**Q106. How does vasodilation help to reduce body temperature?**
**Answer:** Vasodilation helps reduce body temperature by increasing blood flow to the skin's surface. As more warm blood flows through the surface capillaries, more heat is lost through radiation into the surrounding air. This helps to cool down the body when it is overheating, keeping internal conditions within a normal range.

**Q107. What is vasoconstriction and when does it happen?**
**Answer:** Vasoconstriction is the narrowing of blood vessels near the surface of the skin. It happens when the body is too cold. This reduces blood flow to the skin and helps to keep warm blood deeper in the body, limiting heat loss and helping to maintain core body temperature.

**Q108. How does vasoconstriction help to increase body temperature?**
**Answer:** Vasoconstriction helps increase body temperature by reducing the amount of blood that flows near the skin surface. This limits the amount of heat lost through the skin to the environment, keeping more heat inside the body and helping to maintain a stable internal temperature in cold conditions.

**Q109. What is the function of sweat glands in temperature control?**
**Answer:** Sweat glands help to control body temperature by producing sweat when the body becomes too hot. The sweat is released onto the surface of the skin, where it evaporates. The evaporation of sweat removes heat from the body, which helps to cool it down and maintain a healthy temperature.

**Q110. How does sweating reduce body temperature?**
**Answer:** Sweating reduces body temperature through the process of evaporation. When sweat is produced by sweat glands and released onto the skin, it absorbs heat from the body to evaporate. As the sweat evaporates, it takes away some of the body's heat, cooling the skin and lowering overall body temperature.

**Q111. What causes the body to stop sweating?**
**Answer:** The body stops sweating when the thermoregulatory centre in the brain detects that body temperature has returned to a normal range. Once the body has cooled down enough, the brain sends signals to stop the sweat glands from producing more sweat to avoid unnecessary water loss and maintain balance.

**Q112. What is the role of shivering in temperature regulation?**
**Answer:** Shivering helps to increase body temperature when the body is too cold. It involves rapid, involuntary muscle contractions that generate heat. The energy produced during muscle activity creates warmth, helping to raise body temperature and keep it within the normal range when exposed to cold environments.

**Q113. Why is it important to keep the body temperature within a narrow range?**
**Answer:** It is important to keep body temperature within a narrow range (around 37°C) because many biological processes, including enzyme activity, work best at this temperature. If the temperature is too high or too low, enzymes may stop working properly, which can affect metabolism and damage cells or organs.

**Q114. What could happen if body temperature gets too high?**
**Answer:** If body temperature gets too high (above 40°C), it can lead to heat exhaustion or heatstroke. Enzymes may start to denature, leading to a failure in essential chemical reactions. The person may experience dizziness, confusion, dehydration, and in severe cases, unconsciousness or organ failure, which can be life-threatening.

**Q115. What could happen if body temperature gets too low?**
**Answer:** If body temperature gets too low (below 35°C), it can cause hypothermia. The body's processes slow down, enzymes become less effective, and the person may experience shivering, slow breathing, and confusion. If not treated, it can lead to unconsciousness, organ failure, and even death in extreme cases.

**Q116. Explain how blood vessels in the skin respond to cold conditions.**
**Answer:** In cold conditions, the blood vessels near the surface of the skin constrict (vasoconstriction). This reduces the flow of warm blood to the skin, so less heat is lost to the surroundings. This helps to conserve heat in the body and maintain a stable core temperature despite the cold environment.

**Q117. Describe how energy is transferred from the body to the environment.**
**Answer:** Energy is transferred from the body to the environment in several ways: through radiation (heat given off from the skin), evaporation (sweat evaporating from the skin), conduction (touching cooler surfaces), and convection (air moving across the skin). These processes help to regulate body temperature by releasing excess heat.

**Q118. Why is the brain well suited to act as a coordination centre?**
**Answer:** The brain is well suited to act as a coordination centre because it can quickly process large amounts of information from receptors all over the body. It integrates this information and sends appropriate signals to effectors (like muscles or glands) to produce a response that maintains homeostasis, such as regulating temperature.

**Q119. Describe how the body restores normal temperature after being in a hot environment.**
**Answer:** When the body is in a hot environment, the thermoregulatory centre detects an increase in temperature. It triggers vasodilation to increase blood flow near the skin and activates sweat glands to produce sweat. As sweat evaporates and heat is lost through the skin, the body cools down and temperature returns to normal.

**Q120. Describe how the body restores normal temperature after being in a cold environment.**
**Answer:** In a cold environment, the thermoregulatory centre detects a drop in temperature. It triggers vasoconstriction to reduce heat loss from the skin and may also cause shivering to generate heat through muscle activity. These responses help to raise the body temperature and return it to a normal level.

**Q121. How does the endocrine system differ from the nervous system in terms of speed and duration?**
**Answer:** The endocrine system works more slowly than the nervous system because it uses hormones that travel in the bloodstream to reach target organs. However, its effects usually last longer. In contrast, the nervous system sends electrical signals quickly through nerves, but its responses are usually short-lived.

**Q122. What is the main function of the endocrine system?**
**Answer:** The main function of the endocrine system is to regulate body processes through the release of hormones. These hormones control activities such as growth, metabolism, reproduction, and mood. The system ensures that the body maintains internal balance (homeostasis) by sending chemical signals to target organs and tissues.

**Q123. What are hormones and how do they travel through the body?**
**Answer:** Hormones are chemical messengers produced by glands in the endocrine system. They are released into the bloodstream and travel throughout the body. Each hormone affects specific target organs or tissues by binding to receptors, triggering a response that helps regulate body functions like growth, metabolism, and temperature.

**Q124. What is a target organ in relation to hormones?**
**Answer:** A target organ is the specific organ or tissue that a hormone affects. Hormones travel through the blood but only act on target organs that have the correct receptors for that hormone. The hormone binds to these receptors and causes a change or response in that particular organ.

**Q125. Why are the effects of hormones generally slower than those of the nervous system?**
**Answer:** The effects of hormones are generally slower because they travel through the bloodstream to reach their target organs. This takes more time compared to the rapid transmission of electrical signals in the nervous system. However, hormonal effects tend to last longer and help regulate long-term processes like growth and metabolism.

**Q126. What is meant by hormonal coordination?**
**Answer:** Hormonal coordination refers to the way the endocrine system uses hormones to control and regulate body functions. Hormones are chemical messengers released into the blood by glands, and they travel to specific target organs to bring about changes. This coordination helps the body maintain balance, respond to changes, and control long-term processes like growth and metabolism.

**Q127. Name the glands involved in the endocrine system.**
**Answer:** The main glands in the endocrine system are the pituitary gland, thyroid gland, adrenal glands, pancreas, ovaries (in females), and testes (in males). Each gland produces specific hormones that regulate different body functions such as metabolism, stress response, blood sugar levels, and reproductive activities.

**Q128. Where is the pituitary gland located in the body?**
**Answer:** The pituitary gland is located at the base of the brain, just below the hypothalamus. It is a small, pea-sized gland that plays a major role in regulating other endocrine glands and various body functions by releasing hormones in response to signals from the brain.

**Q129. Why is the pituitary gland called the "master gland"?**
**Answer:** The pituitary gland is called the "master gland" because it controls many other glands in the endocrine system. It releases hormones that regulate the activity of glands such as the thyroid, adrenal glands, ovaries, and testes. This central role in hormone control gives it the title of master gland.

**Q130. How does the pituitary gland control other glands?**
**Answer:** The pituitary gland controls other glands by releasing specific hormones that stimulate those glands to produce their own hormones. For example, it produces thyroid-stimulating hormone (TSH) to control the thyroid gland and luteinising hormone (LH) to regulate the reproductive glands. It responds to signals from the brain and regulates hormone levels through feedback mechanisms.

**Q131. Name two hormones secreted by the pituitary gland and their functions.**
**Answer:** One hormone is growth hormone (GH), which stimulates growth in children and helps maintain muscle and bone strength in adults. Another is adrenocorticotropic hormone (ACTH), which stimulates the adrenal glands to release cortisol, a hormone involved in stress response and metabolism regulation.

**Q132. Where is the pancreas located and what is its function in the endocrine system?**
**Answer:** The pancreas is located behind the stomach in the upper abdomen. In the endocrine system, it plays an important role in controlling blood sugar levels. It produces hormones like insulin and glucagon that help regulate how the body uses and stores glucose, keeping blood sugar levels stable.

**Q133. What hormone is produced by the pancreas and what is its effect?**
**Answer:** The pancreas produces insulin, which helps lower blood glucose levels by allowing glucose to enter cells, where it can be used for energy or stored. It also produces glucagon, which raises blood glucose levels by signaling the liver to release stored glucose. These hormones work together to keep blood sugar balanced.

**Q134. Where is the thyroid gland located and what hormone does it release?**
**Answer:** The thyroid gland is located in the front of the neck, just below the voice box (larynx). It releases a hormone called thyroxine, which helps regulate the body's metabolism. Thyroxine controls how quickly the body uses energy, how warm the body stays, and how organs function.

**Q135. What is the role of thyroxine in the body?**
**Answer:** Thyroxine controls the rate of metabolism in the body. It helps regulate processes like heart rate, body temperature, and the speed at which food is turned into energy. It is essential for normal growth and development. When thyroxine levels are too high or too low, it can lead to health problems.

