

CLASS 10 • BIOLOGY

Homeostasis MCQ Bank

CHAPTER 11

93 Solved MCQs with Detailed Explanations

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Solved MCQs

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Topic Sections



Answers Highlighted

1 Introduction to Homeostasis

10 MCQs

Q1 What is the primary definition of homeostasis?

- A** The constant change of internal conditions to match the external environment.
- B** The maintenance of internal conditions of the body at equilibrium, despite changes in the external environment. ✓
- C** The process of eliminating all metabolic wastes from the body.
- D** The regulation of body temperature only.

✓ **Correct Answer: B** The maintenance of internal conditions of the body at equilibrium, despite changes in the external environment.

 **Explanation** Homeostasis is the body's ability to maintain a stable internal environment (like temperature and blood glucose) even when the outside environment changes.

Q2 The core temperature of the human body remains at approximately:

- A** 35°C
- B** 37°C ✓
- C** 39°C
- D** 40°C

✓ **Correct Answer: B** 37°C

 **Explanation** The text specifically mentions that the core temperature of the human body remains at about 37°C despite fluctuations in the surrounding air temperature.

Q3 What is the normal blood glucose level maintained in the human body?

A About 1g per litre ✓

B About 2g per litre

C About 5g per litre

D About 10g per litre

✓ **Correct Answer: A** About 1g per litre

 **Explanation** Homeostasis ensures the blood glucose level remains about 1g per litre, even after eating a meal rich in carbohydrates.

Q4 Why is a stable internal environment important for the body?

A It prevents the body from growing.

B It is important for the efficient functioning of enzymes. ✓

C It stops the production of metabolic wastes.

D It increases the body temperature.

✓ **Correct Answer: B** It is important for the efficient functioning of enzymes.

 **Explanation** Enzymes work best under specific, stable conditions. Any significant change in the internal environment can affect their functioning.

Q5 Which of the following is NOT one of the three main processes of homeostasis mentioned?

A Osmoregulation

B Thermoregulation

C Excretion

D Photosynthesis ✓

✓ **Correct Answer: D** **Photosynthesis**

 **Explanation** Photosynthesis is a process in plants to make food. The three homeostatic processes in animals are Osmoregulation (water/salt balance), Thermoregulation (temperature), and Excretion (waste removal).

Q6 The maintenance of the amounts of water and salts in body fluids is called:

A Thermoregulation

B Osmoregulation ✓

C Excretion

D Respiration

✓ **Correct Answer: B** **Osmoregulation**

 **Explanation** Osmoregulation specifically deals with maintaining the balance of water and salts (electrolytes) in blood and tissue fluids.

Q7 What defines "metabolic waste"?

A Any material produced during body metabolism that may harm the body. ✓

B Any food material that is not digested.

C Any substance that is beneficial to the body.

D Oxygen produced during photosynthesis.

✓ **Correct Answer: A** Any material produced during body metabolism that may harm the body.

 **Explanation** Metabolic waste refers to harmful byproducts generated during normal metabolic processes within the body, which must be excreted.

Q8 The maintenance of internal body temperature is called:

A Osmoregulation

B Excretion

C Thermoregulation ✓

D Digestion

✓ **Correct Answer: C** Thermoregulation

 **Explanation** Thermoregulation is the biological process that allows an organism to keep its body temperature within certain boundaries, even when the surrounding temperature is very different.

Q9 Enzymes in the body work best at their:

A Optimal temperature ✓

B Freezing point

C Boiling point

D Variable temperature

✓ **Correct Answer: A** Optimal temperature

 **Explanation** Enzymes are sensitive to temperature. They function most efficiently at a specific optimal temperature, and deviations can reduce their activity or denature them.

Q10 In plants, homeostasis involves maintaining internal conditions constant by responding to:

A Only water availability

B Environmental changes ✓

C Only temperature changes

D Animal behavior

✓ **Correct Answer: B** Environmental changes

 **Explanation** Plants, like animals, must respond to environmental changes (like light, temperature, water availability) to keep their internal conditions constant.

2 Homeostasis in Plants: Gases and Water

10 MCQs

Q11 During the daytime, why is carbon dioxide not considered a waste product in plants?

A It is stored in the leaves.

B It is utilized in photosynthesis. ✓

C It is released through the roots.

D It is converted into oxygen.

✓ **Correct Answer: B** It is utilized in photosynthesis.

 **Explanation** During the day, plants undergo photosynthesis, which consumes carbon dioxide. Therefore, the CO_2 produced by respiration is used up and not excreted as waste.