**Q136. Where are the adrenal glands located and what is their function?**
**Answer:** The adrenal glands are located on top of each kidney. They produce several hormones, including adrenaline and cortisol, which help the body respond to stress. These hormones affect heart rate, blood

pressure, metabolism, and how the body uses fats and proteins. They are part of the body's "fight or flight" response.

**Q137. What hormone is produced by the adrenal glands and when is it released?**
**Answer:** One major hormone produced by the adrenal glands is adrenaline. It is released in response to stress or danger, triggering the "fight or flight" response. Adrenaline increases heart rate, widens airways, and boosts energy by increasing blood flow to muscles, helping the body react quickly in emergencies.

**Q138. Where are the ovaries located in the female body?**
**Answer:** The ovaries are located in the lower abdomen of females, one on each side of the uterus. They are part of the female reproductive system and play a key role in hormone production and the release of eggs during the menstrual cycle.

**Q139. What hormones are produced by the ovaries?**
**Answer:** The ovaries produce the hormones oestrogen and progesterone. Oestrogen helps regulate the menstrual cycle and is involved in the development of female secondary sexual characteristics. Progesterone prepares the lining of the uterus for pregnancy and helps maintain it if fertilisation occurs.

**Q140. Where are the testes located and what hormone do they release?**
**Answer:** The testes are located in the scrotum, outside the male body. They are part of the male reproductive system and produce the hormone testosterone, which is important for sperm production and the development of male secondary sexual characteristics such as deeper voice and facial hair.

**Q141. What is the function of testosterone in males?**
**Answer:** Testosterone controls the development of male secondary sexual characteristics during puberty, such as voice deepening, facial hair growth, and increased muscle mass. It also plays a vital role in sperm production and maintaining sex drive and reproductive health in adult males.

**Q142. How does the endocrine system maintain homeostasis?**
**Answer:** The endocrine system maintains homeostasis by releasing hormones in response to changes in the body's internal environment. These hormones help regulate body processes like blood sugar levels, temperature, water balance, and metabolism. Feedback mechanisms adjust hormone levels to keep conditions stable and within a healthy range.

**Q143. Why does each hormone affect only specific target organs?**
**Answer:** Each hormone affects only specific target organs because only those organs have the correct receptors for that hormone. Hormones travel throughout the bloodstream, but they can only produce an effect in tissues that have receptors that match their chemical structure. This ensures the hormone acts only where it is needed.

**Q144. Explain how hormones can regulate body processes over long periods.**
**Answer:** Hormones can regulate body processes over long periods because they often remain in the blood longer than nerve signals and can produce lasting effects. For example, hormones control growth,

metabolism, and development, which take place over weeks, months, or years. Their slow but sustained release makes them ideal for long-term regulation.

**Q145. What is the role of feedback mechanisms in hormone control?**
**Answer:** Feedback mechanisms help control hormone levels in the body by turning hormone production on or off based on the body's needs. In negative feedback, when the level of a hormone or its effect reaches a certain point, signals are sent to reduce production. This helps maintain balance and prevents overproduction or underproduction.

**Q146. How do hormones affect growth and development?**
**Answer:** Hormones like growth hormone, thyroxine, oestrogen, and testosterone control different aspects of growth and development. They influence the growth of bones and muscles, the development of sex organs, and changes that occur during puberty. A proper balance of these hormones is essential for healthy physical and reproductive development.

**Q147. What could happen if the endocrine system fails to regulate hormone levels properly?**
**Answer:** If the endocrine system fails to regulate hormone levels, it can lead to health problems. Too much or too little of a hormone can disrupt body functions. For example, too little insulin can cause diabetes, and too much thyroxine can lead to hyperthyroidism. Hormonal imbalances can affect growth, mood, metabolism, and reproduction.

**Q148. Compare the communication methods used by the nervous and endocrine systems.**
**Answer:** The nervous system uses electrical impulses that travel quickly along neurons to produce fast, short-term responses. The endocrine system uses hormones that travel through the blood to target organs, resulting in slower but longer-lasting effects. Both systems work together to maintain internal balance and respond to stimuli.

**Q149. How does the pituitary gland respond to signals from the brain?**
**Answer:** The pituitary gland responds to signals from the hypothalamus, a part of the brain that monitors body conditions. The hypothalamus sends chemical signals to the pituitary gland, telling it when to release or stop releasing certain hormones. This communication ensures the body maintains stable internal conditions.

**Q150. Why is it important for the endocrine system to respond to changing conditions in the body?**
**Answer:** It is important for the endocrine system to respond to changing conditions in the body to maintain homeostasis. The body constantly faces changes like temperature shifts, stress, and blood sugar changes. By releasing appropriate hormones in response, the endocrine system helps the body adjust and function properly.

**Q151. What is the role of the pancreas in controlling blood glucose levels?**
**Answer:** The pancreas controls blood glucose levels by producing two hormones: insulin and glucagon. When blood sugar levels are high, it releases insulin to help lower them. When blood sugar levels are low, it releases glucagon to raise them. This keeps the blood glucose concentration within a safe and steady range, which is important for normal body function.

**Q152. How does insulin help reduce high blood glucose levels?**
**Answer:** Insulin helps reduce high blood glucose levels by allowing glucose to move from the blood into body cells, where it is used for energy or stored as glycogen. Insulin also encourages the liver and muscle cells to store excess glucose as glycogen. As glucose leaves the blood and enters cells, the blood glucose level drops back to normal.

**Q153. What happens to excess glucose in the liver and muscle cells?**
**Answer:** Excess glucose in the liver and muscle cells is converted into glycogen and stored for later use. Glycogen acts as an energy reserve that can be broken down into glucose when the body needs more energy, such as between meals or during exercise. This storage helps maintain balanced blood sugar levels.

**Q154. What causes blood glucose concentration to rise after a meal?**
**Answer:** Blood glucose concentration rises after a meal because carbohydrates in the food are broken down into glucose during digestion. This glucose is absorbed into the bloodstream from the small intestine, increasing the level of sugar in the blood. The pancreas then responds by releasing insulin to reduce it.

**Q155. How does glucose move from the blood into the cells?**
**Answer:** Glucose moves from the blood into cells with the help of insulin. Insulin binds to receptors on the surface of cells, which triggers the opening of channels that allow glucose to enter. This process ensures that cells receive the glucose they need for energy while reducing glucose levels in the blood.

**Q156. What is Type 1 diabetes and what is its main cause?**
**Answer:** Type 1 diabetes is a condition where the pancreas produces little or no insulin. It is usually caused by the immune system attacking and destroying insulin-producing cells in the pancreas. Without insulin, blood glucose levels remain high because glucose cannot enter the cells properly. This type of diabetes often begins in childhood or adolescence.

**Q157. Why do people with Type 1 diabetes need insulin injections?**
**Answer:** People with Type 1 diabetes need insulin injections because their bodies cannot produce insulin naturally. Without insulin, their blood glucose levels would stay dangerously high. The injections provide the insulin needed to move glucose into cells, control blood sugar levels, and prevent serious health complications.

**Q158. What is Type 2 diabetes and how does it affect the body?**
**Answer:** Type 2 diabetes is a condition where the body becomes resistant to insulin or does not produce enough of it. As a result, glucose remains in the blood instead of entering the cells. This leads to high blood sugar levels, which over time can damage organs, nerves, and blood vessels. It is more common in adults and often linked to lifestyle.

**Q159. Why don't the body cells respond to insulin in Type 2 diabetes?**
**Answer:** In Type 2 diabetes, the body's cells become less sensitive to insulin, meaning they don't respond to it as well as they should. This is known as insulin resistance. It often develops due to factors like obesity, lack of physical activity, and poor diet. As a result, glucose cannot enter the cells effectively.

**Q160. How can Type 2 diabetes be controlled through lifestyle changes?**
**Answer:** Type 2 diabetes can be controlled through healthy lifestyle changes such as eating a balanced diet, reducing sugar and fat intake, losing excess weight, and exercising regularly. These actions improve how the body responds to insulin and help lower blood glucose levels. In some cases, medicine may also be needed if lifestyle changes are not enough.

**Q161. Why is obesity a major risk factor for developing Type 2 diabetes?**
**Answer:** Obesity is a major risk factor because excess fat, especially around the abdomen, can make the body's cells less sensitive to insulin. This condition is called insulin resistance. When cells don't respond properly to insulin, blood glucose levels stay high, increasing the risk of developing Type 2 diabetes.

**Q162. What are the main differences between Type 1 and Type 2 diabetes?**
**Answer:** Type 1 diabetes is usually caused by the immune system destroying insulin-producing cells, leading to no insulin production. It often starts in childhood. Type 2 diabetes occurs when the body doesn't respond properly to insulin or doesn't produce enough. It is more common in adults and is often linked to lifestyle factors like obesity.

**Q163. What are common symptoms of untreated diabetes?**
**Answer:** Common symptoms of untreated diabetes include frequent urination, excessive thirst, fatigue, blurred vision, slow healing of cuts, and unexplained weight loss. If left untreated, it can lead to serious complications such as nerve damage, kidney failure, eye problems, and heart disease.

**Q164. What is the role of glucagon in blood glucose control?**
**Answer:** Glucagon is a hormone released by the pancreas when blood glucose levels are too low. It signals the liver to break down glycogen into glucose and release it into the blood. This raises blood glucose levels back to normal, helping to maintain a stable internal environment.

**Q165. How does glucagon raise low blood glucose levels?**
**Answer:** Glucagon raises low blood glucose levels by stimulating the liver to break down stored glycogen into glucose. This glucose is then released into the bloodstream, increasing blood sugar levels. Glucagon also promotes the production of glucose from non-carbohydrate sources when glycogen is not available.

**Q166. What is glycogen and where is it stored?**
**Answer:** Glycogen is a stored form of glucose. It is a complex carbohydrate made up of many glucose molecules. The body stores glycogen mainly in the liver and muscles. When energy is needed or blood sugar drops, glycogen is broken down into glucose to supply energy.

**Q167. How does the body switch between storing and releasing glucose?**
**Answer:** The body switches between storing and releasing glucose based on blood sugar levels. After eating, insulin promotes the storage of glucose as glycogen in the liver and muscles. When blood sugar levels fall, glucagon is released to trigger the breakdown of glycogen into glucose, which is released into the blood to maintain balance.

**Q168. What is a negative feedback cycle in the context of blood sugar regulation?**
**Answer:** A negative feedback cycle helps keep blood sugar levels stable. When blood sugar rises, insulin is released to lower it. When blood sugar drops, glucagon is released to raise it. Once normal levels are restored, the release of insulin or glucagon slows down. This loop prevents blood sugar from getting too high or too low.

**Q169. How do insulin and glucagon work together in a feedback loop?**
**Answer:** Insulin and glucagon work together to keep blood glucose levels within a normal range. When glucose levels are high, insulin helps lower them. When levels are low, glucagon raises them. These hormones have opposite effects but work as a team in a feedback loop to keep the balance needed for body function.

**Q170. How does the body respond to a drop in blood sugar concentration?**
**Answer:** When blood sugar concentration drops, the pancreas releases glucagon. This hormone tells the liver to break down stored glycogen into glucose and release it into the bloodstream. This raises blood sugar levels back to normal and ensures that cells continue to get the energy they need.

**Q171. What might a graph of blood glucose levels after eating show?**
**Answer:** A graph of blood glucose levels after eating would show a rise in blood sugar shortly after the meal, reaching a peak. Then, as insulin is released and glucose is absorbed into cells, the graph would show a gradual drop back to normal levels. This shows how the body manages glucose after food intake.

**Q172. How do blood glucose graphs differ for diabetic and non-diabetic people?**
**Answer:** In non-diabetic people, the graph shows a quick rise in blood glucose after eating followed by a steady return to normal levels. In diabetic people, the rise is usually higher and the return to normal is slower or incomplete. This shows poor glucose regulation due to problems with insulin production or response.

**Q173. What are the dangers of high blood sugar levels over time?**
**Answer:** High blood sugar levels over time can damage blood vessels and nerves. This can lead to complications such as heart disease, kidney damage, vision loss, nerve pain, and poor circulation, which may result in infections or limb amputations. It is important to manage blood sugar to avoid long-term health problems.

**Q174. Why is it important to maintain constant blood glucose concentration?**
**Answer:** It is important to maintain constant blood glucose concentration because glucose is the main source of energy for the body's cells, especially the brain. If blood sugar is too high or too low, it can affect cell function and cause serious health issues such as fainting, coma, or long-term organ damage.

**Q175. How does the body lose water through the lungs?**
**Answer:** The body loses water through the lungs during breathing. When we exhale, the air we breathe out contains water vapour. This is because moisture from the lining of the respiratory tract evaporates into the air in the lungs and leaves the body as we breathe out. This is a form of water loss known as insensible loss.

**Q176. What substances are lost through sweating?**
**Answer:** Sweat contains water, salts (mainly sodium chloride), and small amounts of urea. These substances are lost from the body when sweat is released onto the skin to help cool the body down. Sweating helps regulate body temperature, but it also causes the body to lose important substances that must be replaced through food and drink.

**Q177. Why can't water loss from lungs and skin be controlled?**
**Answer:** Water loss from the lungs and skin is not under conscious control because it happens automatically. Water evaporates from the moist surfaces of the lungs when we breathe out and from the skin during sweating. These are natural processes that the body uses for temperature control and gas exchange, so they cannot be completely regulated.

**Q178. What happens if body cells lose too much water?**
**Answer:** If body cells lose too much water, they become dehydrated and shrink. This affects their ability to carry out normal functions, including chemical reactions and nutrient transport. Severe water loss can lead to symptoms like dizziness, fatigue, confusion, and in extreme cases, organ failure if not treated quickly.

**Q179. What happens if body cells gain too much water?**
**Answer:** If body cells gain too much water, they swell and may burst. This happens when the blood becomes too dilute, causing water to enter cells by osmosis. It can disturb normal cell function, damage tissues, and lead to serious health problems such as brain swelling, which is life-threatening.

**Q180. How do the kidneys help regulate the water balance in the body?**
**Answer:** The kidneys help regulate water balance by adjusting the amount of water reabsorbed into the blood. When the body needs to conserve water, the kidneys reabsorb more. When there's excess water, they reabsorb less, and more water is lost in urine. This keeps water levels in the blood stable and supports homeostasis.

**Q181. What is the role of the kidneys in removing urea?**
**Answer:** The kidneys filter urea out of the blood and remove it through urine. Urea is a waste product formed in the liver from the breakdown of proteins. The kidneys ensure it doesn't build up in the body, which could be harmful. Removing urea is an important part of excretion and keeping the blood clean.

**Q182. What is filtration in the kidney?**
**Answer:** Filtration in the kidney is the process where blood passes through tiny filters in the nephrons. These filters remove waste products like urea, excess ions, and water from the blood. Useful substances like glucose and some water are reabsorbed later, while the remaining waste is sent to the bladder as urine.

**Q183. What substances are reabsorbed into the blood by the kidney?**
**Answer:** The kidneys reabsorb glucose, some water, and useful ions like sodium and potassium back into the blood. This reabsorption happens in the tubules of the nephron and ensures the body keeps what it needs while removing wastes. The amount reabsorbed depends on the body's needs at that time.

**Q184. Why is glucose reabsorbed and not lost in urine?**
**Answer:** Glucose is reabsorbed because it is a valuable source of energy for the body. Losing glucose in the urine would waste energy and cause health problems. The kidneys use active transport to reabsorb all of the glucose from the filtrate back into the blood, ensuring none is lost in urine under normal conditions.

**Q185. What happens to excess ions in the kidney?**
**Answer:** Excess ions such as sodium and potassium are removed from the blood by the kidneys and passed out in the urine. This helps keep the balance of ions in the body correct, which is essential for nerve function, muscle activity, and overall homeostasis. If the ion balance is not correct, it can lead to health issues.

**Q186. What is urea and how is it made in the liver?**
**Answer:** Urea is a waste product made in the liver when excess amino acids are broken down. This process is called deamination. During deamination, the nitrogen part of amino acids is removed and converted into ammonia, which is toxic. The liver quickly changes ammonia into urea, which is safer and can be removed by the kidneys.

**Q187. What is deamination and why is it necessary?**
**Answer:** Deamination is the process in the liver where excess amino acids are broken down. The nitrogen part is removed and turned into ammonia, which is then converted into urea. This is necessary because the body cannot store excess protein, and removing the nitrogen safely prevents toxic build-up in the body.

**Q188. Why is ammonia quickly converted to urea?**
**Answer:** Ammonia is very toxic to cells and must be dealt with quickly. The liver converts ammonia into urea because urea is much less harmful and can be safely transported in the blood to the kidneys. Urea is then excreted in the urine. This protects the body from the harmful effects of ammonia.

**Q189. How is urea safely removed from the body?**
**Answer:** Urea is safely removed from the body through the kidneys. It is filtered out of the blood by the nephrons and then passed into the bladder in the urine. This process ensures that toxic waste is regularly removed from the blood and does not build up to harmful levels in the body.

**Q190. What does ADH stand for and what is its function?**
**Answer:** ADH stands for antidiuretic hormone. Its function is to control the amount of water reabsorbed by the kidney tubules. When ADH levels are high, more water is reabsorbed into the blood, producing less urine. This helps the body conserve water when needed and maintain a steady internal water balance.

**Q191. When is ADH released from the pituitary gland?**
**Answer:** ADH is released from the pituitary gland when the brain detects that the blood is too concentrated (not enough water). The hypothalamus senses this and signals the pituitary to release ADH. This causes the kidneys to reabsorb more water into the blood, reducing water loss through urine.

**Q192. What effect does ADH have on kidney tubules?**
**Answer:** ADH increases the permeability of the kidney tubules to water. This means more water can pass

from the filtrate back into the blood. As a result, less water is lost in urine and the urine becomes more concentrated. This helps the body conserve water and maintain proper hydration levels.

**Q193. How does ADH help conserve water when blood is too concentrated?**
**Answer:** When blood is too concentrated, ADH is released. It makes the kidney tubules more permeable, so more water is reabsorbed into the bloodstream. This reduces the amount of water lost in urine, helping to dilute the blood and return it to the correct concentration. This process keeps the body hydrated.

**Q194. What happens to ADH levels when blood becomes too dilute?**
**Answer:** When blood becomes too dilute, the brain tells the pituitary gland to stop releasing ADH. With less ADH, the kidney tubules become less permeable to water, so less water is reabsorbed. More water is lost in urine, making the blood more concentrated again. This helps maintain a balanced water level in the blood.