Q12 At night, how is surplus carbon dioxide removed from plant tissues?

A Through the roots

B Through the stomata by diffusion ✓

C Through the stem

D It is stored as calcium oxalate

✓ **Correct Answer: B** Through the stomata by diffusion

 **Explanation** At night, photosynthesis stops, so CO_2 accumulates. It is removed from leaves and young stems through the stomata via diffusion.

Q13 Oxygen is produced in mesophyll cells as a by-product of:

A Respiration

B **Photosynthesis** ✓

C Transpiration

D Guttation

✓ **Correct Answer: B** **Photosynthesis**

 **Explanation** Oxygen is generated during the light-dependent reactions of photosynthesis in the mesophyll cells of the leaves.

Q14 How do leaf cells remove the extra amount of oxygen after utilizing it in respiration?

A Through the roots

B **Through the stomata** ✓

C Through the xylem

D Through the phloem

✓ **Correct Answer: B** **Through the stomata**

 **Explanation** Just like CO_2 , excess oxygen diffuses out of the leaf cells and exits the plant through the stomata.

Q15 The loss of water from the plant surface in the form of vapours is called:

A Guttation

B **Transpiration** ✓

C Osmosis

D Diffusion

✓ **Correct Answer: B** **Transpiration**

 **Explanation** Transpiration is the process of water movement through a plant and its evaporation from aerial parts, such as leaves, stems, and flowers.

Q16 What is "guttation"?

- A** The loss of water vapor through stomata.
- B** The appearance of drops of water on the tips or edges of leaves. ✓
- C** The condensation of atmospheric water on plant surfaces.
- D** The absorption of water by roots.

✓ **Correct Answer: B** The appearance of drops of water on the tips or edges of leaves.

 **Explanation** Guttation occurs when root pressure forces water out of special pores (hydathodes) at the tips or edges of leaves, forming visible water droplets.

Q17 Guttation is commonly observed in plants such as:

- A** Cacti
- B** Grasses ✓
- C** Rubber plants
- D** Coniferous trees

✓ **Correct Answer: B** Grasses

 **Explanation** The text specifies that some plants like grasses force water through special pores at leaf tips, forming drops (guttation).

Q18 Why does transpiration usually not occur at night?

A Because roots stop absorbing water.

B Because most plants have their stomata closed. ✓

C Because the temperature is too low.

D Because guttation takes over.

✓ **Correct Answer: B** Because most plants have their stomata closed.

 **Explanation** Transpiration requires stomata to be open. At night, to conserve water, most plants close their stomata, halting transpiration.

Q19 How is guttation different from dew?

A Guttation is water from inside the plant; dew condenses from the atmosphere. ✓

B Guttation occurs at night; dew occurs during the day.

C Guttation is saltwater; dew is freshwater.

D There is no difference.

✓ **Correct Answer: A** Guttation is water from inside the plant; dew condenses from the atmosphere.

 **Explanation** The text explicitly states that guttation (water from inside the plant pushed out by root pressure) is not to be confused with dew, which is atmospheric moisture condensing on the plant surface.

Q20 Which force pushes water out of the special pores during guttation?

A Transpiration pull

B Root pressure ✓

C Capillary action

D Osmotic pressure from leaves

✓ **Correct Answer: B** Root pressure

 **Explanation** When transpiration is low (e.g., at night) and soil water is high, root pressure builds up and forces water out through special pores, causing guttation.

3 Plants: Other Wastes and Osmotic Adjustments

16 MCQs

Q21 In what form do plants deposit many metabolic wastes in their bodies?

A As harmful soluble gases

B As harmless insoluble materials ✓

C As liquid acids

D As toxic salts

✓ **Correct Answer: B** As harmless insoluble materials

 **Explanation** Plants often convert toxic metabolic wastes into harmless, insoluble forms (like crystals) and store them in tissues, such as vacuoles or cell walls.

Q22 Calcium oxalate is deposited in the leaves and stems of plants like tomato in the form of:

A Gas

B Crystals ✓

C Liquid

D Resin

✓ **Correct Answer: B** Crystals

 **Explanation** The text highlights that calcium oxalate is deposited as harmless insoluble crystals in the leaves and stems of many plants, such as tomatoes.

Q23 How do deciduous trees primarily remove excretory products?

A Through guttation

B Through leaf fall ✓

C Through the bark

D Through the roots

✓ **Correct Answer: B** Through leaf fall

 **Explanation** In trees that shed leaves yearly, excretory products stored in the leaves are removed from the body when the leaves fall off.