**Q195. How is ADH controlled by negative feedback?**
**Answer:** ADH is controlled by negative feedback. When blood water concentration drops, ADH is released to conserve water. As water levels return to normal, the release of ADH is reduced. This loop ensures that water balance is maintained and prevents too much or too little water in the blood.

**Q196. What happens when the kidneys stop working properly?**
**Answer:** When the kidneys stop working properly, waste products like urea build up in the blood, and the body cannot maintain water and ion balance. This can lead to serious health problems, including swelling, high blood pressure, fatigue, and damage to other organs. If untreated, kidney failure can be life-threatening.

**Q197. What is kidney dialysis and when is it needed?**
**Answer:** Kidney dialysis is a treatment that removes waste products, excess water, and ions from the blood when the kidneys fail. It is needed when a person's kidneys can no longer perform these functions naturally. Dialysis keeps the blood clean and balanced until the person can receive a kidney transplant or recover.

**Q198. How does dialysis remove waste products from the blood?**
**Answer:** Dialysis removes waste by passing the patient's blood through a dialysis machine with a semi-permeable membrane. Waste products like urea, excess ions, and water pass from the blood into the dialysis fluid. The membrane allows only certain substances through, helping to clean the blood and restore balance.

**Q199. What are the key differences between dialysis and kidney transplant?**
**Answer:** Dialysis is a mechanical process that must be done regularly to clean the blood, while a kidney transplant is a surgical procedure to replace a damaged kidney with a healthy one. Dialysis is time-consuming and temporary, while a transplant can offer a long-term solution, though it involves risks like rejection and lifelong medication.

**Q200. What are the benefits and risks of kidney transplantation?**
**Answer:** Benefits of kidney transplantation include freedom from dialysis, improved quality of life, and better long-term health. However, there are risks such as the body rejecting the new kidney, infection, and side

effects from the drugs needed to stop rejection. There is also a need for a suitable donor and surgery-related risks.

**Q201. What is the role of reproductive hormones during puberty?**
**Answer:** Reproductive hormones trigger physical and emotional changes in boys and girls during puberty. In males, testosterone causes sperm production and development of male features. In females, oestrogen starts the menstrual cycle and leads to development of female features. These hormones help prepare the body for reproduction.

**Q202. What secondary sex characteristics are caused by reproductive hormones in females?**
**Answer:** In females, oestrogen causes the development of breasts, widening of hips, growth of underarm and pubic hair, and the start of the menstrual cycle. It also causes emotional changes and promotes fat storage in certain areas of the body. These changes prepare the female body for potential pregnancy.

**Q203. What changes occur in males during puberty due to testosterone?**
**Answer:** Testosterone causes deepening of the voice, growth of facial, pubic, and body hair, increased muscle mass, growth of the testes and penis, and the start of sperm production. These changes prepare the male body for reproduction and signal the onset of sexual maturity.

**Q204. Where is oestrogen produced and what is its main function?**
**Answer:** Oestrogen is produced in the ovaries. Its main functions are to control the development of female secondary sexual characteristics and to regulate the menstrual cycle by rebuilding the uterus lining after menstruation and controlling levels of other reproductive hormones such as FSH and LH.

**Q205. What is ovulation and how often does it occur?**
**Answer:** Ovulation is the release of a mature egg from one of the ovaries. It usually occurs once during each menstrual cycle, around the 14th day in a typical 28-day cycle. The egg travels down the fallopian tube, where it may meet sperm and become fertilised.

**Q206. What is the role of testosterone in the male body?**
**Answer:** Testosterone controls the development of male secondary sexual characteristics and stimulates sperm production. It causes features such as a deeper voice, facial and body hair growth, and muscle development. It also helps maintain sex drive and supports male reproductive function throughout life.

**Q207. What does follicle stimulating hormone (FSH) do in the menstrual cycle?**
**Answer:** FSH is produced by the pituitary gland and causes an egg to mature in a follicle in the ovary. It also stimulates the ovaries to produce oestrogen. FSH levels rise at the start of the cycle and help prepare the egg for ovulation, making it a key hormone in early stages of the cycle.

**Q208. What effect does luteinising hormone (LH) have in the female reproductive system?**
**Answer:** LH is released by the pituitary gland and triggers ovulation, which is the release of a mature egg from the ovary. LH levels rise sharply around the middle of the cycle. It also helps the follicle form a structure called the corpus luteum, which produces progesterone.

**Q209. How does oestrogen help in the menstrual cycle?**
**Answer:** Oestrogen helps by causing the uterus lining to grow and thicken in preparation for a possible pregnancy. It also inhibits FSH release to prevent more eggs from maturing and stimulates LH release, which leads to ovulation. Oestrogen is vital for controlling the first half of the cycle.

**Q210. What is the function of progesterone in the menstrual cycle?**
**Answer:** Progesterone maintains the uterus lining after ovulation, preparing it to support a fertilised egg. If pregnancy does not occur, progesterone levels fall, causing the lining to break down and menstruation to begin. It also inhibits the release of FSH and LH to prevent further ovulation during the cycle.

**Q211. What triggers the start of the menstrual cycle?**
**Answer:** The menstrual cycle begins when the levels of oestrogen and progesterone fall, causing the uterus lining to break down and be shed as menstrual blood. At the same time, low hormone levels signal the pituitary gland to release FSH, which stimulates the next egg to begin maturing.

**Q212. How do FSH and oestrogen interact during the menstrual cycle?**
**Answer:** FSH stimulates the maturation of an egg and the production of oestrogen. As oestrogen levels rise, they inhibit further release of FSH to stop multiple eggs from maturing. Oestrogen also stimulates LH release, which later triggers ovulation. This interaction helps regulate the timing and order of events in the cycle.

**Q213. What causes a rise in LH levels during the cycle?**
**Answer:** A rise in LH levels is caused by high levels of oestrogen produced by the maturing follicle. This increase in oestrogen stimulates the pituitary gland to release a surge of LH, which then triggers ovulation. This peak usually happens around the middle of the cycle.

**Q214. How do oestrogen and progesterone prepare the uterus for pregnancy?**
**Answer:** Oestrogen causes the uterus lining to grow thicker in the first half of the cycle, while progesterone maintains the lining in the second half. Together, they ensure the lining is suitable for the implantation of a fertilised egg. If pregnancy occurs, progesterone levels stay high to support the embryo.

**Q215. What causes the uterus lining to break down if pregnancy does not occur?**
**Answer:** If pregnancy does not happen, the levels of progesterone and oestrogen fall because the corpus luteum breaks down. Without these hormones, the thick uterus lining is no longer maintained and begins to shed. This leads to menstruation, which marks the start of a new cycle.

**Q216. What happens to hormone levels after ovulation?**
**Answer:** After ovulation, LH causes the follicle to become the corpus luteum, which releases progesterone. Progesterone levels rise and maintain the uterus lining. Oestrogen levels are also moderately high. If no fertilisation occurs, progesterone and oestrogen levels drop, causing the cycle to restart.

**Q217. How can hormone graphs help track the menstrual cycle?**
**Answer:** Hormone graphs show the changes in FSH, LH, oestrogen, and progesterone levels across the menstrual cycle. They help identify when ovulation occurs, which is useful for tracking fertility. These graphs can also show if hormone levels are normal or if there are imbalances affecting the cycle.

**Q218. When in the cycle is a woman most likely to become pregnant?**
**Answer:** A woman is most likely to become pregnant during ovulation, which usually occurs around day 14 of a 28-day cycle. The days just before and after ovulation are the most fertile because the egg can be fertilised within about 24 hours, and sperm can live for several days in the female body.

**Q219. What happens to hormone levels if fertilisation occurs?**
**Answer:** If fertilisation occurs, progesterone levels stay high to maintain the uterus lining and support the developing embryo. The body also produces human chorionic gonadotropin (hCG), which keeps the corpus luteum active. Oestrogen levels remain steady, and FSH and LH are kept low to prevent further ovulation.

**Q220. How does the interaction of four hormones regulate the menstrual cycle?**
**Answer:** FSH starts the cycle by maturing an egg. Oestrogen thickens the uterus lining and stimulates LH release. LH triggers ovulation, and then progesterone maintains the lining. Progesterone and oestrogen then inhibit FSH and LH. If no pregnancy occurs, their levels fall, the lining sheds, and the cycle restarts.

**Q221. What is the purpose of oral contraceptives?**
**Answer:** The purpose of oral contraceptives is to prevent pregnancy. They contain hormones like oestrogen and/or progesterone that stop ovulation, thicken cervical mucus to block sperm, and thin the uterus lining to prevent implantation. They are taken daily and are a reliable form of birth control when used correctly.

**Q222. How do oral contraceptives prevent pregnancy?**
**Answer:** Oral contraceptives prevent pregnancy mainly by stopping ovulation through the suppression of FSH and LH. They also thicken the mucus at the cervix to stop sperm from reaching an egg and make the uterus lining thinner, reducing the chance of implantation if an egg is fertilised.

**Q223. What are the benefits and risks of taking oral contraceptive pills?**
**Answer:** Benefits include effective pregnancy prevention, lighter and more regular periods, and reduced menstrual pain. Some also help with acne. Risks include side effects like nausea, mood changes, and headaches. There is also a small increased risk of blood clots and high blood pressure in some users.

**Q224. What is the role of progesterone in hormonal contraception?**
**Answer:** Progesterone in hormonal contraception prevents ovulation, thickens cervical mucus to block sperm, and thins the uterus lining to prevent implantation. It is used in mini-pills, injections, patches, and implants. It is especially useful for people who cannot take oestrogen-based contraceptives.

**Q225. How do implants, patches or injections work to prevent pregnancy?**
**Answer:** These methods release hormones like progesterone into the body over time. They prevent ovulation, thicken cervical mucus, and thin the uterus lining. Implants are placed under the skin, patches stick to the skin, and injections are given every few months. They provide long-term birth control without daily action.

**Q226. What are barrier methods of contraception?**
**Answer:** Barrier methods of contraception are physical devices that prevent sperm from reaching the egg.

They include male and female condoms, diaphragms, and cervical caps. These methods create a physical barrier between sperm and the female reproductive system, reducing the chance of fertilisation.

**Q227. How do condoms and diaphragms prevent fertilisation?**
**Answer:** Condoms cover the penis (male) or line the vagina (female) to collect semen and stop sperm from entering the uterus. Diaphragms are soft rubber domes inserted into the vagina to cover the cervix. Both block sperm from reaching the egg, preventing fertilisation from occurring.

**Q228. What are intrauterine devices (IUDs) and how do they work?**
**Answer:** IUDs are small T-shaped devices placed in the uterus. Copper IUDs release copper to kill sperm and stop fertilisation. Hormonal IUDs release progesterone to thicken cervical mucus and thin the uterus lining, also preventing fertilisation or implantation. They provide long-term protection.

**Q229. How do hormonal IUDs differ from copper IUDs?**
**Answer:** Hormonal IUDs release progesterone, which thickens cervical mucus, thins the uterus lining, and may stop ovulation. Copper IUDs do not contain hormones but release copper, which is toxic to sperm. Hormonal IUDs can affect periods, while copper IUDs often don't affect hormones.

**Q230. What is the function of spermicidal agents?**
**Answer:** Spermicidal agents are chemicals that kill or disable sperm. They are used with barrier methods like diaphragms or alone as gels or creams. By reducing the number of active sperm, they lower the chance of fertilisation, although they are less effective on their own.

**Q231. Why is abstaining from intercourse considered a method of contraception?**
**Answer:** Abstaining from intercourse means not having sex, so no sperm is introduced into the vagina. Without sperm, fertilisation cannot occur. It is a natural, 100% effective method of contraception when followed strictly, but it requires self-control and discipline.

**Q232. What is surgical sterilisation and how does it prevent pregnancy?**
**Answer:** Surgical sterilisation is a permanent method of contraception. In men, it involves cutting the sperm ducts (vasectomy). In women, it involves cutting or blocking the fallopian tubes (tubal ligation). Both procedures prevent sperm and egg from meeting, so fertilisation cannot happen.

**Q233. What are the advantages of non-hormonal methods of contraception?**
**Answer:** Non-hormonal methods like condoms and copper IUDs do not interfere with natural hormone levels, avoid side effects like mood swings, and are suitable for people who cannot take hormones. Some, like condoms, also protect against sexually transmitted infections (STIs).

**Q234. What are the disadvantages of hormonal contraceptive methods?**
**Answer:** Hormonal contraceptives can cause side effects such as mood changes, weight gain, headaches, and nausea. They may also affect menstrual cycles. Some users face a small increased risk of blood clots. They must be used correctly to be effective and may not suit everyone.

**Q235. Why is it important to evaluate different contraception methods?**
**Answer:** Evaluating contraception methods helps individuals choose the one that fits their health, lifestyle, and beliefs. Some methods are more effective, long-lasting, or convenient than others. Comparing options helps avoid side effects, ensures proper use, and supports safe family planning.

**Q236. How can personal beliefs influence contraception choices?**
**Answer:** Personal, cultural, or religious beliefs may affect which contraception methods are acceptable. Some may avoid hormonal or permanent methods. Others may prefer natural family planning. Beliefs about sexual behaviour, health, or fertility can guide decisions on what method to use.

**Q237. Why can't science alone answer questions about contraception?**
**Answer:** Science can explain how contraception works and its effectiveness, but it cannot decide what is right for every person. Decisions also involve values, beliefs, emotions, and social norms. These personal or ethical factors are beyond what science alone can determine.

**Q238. What social factors affect access to contraception?**
**Answer:** Access can be influenced by education, income, culture, religion, gender roles, and healthcare availability. In some places, social stigma or lack of information prevents people from using contraception. Improving social support and education helps make contraception more accessible.

**Q239. How can the use of contraception impact population growth?**
**Answer:** Contraception helps control birth rates by allowing people to plan when and how many children to have. Widespread use can slow population growth, reduce pressure on resources, and support economic development. It also improves maternal and child health by spacing births.

**Q240. What ethical concerns exist around long-term contraception use?**
**Answer:** Ethical concerns include consent, especially in vulnerable groups, and the potential pressure to use certain methods. Some worry about the long-term health effects or believe contraception interferes with natural or religious values. Ensuring informed choice and respect is important.

**Q241. What economic issues are linked to access to contraceptive methods?**
**Answer:** In some areas, contraception can be too expensive or not provided through public healthcare. Lack of funding for education and clinics limits access. Investing in contraception can reduce healthcare costs long-term by preventing unplanned pregnancies and reducing strain on services.

**Q242. How do contraceptives empower individuals in family planning?**
**Answer:** Contraceptives give people control over when to have children, allowing them to focus on education, careers, or personal goals. This leads to better financial stability, healthier families, and more opportunities, especially for women. It supports freedom and informed decision-making.

**Q243. How can contraception reduce the spread of sexually transmitted infections?**
**Answer:** Barrier methods like condoms create a physical barrier that stops the exchange of bodily fluids during sex. This helps prevent the transmission of STIs such as HIV, chlamydia, and gonorrhoea. Using condoms consistently is an effective way to protect against infection.

**Q244. Why might someone choose natural family planning over other methods?**
**Answer:** Natural family planning does not involve hormones or devices and is based on tracking the menstrual cycle. Some people choose it for religious or personal reasons, or to avoid side effects of other methods. It requires careful monitoring and is less effective unless followed strictly.

**Q245. How does contraception benefit public health systems?**
**Answer:** Contraception reduces unplanned pregnancies, lowers maternal and infant mortality rates, and eases pressure on health services. Fewer unintended pregnancies mean fewer complications and reduced costs. It also allows better allocation of resources and improves community well-being.

**Q246. What are the consequences of not using effective contraception?**
**Answer:** Not using contraception can lead to unplanned pregnancies, which may affect education, income, and health. It can increase the risk of unsafe abortions and strain family resources. It also raises the chances of STIs if barrier methods are not used. Planning prevents these issues.

**Q247. How is the effectiveness of a contraceptive method measured?**
**Answer:** Effectiveness is measured by how well a method prevents pregnancy over a year of regular use. This is often shown as a percentage or number of pregnancies per 100 users. Methods are classified as typical use (real-life conditions) and perfect use (used exactly as directed).

**Q248. Why might contraceptive failure occur even when methods are used?**
**Answer:** Failure can happen due to incorrect or inconsistent use, expired products, interference from medications, or physical issues like a condom breaking. No method is 100% effective except abstinence. Knowing how to use a method correctly helps reduce the risk of failure.

**Q249. How do hormonal methods of contraception affect menstrual cycles?**
**Answer:** Hormonal methods can make periods lighter, more regular, or stop them altogether. They may reduce period pain and PMS symptoms. Some people experience irregular bleeding or spotting. These effects happen because hormones prevent ovulation and change the uterus lining.

**Q250. What role do healthcare providers play in educating about contraception?**
**Answer:** Healthcare providers give information about different methods, how to use them, and their benefits and risks. They help individuals choose the best method for their needs and health. Providers also ensure safe access, answer questions, and promote responsible family planning.

**Q251. What hormones are included in fertility drugs and what are their roles?**
**Answer:** Fertility drugs usually contain FSH (follicle-stimulating hormone) and LH (luteinising hormone). FSH stimulates the ovaries to mature eggs, while LH helps trigger ovulation. These hormones help women who are not ovulating regularly to produce eggs and increase their chances of becoming pregnant.

**Q252. How does FSH help women who are infertile?**
**Answer:** FSH stimulates the growth and maturation of eggs in the ovaries. For women who are infertile due to low levels of FSH or irregular ovulation, giving FSH through fertility drugs can help develop mature eggs that can be released during ovulation, making it possible for fertilisation to occur.

**Q253. What is the role of LH in treating infertility?**
**Answer:** LH works with FSH to support ovulation. In fertility treatment, LH helps to trigger the release of a mature egg from the ovary. It also helps develop the corpus luteum after ovulation, which produces progesterone to prepare the uterus for pregnancy. Without LH, ovulation may not happen.

**Q254. Why might a woman take fertility drugs before trying to conceive?**
**Answer:** A woman may take fertility drugs if she has trouble ovulating naturally. The drugs help her ovaries produce eggs and increase her chance of releasing one or more eggs during her cycle. This boosts the likelihood of successful fertilisation when trying to get pregnant.