Q24 Which of the following is a waste material removed by coniferous trees?

A Latex

B Gums

C Resins ✓

D Mucilage

✓ **Correct Answer: C** Resins

 **Explanation** Coniferous trees remove their waste materials in the form of resins.

Q25 Keekar trees remove their waste materials in the form of:

A Resins

B Gums ✓

C Latex

D Mucilage

✓ **Correct Answer: B** Gums

 **Explanation** The text specifies that keekar trees remove waste materials as gums.

Q26 Rubber plants remove their waste materials in the form of:

A Resins

B Gums

C Latex ✓

D Mucilage

✓ **Correct Answer: C** Latex

 **Explanation** Rubber plants excrete waste materials as latex.

Q27 Plants living completely or partially submerged in freshwater are called:

A Xerophytes

B Halophytes

C Hydrophytes ✓

D Succulents

✓ **Correct Answer: C** Hydrophytes

 **Explanation** Hydrophytes are plants adapted to live in water (freshwater). They do not face water shortage.

Q28 Which adaptation helps hydrophytes remove extra water?

A Thick waxy cuticle

B Broad leaves with a large number of stomata ✓

C Deep roots

D Succulent organs

✓ **Correct Answer: B** Broad leaves with a large number of stomata

 **Explanation** Hydrophytes have broad leaves with numerous stomata on their upper surfaces to facilitate the removal of extra water.

Q29 Plants living in dry environments are called:

A Hydrophytes

B Halophytes

C Xerophytes ✓

D Mesophytes

✓ **Correct Answer: C** Xerophytes

 **Explanation** Xerophytes are plants adapted to survive in dry environments with limited water availability.

Q30 Which of the following is an adaptation of xerophytes to reduce water loss?

A Broad leaves

B Thick waxy cuticle over the epidermis ✓

C A large number of stomata

D Shallow roots

✓ **Correct Answer: B** Thick waxy cuticle over the epidermis

 **Explanation** Xerophytes possess a thick waxy cuticle to minimize water loss from internal tissues through evaporation.

Q31 Succulent organs in xerophytes are specialized to:

A Absorb maximum water

B Store large quantities of water ✓

C Reduce transpiration

D Perform photosynthesis

✓ **Correct Answer: B** Store large quantities of water

 **Explanation** Some xerophytes have special parenchyma cells in stems or roots that store water, making them fleshy or succulent.

Q32 Which of the following is a common example of a xerophyte?

A Water lily

B Cacti ✓

C Sea grass

D Tomato

✓ **Correct Answer: B** Cacti

 **Explanation** Cacti are classic examples of xerophytes, adapted to survive in arid environments with water-storing tissues and reduced leaves (spines).

Q33 Plants living in sea waters and adapted to salty environments are called:

A Hydrophytes

B Xerophytes

C Halophytes ✓

D Succulents

✓ **Correct Answer: C** Halophytes

 **Explanation** Halophytes are salt-tolerant plants that live in sea waters or saline environments.

Q34 In halophytes, why does water tend to move out of their cells into the sea water?

A Because sea water is hypotonic to their cells.

B Because sea water is hypertonic to their cells. ✓

C Because they have thick waxy cuticles.

D Because they lack stomata.

✓ **Correct Answer: B** Because sea water is hypertonic to their cells.

 **Explanation** Sea water has a higher salt concentration (hypertonic) than the plant's normal cell sap. Osmosis dictates that water moves from a hypotonic solution to a hypertonic solution, so water moves out.

Q35 How do halophytes prevent water loss to the hypertonic sea water?

A By closing their stomata permanently.

B By actively transporting salts into their vacuoles to make sap hypertonic. ✓

C By storing water in succulent stems.

D By shedding their leaves.

✓ **Correct Answer: B** By actively transporting salts into their vacuoles to make sap hypertonic.

 **Explanation** Halophytes actively transport salts into their cell vacuoles. This increases the salt concentration inside the vacuoles, making the sap hypertonic to sea water, which prevents water from leaving the cells.

Q36 Which of the following is an example of a halophyte?

A Water lily

B Cacti

C Sea grasses ✓

D Keekar

✓ **Correct Answer: C** Sea grasses

 **Explanation** The text explicitly mentions that many sea grasses are included in the group of halophytes.

4 Homeostasis in Humans: Skin and Lungs

9 MCQs

Q37 Which organs work together for homeostasis in humans?