**Q255. How does IVF treatment help couples with fertility problems?**
**Answer:** IVF (in vitro fertilisation) helps by collecting eggs from the woman and fertilising them with sperm in a lab. The fertilised eggs become embryos, and one or two are placed into the uterus. IVF is useful for couples with blocked fallopian tubes, low sperm count, or unexplained infertility.

**Q256. What are the first steps in the IVF process?**
**Answer:** IVF begins with giving the woman fertility drugs containing FSH and LH to stimulate the ovaries to produce several mature eggs. These eggs are then monitored using ultrasound scans until they are ready for collection. This preparation phase is essential for a successful IVF cycle.

**Q257. How are eggs collected from the mother during IVF?**
**Answer:** When the eggs are mature, they are collected using a needle guided by ultrasound. The procedure is usually done under mild sedation or anaesthesia. The eggs are removed from the ovaries through the vagina and then taken to a lab for fertilisation with sperm.

**Q258. What happens to the eggs after they are collected in IVF?**
**Answer:** After collection, the eggs are placed in a special fluid and mixed with sperm in a laboratory dish. The dish is kept in a warm environment to allow fertilisation to happen. The eggs are carefully monitored to check if they become fertilised and develop into embryos.

**Q259. How is fertilisation carried out in IVF?**
**Answer:** Fertilisation in IVF is usually done by mixing eggs with sperm in a lab dish. In some cases, a single sperm is injected directly into an egg using a method called ICSI (intracytoplasmic sperm injection). Once fertilisation happens, the embryo begins to develop under controlled conditions.

**Q260. At what stage are embryos transferred back into the uterus?**
**Answer:** Embryos are usually transferred into the uterus after 3 to 5 days of development. By this time, they have divided into several cells and reached a stage where they can implant into the uterus lining. Timing the transfer is important for successful implantation and pregnancy.

**Q261. Why are only one or two embryos inserted into the uterus during IVF?**
**Answer:** Only one or two embryos are inserted to reduce the risk of multiple births, which can lead to health problems for both the mother and babies. Multiple births increase the chances of premature delivery and complications, so doctors aim to transfer just enough embryos for a good chance of pregnancy.

**Q262. What are the possible outcomes of transferring more than one embryo?**
**Answer:** Transferring more than one embryo can increase the chance of pregnancy but also raises the risk of multiple births like twins or triplets. This can lead to premature birth, low birth weight, and complications for the mother, such as high blood pressure and delivery risks.

**Q263. Why are FSH and LH used together in IVF treatment?**
**Answer:** FSH and LH are used together in IVF to increase the number of eggs produced by the ovaries. FSH stimulates egg growth, while LH helps with final egg maturation and ovulation. Using both hormones gives a better chance of collecting multiple healthy eggs for fertilisation.

**Q264. How have improved microscopy techniques supported IVF procedures?**
**Answer:** Better microscopes allow doctors to closely examine eggs and sperm, select the healthiest ones, and monitor embryo development more accurately. Techniques like time-lapse imaging and ICSI rely on advanced microscopy, which improves fertilisation success and helps choose the best embryos.

**Q265. What are the chances of success with IVF treatment?**
**Answer:** IVF success rates vary by age and health. On average, women under 35 have around a 30–40% chance of pregnancy per IVF cycle. Success decreases with age. Factors like egg quality, sperm health, and medical history also affect results, so success cannot be guaranteed.

**Q266. Why can IVF be emotionally and physically stressful for patients?**
**Answer:** IVF involves hormone injections, medical procedures, and waiting for results, which can cause anxiety, mood swings, and physical discomfort. If treatment fails, it can lead to emotional disappointment and stress. Repeated attempts may also cause financial and relationship strain.

**Q267. What are the health risks of multiple births for the mother?**
**Answer:** Multiple births increase the risk of high blood pressure, gestational diabetes, and complications during delivery. Mothers may need a C-section and face more medical visits. The strain on the body is higher, and there is a greater chance of premature labour and hospitalisation.

**Q268. Why are multiple births risky for babies?**
**Answer:** Babies from multiple births are more likely to be born early and have low birth weight. They may need special care in neonatal units and face breathing problems, feeding issues, or long-term health problems. Their development can be slower, and some may face learning difficulties.

**Q269. How do patients usually feel after unsuccessful IVF cycles?**
**Answer:** After an unsuccessful IVF cycle, patients often feel sad, disappointed, or hopeless. It can lead to emotional stress, especially if several attempts have failed. Some may feel anger or guilt, while others may need support or counselling to cope and decide on their next steps.

**Q270. What ethical issues are linked to the selection of embryos in IVF?**
**Answer:** Selecting embryos raises ethical concerns about choosing based on health, gender, or traits. Some worry it could lead to discrimination or "designer babies." Others question what happens to unused embryos. These issues involve beliefs about life, fairness, and the role of science in reproduction.

**Q271. Why might some people be against IVF on religious or moral grounds?**
**Answer:** Some believe IVF interferes with natural reproduction or involves the destruction of embryos, which they see as potential life. Religious views may oppose fertilisation outside the body or using donor sperm or eggs. Personal and cultural values also influence such beliefs.

**Q272. How do doctors decide which embryos to transfer during IVF?**
**Answer:** Doctors choose embryos based on their appearance, growth rate, and development. The healthiest-looking embryos are selected to give the best chance of implantation. Sometimes, genetic tests are used to check for inherited disorders. Only one or two of the best embryos are transferred.

**Q273. What social challenges might couples face when undergoing IVF?**
**Answer:** Couples may face stress from family or community expectations, financial pressure, or emotional strain during treatment. Some may feel isolated or judged. IVF can also affect relationships if one partner feels more burdened. Support from healthcare and counselling can help manage these issues.

**Q274. How does the cost of IVF affect access to treatment?**
**Answer:** IVF is expensive and often not fully covered by insurance or government healthcare. This limits access for many people, especially in low-income areas. High costs may prevent repeated attempts or force people to borrow money. It can create inequality in who can afford treatment.

**Q275. Why is it important for doctors to explain IVF success rates clearly?**
**Answer:** Patients need clear information to make informed choices. IVF success rates depend on age, health, and other factors. If patients don't understand the chances, they may have false hope or make decisions they later regret. Honest communication helps manage expectations and plan next steps wisely.

**Q276. What role does thyroxine play in the human body?**
**Answer:** Thyroxine controls how fast chemical reactions happen in the body, which is called metabolism. It affects how the body uses energy, controls heart rate, helps keep body temperature stable, and supports growth and brain development. Without the right level of thyroxine, the body cannot work properly.

**Q277. Where is thyroxine produced and what gland is involved?**
**Answer:** Thyroxine is produced by the thyroid gland. The thyroid gland is found in the neck, just in front of the windpipe. It takes in iodine from food to make thyroxine. The thyroid gland releases thyroxine into the blood to be carried around the body where it affects cells and organs.

**Q278. What effect does thyroxine have on the body's metabolism?**
**Answer:** Thyroxine speeds up the body's metabolism. This means it helps the body break down food faster to release energy. It affects how cells use oxygen and nutrients, and helps regulate the energy needed for all body processes like breathing, digestion, and circulation. Low thyroxine slows metabolism.

**Q279. How is growth and development influenced by thyroxine?**
**Answer:** Thyroxine helps control the rate of growth and development, especially in children. It supports the development of bones, the brain, and organs. Without enough thyroxine, children may grow slowly or have learning difficulties. In adults, it helps keep organs and systems working properly.

**Q280. What is a feedback system?**
**Answer:** A feedback system is a way the body keeps certain levels, like hormones, steady. When something in the body changes, sensors notice and send signals. The body then makes adjustments to bring the level back to normal. This helps keep the internal environment stable, which is called homeostasis.

**Q281. How does negative feedback control thyroxine levels?**
**Answer:** Negative feedback keeps thyroxine levels stable. If thyroxine is too low, the brain releases TSH (thyroid-stimulating hormone) to make the thyroid produce more. If thyroxine is too high, TSH is reduced so the thyroid makes less. This cycle keeps thyroxine at the right level in the blood.

**Q282. What hormone is involved in regulating thyroxine production?**
**Answer:** TSH, or thyroid-stimulating hormone, controls thyroxine production. It is released from the pituitary gland in the brain. When thyroxine levels drop, TSH is released to tell the thyroid gland to make more. When thyroxine is high, TSH levels fall to reduce thyroxine production.

**Q283. What happens if thyroxine levels are too low?**
**Answer:** If thyroxine levels are too low, metabolism slows down. This can cause tiredness, weight gain, cold feelings, slow heart rate, and depression. Growth and brain development in children can also be affected. The pituitary gland responds by making more TSH to raise thyroxine levels again.

**Q284. What happens if thyroxine levels are too high?**
**Answer:** High thyroxine levels speed up metabolism. This can cause weight loss, sweating, nervousness, fast heartbeat, and trouble sleeping. The body tries to fix this by reducing TSH production, which tells the thyroid gland to make less thyroxine and return levels to normal.

**Q285. What is the role of adrenaline in the body?**
**Answer:** Adrenaline is a hormone that helps the body respond to stress or danger. It prepares the body for “fight or flight” by increasing heart rate, breathing rate, and blood flow to muscles. It also raises blood sugar for energy, helping the body react quickly in emergencies.

**Q286. What triggers the release of adrenaline?**
**Answer:** The release of adrenaline is triggered by stress, fear, excitement, or danger. The brain sends signals to the adrenal glands, which quickly release adrenaline into the blood. It helps the body get ready to act fast in an emergency situation.

**Q287. How does adrenaline prepare the body for action?**
**Answer:** Adrenaline prepares the body for action by making the heart beat faster, increasing breathing rate, and sending more blood to the muscles. It also causes pupils to widen and raises blood sugar levels. These changes help the body move quickly, think fast, and fight or run away from danger.

**Q288. What changes occur in the body due to adrenaline?**
**Answer:** When adrenaline is released, heart rate and breathing rate go up, blood is sent to muscles, airways widen, pupils expand, and blood sugar rises. These changes help provide energy and oxygen to the body so it can respond quickly in a stressful situation.

**Q289. Why does adrenaline increase heart rate?**
**Answer:** Adrenaline increases heart rate to pump more blood, carrying oxygen and glucose quickly to the muscles and brain. This gives the body the energy and alertness it needs to react fast in dangerous or stressful situations. It is part of the body's natural survival response.

**Q290. How does adrenaline help muscles during stress?**
**Answer:** Adrenaline helps muscles by increasing blood flow to them and raising blood sugar levels. This gives muscles more oxygen and energy so they can work harder and faster. It also makes muscles more ready to respond, which is useful in emergencies or when facing danger.

**Q291. Where is adrenaline produced?**
**Answer:** Adrenaline is produced by the adrenal glands. These glands sit on top of each kidney. When the brain senses stress or danger, it tells the adrenal glands to release adrenaline into the bloodstream to help the body prepare for quick action.

**Q292. Why is adrenaline not controlled by negative feedback?**
**Answer:** Adrenaline is released quickly during emergencies and only for a short time. It is not needed all the time, so it is not controlled by a constant feedback system. Once the stressful situation is over, the body naturally stops releasing adrenaline and returns to normal.

**Q293. How are oxygen and glucose delivered more quickly during the fight or flight response?**
**Answer:** Adrenaline causes the heart to beat faster and breathing to increase, so more oxygen enters the blood. Blood vessels to muscles widen, sending more blood with oxygen and glucose quickly. This gives muscles the energy they need to act fast in a stressful situation.

**Q294. What is meant by the fight or flight response?**
**Answer:** The fight or flight response is how the body reacts to danger or stress. Adrenaline is released, and changes happen like faster heartbeat, quick breathing, and more blood to muscles. This prepares the body to either fight the threat or run away from it.

**Q295. How do thyroxine and adrenaline differ in their effects?**
**Answer:** Thyroxine controls long-term body processes like metabolism and growth. It works slowly and keeps the body running normally. Adrenaline acts quickly during stress to prepare the body for action. Thyroxine is controlled by negative feedback, while adrenaline is released only when needed.

**Q296. How do stress and fear affect hormone levels?**
**Answer:** Stress and fear cause the brain to send signals to the adrenal glands, which release adrenaline. This causes many quick body changes like faster heart rate and more energy. Long-term stress can also affect other hormones like cortisol, which can impact health over time.

**Q297. Why is the control of thyroxine levels important for health?**
**Answer:** Thyroxine controls metabolism, heart rate, body temperature, and growth. If levels are too low, the body slows down and becomes tired or gains weight. If too high, the body speeds up too much, causing weight loss and heart problems. Keeping it balanced helps the body work properly.

**Q298. What might a diagram of thyroxine feedback show?**
**Answer:** A diagram would show the pituitary gland releasing TSH when thyroxine is low, causing the thyroid to make more thyroxine. When enough thyroxine is in the blood, TSH production is reduced. This keeps thyroxine levels stable, showing a negative feedback loop between TSH and thyroxine.

**Q299. Why is homeostasis important in the hormonal system?**
**Answer:** Homeostasis keeps the body's internal conditions steady, like temperature, water level, and blood sugar. Hormones help carry out this control. Without homeostasis, the body's organs and cells could not work properly, and health problems could develop. Hormones are key to this balance.

**Q300. How does the body keep internal conditions stable using hormones?**
**Answer:** The body uses hormones like insulin, thyroxine, and ADH to control things like blood sugar, metabolism, and water balance. Hormones are released when sensors detect a change. The body then acts to return to normal. This process helps keep internal conditions stable, called homeostasis.

**Q301. What are plant hormones and why are they important for plant growth?**
**Answer:** Plant hormones are chemicals made in plants that control growth and responses to the environment. They help plants grow taller, grow roots, flower, ripen fruits, and respond to light and gravity. Without hormones, plants would not grow properly or be able to react to changes around them.

**Q302. What is phototropism and how does it help plants survive?**
**Answer:** Phototropism is the way plants grow in response to light. Shoots usually grow towards light (positive phototropism), which helps them get more sunlight for photosynthesis. This allows the plant to make more food, grow better, and stay healthy. It is a key way plants adapt to their surroundings.

**Q303. What is gravitropism and why is it also called geotropism?**
**Answer:** Gravitropism (or geotropism) is how plants respond to gravity. Roots grow downward (positive gravitropism), and shoots grow upward (negative gravitropism). This helps roots anchor the plant and find water, while shoots grow towards the light. "Geo" means earth, so it's also called geotropism.

**Q304. What role does auxin play in plant responses to light?**
**Answer:** Auxin is a plant hormone that controls how fast cells grow. In light, auxin moves to the shaded side of the shoot, causing those cells to grow more and bend the shoot towards the light. This helps the plant get more sunlight for photosynthesis and grow better.

**Q305. How does an uneven distribution of auxin affect shoot growth?**
**Answer:** If there's more auxin on one side of the shoot than the other, that side grows faster, causing the shoot to bend. In shoots, auxin makes cells grow more, so when light hits one side, auxin collects on the shaded side and makes it grow more, bending the shoot towards the light.

**Q306. How does auxin influence root growth differently from shoot growth?**
**Answer:** In roots, high levels of auxin slow down cell growth, while in shoots, they speed it up. So if auxin builds up on the lower side of a root due to gravity, it makes that side grow slower, and the root bends downwards. This is the opposite of what happens in shoots.

**Q307. What happens to a plant shoot placed in one-sided light?**
**Answer:** When light hits only one side of a shoot, auxin moves to the darker side. This side grows faster, making the shoot bend towards the light. This helps the plant get more light for photosynthesis. It's a good example of phototropism and how auxin controls plant direction.

**Q308. What is the response of plant roots to gravity?**
**Answer:** Roots show positive gravitropism, which means they grow in the direction of gravity. Auxin collects on the lower side of the root, slowing its growth. The upper side grows faster, and the root bends downward. This helps the root anchor the plant and find water in the soil.

**Q309. How can we observe phototropism in a practical experiment?**
**Answer:** You can grow seedlings in a box with a hole for light on one side. After a few days, you'll see the shoots bend towards the light. This shows how auxin works to make the shoot grow towards the light. It's a simple way to see phototropism in action.

**Q310. How should measurements be recorded in the plant growth practical?**
**Answer:** Measure the length and angle of the seedlings using a ruler and protractor. Record how much the shoot has grown and how much it has bent. Use a table to keep results clear. Taking measurements before and after the experiment helps show how the plants responded to light or gravity.

**Q311. Why are labelled diagrams important when recording plant responses?**
**Answer:** Labelled diagrams show clearly what changes happened to the plant. They make it easy to compare the shape, direction, and growth before and after the experiment. Diagrams help explain results and support written observations, especially when comparing different conditions.

**Q312. What factors must be controlled during a tropism experiment?**
**Answer:** You must control temperature, light intensity (except the direction of light), water, type of seedling, and time of growth. Keeping these factors the same ensures a fair test. Only the variable being tested, like direction of light or gravity, should change.

**Q313. Why are both length and direction of growth measured in the seedling practical?**
**Answer:** Measuring both length and direction shows how much the plant grew and in what way it responded to the stimulus. Length shows how active the growth was, and direction shows if the plant bent toward or away from light or gravity. This gives a full picture of the response.

**Q314. What is the benefit of using seedlings in plant hormone investigations?**
**Answer:** Seedlings are small, grow quickly, and respond clearly to hormones like auxin. Their shoots and roots are easy to observe, and they show results in a short time. This makes it easier to study how plant hormones affect growth and direction of movement.

**Q315. How do plants sense the direction of light?**
**Answer:** Cells at the tip of the shoot detect light. When light hits one side, auxin moves to the shaded side. The shaded side then grows faster, causing the shoot to bend towards the light. This helps the plant grow in the best direction for photosynthesis.

**Q316. How does gravity affect where auxin collects in plant tissues?**
**Answer:** Gravity causes auxin to move to the lower side of both roots and shoots. In shoots, the lower side grows faster, bending the shoot upward. In roots, the lower side grows slower, so the root bends downward. This helps the plant stay upright and send roots into the ground.

**Q317. What changes can be seen in seedlings grown in the dark?**
**Answer:** Seedlings grown in the dark grow tall and thin as they try to find light. They may look pale or yellowish because they don't make much chlorophyll without light. This is called etiolation. It shows how important light is for healthy plant growth and leaf development.

**Q318. What is the difference between positive and negative tropisms?**
**Answer:** In positive tropism, a plant part grows towards a stimulus, like a shoot growing towards light. In negative tropism, the plant grows away from the stimulus, like a root growing away from light. These responses help plants survive by directing growth in the best way.