A Lungs, Skin, and Kidney ✓

B Heart, Liver, and Stomach

C Brain, Lungs, and Intestines

D Skin, Bones, and Muscles

✓ **Correct Answer: A** Lungs, Skin, and Kidney

 **Explanation** The text lists the lungs (CO₂ removal), skin (temperature, water, salt regulation), and kidneys (filtration of waste, water, salt balance) as the main organs for homeostasis.

Q38 The skin consists of two layers: the outer protective layer is called:

A Dermis

B Epidermis ✓

C Hypodermis

D Endodermis

✓ **Correct Answer: B** Epidermis

 **Explanation** The skin's outer layer is the epidermis, which is protective and lacks blood vessels.

Q39 Which layer of the skin contains blood vessels, sensory nerve endings, and sweat glands?

A Epidermis

B Dermis ✓

C Hypodermis

D Cuticle

✓ **Correct Answer: B** Dermis

 **Explanation** The dermis is the inner layer of the skin and contains blood vessels, sensory nerve endings, sweat and oil glands, and hair follicles.

Q40 What is the role of the thin layer of fat cells in the dermis?

A To produce sweat

B To insulate the body ✓

C To detect temperature

D To grow hair

✓ **Correct Answer: B** To insulate the body

 **Explanation** The fat cells in the dermis act as an insulating layer, helping to regulate body temperature by reducing heat loss.

Q41 What causes "goosebumps" when a person is cold?

A Relaxation of small muscles attached to hairs.

B Contraction of small muscles attached to hairs. ✓

C Evaporation of sweat.

D Dilation of blood vessels.

✓ **Correct Answer: B** Contraction of small muscles attached to hairs.

 **Explanation** When cold, tiny muscles attached to hair follicles contract, causing the hairs to stand up (goosebumps). This creates an insulating blanket of warm air.

Q42 How does the skin help in cooling the body?

A By shivering

B By producing sweat, which evaporates and releases heat. ✓

C By constricting blood vessels.

D By growing more hair.

✓ **Correct Answer: B** By producing sweat, which evaporates and releases heat.

 **Explanation** Sweat glands produce sweat. As sweat evaporates from the skin surface, it absorbs heat from the body, providing a cooling effect.

Q43 Which metabolic wastes are removed from the body in sweat?

A Carbon dioxide and oxygen

B Excess water, salts, urea, and uric acid ✓

C Glucose and amino acids

D Proteins and fats

✓ **Correct Answer: B** Excess water, salts, urea, and uric acid

 **Explanation** Sweat contains water, salts, and small amounts of metabolic wastes like urea and uric acid.

Q44 How do the lungs contribute to homeostasis?

A By regulating body temperature.

B By maintaining the concentration of carbon dioxide in the blood. ✓

C By filtering excess salts.

D By producing sweat.

✓ **Correct Answer: B** By maintaining the concentration of carbon dioxide in the blood.

 **Explanation** The lungs remove excess carbon dioxide (a metabolic waste produced during cellular respiration) from the blood and release it into the air.

Q45 What is the pathway of carbon dioxide from cells to the lungs?

A Cells -> Blood -> Tissue fluid -> Lungs

B Cells -> Tissue fluid -> Blood -> Lungs ✓

C Cells -> Lungs -> Blood -> Tissue fluid

D Cells -> Blood -> Lungs -> Tissue fluid

✓ **Correct Answer: B** Cells -> Tissue fluid -> Blood -> Lungs

 **Explanation** CO₂ diffuses from cells into tissue fluid, then into the blood. The blood carries it to the lungs where it is removed in the air.

5 The Urinary System and Kidney Structure

15 MCQs

Q46 The excretory system of humans is also called the:

A Respiratory system

B Urinary system ✓

C Digestive system

D Circulatory system

✓ **Correct Answer: B** Urinary system

 **Explanation** The urinary system is the primary excretory system in humans, responsible for removing metabolic wastes from the blood.

Q47 Which of the following is NOT a component of the human urinary system?

A Kidneys

B Ureters

C Urinary bladder

D Liver ✓

✓ **Correct Answer: D** Liver

 **Explanation** The urinary system consists of a pair of kidneys, a pair of ureters, a urinary bladder, and a urethra. The liver is part of the digestive and metabolic systems.

Q48 What is the function of the ureters?

A To store urine.

B To carry urine from kidneys to the urinary bladder. ✓

C To carry urine out of the body.

D To filter blood.

✓ **Correct Answer: B** To carry urine from kidneys to the urinary bladder.