**Q319. Why is auxin important for plant coordination?**
**Answer:** Auxin helps plants grow in the right direction by controlling cell growth. It allows plants to respond to light and gravity, guiding shoots upward and roots downward. This coordination helps the plant get light for photosynthesis and water from the soil for survival.

**Q320. What are gibberellins and what do they help with in plants?**
**Answer:** Gibberellins are plant hormones that help with seed germination, stem growth, and flowering. They break seed dormancy and allow the plant to start growing. They also make stems grow longer and help some plants flower earlier. They are important in early plant development.

**Q321. What role do gibberellins play in seed germination?**
**Answer:** Gibberellins activate enzymes that break down food stored in the seed, providing energy for the seed to grow. This helps the seedling push through the soil and begin photosynthesis. Without gibberellins, seeds may stay dormant and not sprout properly.

**Q322. How can gibberellins promote flowering in plants?**
**Answer:** Gibberellins can cause flowering in some plants that would not normally flower at certain times. They override the natural controls that delay flowering. Farmers can use them to make plants flower earlier or more evenly, which is useful in commercial growing.

**Q323. Why are gibberellins used to increase fruit size?**
**Answer:** Gibberellins make fruit cells grow larger, which increases the overall size of the fruit. This is especially used in fruits like grapes to make them bigger and more appealing for sale. Bigger fruits can bring higher market value and meet consumer demand.

**Q324. What is ethene and what is its role in fruit ripening?**
**Answer:** Ethene is a gas hormone made by plants. It helps fruits ripen by speeding up chemical changes inside the fruit. These changes soften the fruit, change its colour, and make it sweeter. Ethene is used in farming to ripen fruits like bananas and tomatoes after they are picked.

**Q325. How does ethene help during transport of fruits?**
**Answer:** Fruits can be picked before they are ripe, which makes transport easier and reduces damage. Ethene is then used later to ripen the fruits just before they are sold. This helps farmers and sellers control when fruits are ready to eat, reducing waste and improving quality for shops.

**Q326. Why is the control of fruit ripening important in the food industry?**
**Answer:** Controlling fruit ripening helps fruits stay fresh during storage and transport. Fruits can be picked when unripe and hard, reducing damage. They are ripened later with ethene gas so they are ready to eat when they reach shops. This reduces waste, improves shelf life, and ensures fruits are ripe at the right time for sale.

**Q327. What is tissue culture and how is auxin used in this process?**
**Answer:** Tissue culture is a method of growing new plants from small pieces of plant tissue in special conditions. Auxin is added to the growth medium to help cells divide and form roots and shoots. It allows many new plants to be made from one parent plant, which is useful for cloning rare or useful plants.

**Q328. How do auxins help in producing new plants from cuttings?**
**Answer:** Auxins help cuttings form roots quickly. When a plant cutting is taken and treated with auxin, it encourages cells at the base of the cutting to grow into roots. This helps the cutting develop into a new plant faster and increases the chances of successful growth.

**Q329. What is the role of rooting powder and why is auxin added to it?**
**Answer:** Rooting powder contains auxin and is used to help plant cuttings grow roots. When applied to the base of a cutting, auxin in the powder stimulates root formation, making it easier to grow new plants. It improves success in plant cloning and is useful in gardening and farming.

**Q330. Why are auxins used as weed killers?**
**Answer:** Auxins are used as weed killers because they cause uncontrolled growth in some plants, especially broad-leafed weeds. This abnormal growth damages the weed and leads to its death. Auxin-based weedkillers are selective and do not harm grasses and cereals, which are narrow-leafed.

**Q331. How do auxin-based weedkillers target only certain plants?**
**Answer:** Auxin-based weedkillers are selective. Broad-leafed plants, like dandelions and nettles, absorb more of the chemical than narrow-leafed crops like wheat or grass. The high amount of auxin causes rapid, uncontrolled growth in the weed, which kills it without harming nearby crops.

**Q332. What is the benefit of using selective weedkillers in farming?**
**Answer:** Selective weedkillers kill unwanted weeds without damaging the crops. This helps crops grow better by reducing competition for water, sunlight, and nutrients. It increases crop yield and saves farmers time and effort compared to removing weeds by hand.

**Q333. How can overuse of plant hormones affect biodiversity?**
**Answer:** Overusing plant hormones like weedkillers can harm wild plants, reduce plant variety, and affect

insects and animals that rely on them. Killing too many non-target plants can reduce food and shelter for wildlife, leading to fewer species and upsetting the balance of the ecosystem.

**Q334. What is the environmental risk of hormone-based weed control?**
**Answer:** Hormone-based weedkillers can spread to nearby areas and harm non-target plants, reduce biodiversity, and contaminate water. They may also affect soil health and the animals that feed on treated plants. This can cause long-term damage to ecosystems if not managed carefully.

**Q335. Why is it important to use plant hormones carefully in agriculture?**
**Answer:** Using plant hormones carefully helps protect the environment and avoid harming useful plants or animals. It prevents pollution of soil and water and reduces the chance of harming bees, insects, or other wildlife. Careful use also helps avoid resistance in weeds and keeps farming sustainable.

**Q336. How can gibberellins be used to improve crop production?**
**Answer:** Gibberellins can improve crop production by helping seeds germinate faster, making plants grow taller, and encouraging flowering. They can also make fruits grow bigger and help plants grow even when conditions are not ideal. This leads to better yield and more reliable farming.

**Q337. What are the commercial benefits of using plant hormones in farming?**
**Answer:** Plant hormones help farmers grow more food, produce better-quality crops, and save time. They can control when plants grow, flower, and produce fruit, making harvest easier. Hormones like ethene, auxin, and gibberellins improve storage, reduce waste, and increase profits.

**Q338. Why might farmers delay or speed up fruit ripening?**
**Answer:** Farmers may delay ripening during transport to stop fruit from spoiling. Once fruit reaches its destination, ripening is sped up using ethene gas so it's ready to sell. This control helps deliver ripe, fresh fruit to shops and prevents damage during travel, improving profits.

**Q339. How does controlling plant hormones help in food supply chains?**
**Answer:** Controlling hormones allows farmers and sellers to manage when fruits ripen or when seeds germinate. This helps make sure food is ready at the right time, reduces waste, and keeps food fresh longer. It also helps plan harvests and deliveries more effectively in the food industry.

**Q340. What are some examples of crops treated with gibberellins?**
**Answer:** Grapes, apples, and citrus fruits are often treated with gibberellins to grow larger or ripen more evenly. In cereals like rice or wheat, gibberellins help seeds germinate and grow well. This use improves crop quality and helps increase the amount of food produced.

**Q341. Why is it useful to control seed dormancy with plant hormones?**
**Answer:** Some seeds stay dormant until conditions are right. Using plant hormones like gibberellins can break dormancy and help seeds grow faster and more evenly. This is useful for farming because it allows better control over when crops grow and makes harvests more predictable.

**Q342. How does ethene influence cell division?**
**Answer:** Ethene speeds up cell division and the breakdown of cell walls in fruit, which helps it ripen. It makes cells work faster, causing fruits to soften, sweeten, and change colour. Ethene helps control fruit ripening and is important in getting fruits ready for sale and eating.

**Q343. What advantages do hormones offer over mechanical methods in agriculture?**
**Answer:** Hormones are easier to apply and can cover large areas quickly. They reduce the need for manual work like weeding or trimming and allow better control of plant growth, ripening, and flowering. This saves time, money, and effort while improving results in farming.

**Q344. How might hormone use affect non-target plant species?**
**Answer:** Hormones like weedkillers can affect nearby plants that weren't meant to be treated. If sprayed carelessly, they can harm flowers, trees, or crops that are sensitive. This may reduce biodiversity and harm insects and animals that depend on those plants.

**Q345. How are plant hormones transported in the plant body?**
**Answer:** Plant hormones are made in one part of the plant and moved around through the phloem or from cell to cell. For example, auxin is made in shoot tips and moves down to other parts. Hormones travel to where they're needed to control growth and responses to the environment.

**Q346. What precautions are taken when using plant hormones in greenhouses?**
**Answer:** In greenhouses, workers use the right amounts of hormones to avoid harming plants. They control temperature, light, and moisture to make sure hormones work properly. Safety rules are followed to protect people and prevent damage to useful plants or the environment.

**Q347. How could hormone misuse affect pollinators?**
**Answer:** If plant hormones are misused, they could harm flowers or reduce nectar, making it harder for bees and other pollinators to find food. Some chemicals may be toxic to insects. This can reduce pollination, affect crop yield, and harm biodiversity in the area.

**Q348. Why should plant hormone levels be monitored in food production?**
**Answer:** Monitoring ensures hormone levels are safe for people and the environment. Too much hormone can harm plants, reduce quality, or leave residues in food. Careful control helps produce healthy crops, protects wildlife, and follows food safety laws.

**Q349. What is a practical way to test the effect of auxin on root growth?**
**Answer:** You can grow plant cuttings or seedlings in trays with different amounts of auxin and compare root growth. Measure the number and length of roots over time. By keeping other conditions the same, you can see how auxin affects root development clearly.

**Q350. How do plant hormone technologies demonstrate applied biology in agriculture?**
**Answer:** Plant hormone use shows how science is used to solve real-life farming problems. Hormones help control plant growth, fruit ripening, and weed control. This use of biology improves food production, saves resources, and helps meet the needs of growing populations.