 **Explanation** Ureters are tubes that transport urine from the kidneys to the urinary bladder.

Q49 What is the function of the urethra?

A To carry urine from the bladder to the outside of the body. ✓

B To carry urine from the kidneys to the bladder.

C To filter blood.

D To store urine.

✓ **Correct Answer: A** To carry urine from the bladder to the outside of the body.

 **Explanation** The urethra is the tube that carries urine from the urinary bladder to the outside of the body.

Q50 Which organ temporarily stores urine until it is released?

A Kidney

B Ureter

C Urinary bladder ✓

D Urethra

✓ **Correct Answer: C** Urinary bladder

 **Explanation** The urinary bladder is a muscular sac that temporarily stores urine before urination.

Q51 Describe the physical characteristics of the kidneys.

A Light red, round, and soft.

B Dark-red, bean-shaped organs. ✓

C Yellow, oval-shaped organs.

D Pale, star-shaped organs.

✓ **Correct Answer: B** Dark-red, bean-shaped organs.

 **Explanation** The text describes the kidneys as dark-red, bean-shaped organs.

Q52 What is the approximate weight of an adult human kidney?

A 50 grams

B 120 grams ✓

C 250 grams

D 500 grams

✓ **Correct Answer: B** 120 grams

 **Explanation** Each kidney weighs about 120 grams.

Q53 Where are the kidneys located in the human body?

- A** In the chest cavity, above the lungs.
- B** Against the back wall of the abdominal cavity, just below the diaphragm. ✓
- C** In the pelvic cavity.
- D** Behind the stomach.

✓ **Correct Answer: B** Against the back wall of the abdominal cavity, just below the diaphragm.

 **Explanation** The kidneys are located against the back wall of the abdominal cavity, just below the diaphragm, on either side of the vertebral column.

Q54 Which ribs protect the kidneys?

- A** The last 2 ribs ✓
- B** The first 2 ribs
- C** The middle 6 ribs
- D** They are not protected by ribs.

✓ **Correct Answer: A** The last 2 ribs

 **Explanation** The text states that the kidneys are protected by the last 2 ribs.

Q55 Which kidney is slightly higher than the other?

A The right kidney

B The left kidney ✓

C They are at the same level

D It varies from person to person

✓ **Correct Answer: B** The left kidney

 **Explanation** The left kidney is a little higher than the right kidney due to the presence of the liver on the right side.

Q56 What is the "hilus" of the kidney?

A The outer protective layer.

B A depression near the center of the concave area where vessels and nerves enter/leave. ✓

C The inner pale region.

D The funnel-shaped cavity.

✓ **Correct Answer: B** A depression near the center of the concave area where vessels and nerves enter/leave.

 **Explanation** The hilus is the indentation on the concave side of the kidney through which the ureter, blood vessels, lymphatic vessels, and nerves enter and leave.

Q57 What are the two main regions of the kidney seen in a longitudinal section?

A Epidermis and dermis

B Renal cortex and renal medulla ✓

C Renal pelvis and ureter

D Hilus and renal pelvis

✓ **Correct Answer: B Renal cortex and renal medulla**

 **Explanation** The longitudinal section reveals the outer renal cortex (dark red) and the inner renal medulla (pale red).

Q58 The outer part of the kidney, which is dark red in color, is called:

A Renal medulla

B Renal pelvis

C Renal cortex ✓

D Renal pyramid

✓ **Correct Answer: C Renal cortex**

 **Explanation** The renal cortex is the outer region of the kidney and is dark red in color.

Q59 What are the cone-shaped areas in the renal medulla called?

A Renal pyramids ✓

B Renal pelvis

C Nephrons

D Collecting ducts

✓ **Correct Answer: A Renal pyramids**

 **Explanation** The renal medulla consists of several cone-shaped areas called renal pyramids.

Q60 The funnel-shaped cavity that collects urine and forms the base of the ureter is the:

A Renal cortex

B Renal medulla

C Renal pelvis ✓

D Bowman's capsule

✓ **Correct Answer: C** Renal pelvis

 **Explanation** The renal pyramids project into a funnel-shaped cavity called the renal pelvis, which narrows to become the ureter.

6 The Nephron and Urine Formation

19 MCQs

Q61 What is the functional unit of the kidney?

A Neuron

B Nephron ✓

C Alveolus

D Villus

✓ **Correct Answer: B** Nephron

 **Explanation** The nephron is the basic structural and functional unit of the kidney, responsible for filtering blood and forming urine.

Q62 How many nephrons are approximately present in each kidney?

A 10,000

B 100,000

C Over one million ✓

D Over ten million

✓ **Correct Answer: C** Over one million

 **Explanation** The text states there are over one million nephrons in each kidney.

Q63 The renal corpuscle consists of two parts:

A Glomerulus and Bowman's capsule ✓

B Proximal and distal convoluted tubules

C Loop of Henle and collecting duct

D Renal cortex and medulla

✓ **Correct Answer: A** Glomerulus and Bowman's capsule

 **Explanation** The renal corpuscle is composed of the glomerulus (a network of capillaries) and Bowman's capsule (a cup-shaped structure enclosing the glomerulus).

Q64 What is the glomerulus?

A A cup-shaped structure.

B A network of capillaries. ✓

C A U-shaped tube.

D A collecting duct.

✓ **Correct Answer: B** A network of capillaries.

 **Explanation** The glomerulus is a tuft or network of high-pressure capillaries located within Bowman's capsule.

Q65 The part of the nephron that starts after Bowman's capsule is called:

A Loop of Henle

B Collecting duct

C Renal tubule ✓

D Renal pelvis

✓ **Correct Answer: C** Renal tubule

 **Explanation** The renal tubule is the part of the nephron that begins after Bowman's capsule and consists of the proximal convoluted tubule, Loop of Henle, and distal convoluted tubule.

Q66 What is the correct sequence of the renal tubule?

A Proximal convoluted tubule -> Loop of Henle -> Distal convoluted tubule ✓

B Distal convoluted tubule -> Loop of Henle -> Proximal convoluted tubule

C Loop of Henle -> Proximal convoluted tubule -> Distal convoluted tubule

D Collecting duct -> Distal convoluted tubule -> Loop of Henle

✓ **Correct Answer: A** Proximal convoluted tubule -> Loop of Henle -> Distal convoluted tubule

 **Explanation** The filtrate flows from Bowman's capsule into the proximal convoluted tubule, then down the descending limb, through the Loop of Henle, up the ascending limb, and into the distal convoluted tubule.

Q67 The first step in urine formation is:

A Selective re-absorption

B Tubular secretion

C Pressure filtration ✓

D Osmosis

✓ **Correct Answer: C** Pressure filtration

 **Explanation** Pressure filtration occurs first, where high blood pressure in the glomerulus forces water, salts, glucose, and urea into Bowman's capsule.

Q68 What drives pressure filtration in the glomerulus?

A Osmotic pressure

B High blood pressure ✓

C Active transport

D Diffusion

✓ **Correct Answer: B** High blood pressure

 **Explanation** Blood enters the glomerulus under high pressure, which forces small molecules out of the capillaries into Bowman's capsule.

Q69 The fluid filtered into Bowman's capsule is called:

A Urine

B Glomerular filtrate ✓

C Blood plasma

D Tissue fluid

✓ **Correct Answer: B** Glomerular filtrate

 **Explanation** The material forced out of the glomerular capillaries into Bowman's capsule is called the glomerular filtrate.

Q70 Why are blood cells and proteins NOT filtered into Bowman's capsule?

- A** They are too small.
- B** They are relatively larger in size. ✓
- C** They are actively transported back.
- D** They are dissolved in plasma.

✓ **Correct Answer: B** They are relatively larger in size.

 **Explanation** Blood cells and proteins are too large to pass through the pores of the glomerular capillaries and are therefore retained in the blood.

Q71 In selective re-absorption, what percentage of the glomerular filtrate is reabsorbed into the blood capillaries?

- A** 50%
- B** 75%
- C** 99% ✓
- D** 100%

✓ **Correct Answer: C** 99%

 **Explanation** The text states that about 99% of the glomerular filtrate is reabsorbed into the blood capillaries surrounding the renal tubule.

Q72 Where does the majority of water and glucose re-absorption occur?

A Distal convoluted tubule

B Loop of Henle

C Proximal convoluted tubule ✓

D Collecting duct

✓ **Correct Answer: C** Proximal convoluted tubule

 **Explanation** Most water and glucose are reabsorbed from the proximal convoluted tubule through osmosis, diffusion, and active transport.

Q73 What is the role of the descending limb of the Loop of Henle?

A Allows re-absorption of salts.

B Allows re-absorption of water. ✓

C Secretes urea.

D Filters blood.

✓ **Correct Answer: B** Allows re-absorption of water.

 **Explanation** The descending limb of the Loop of Henle is permeable to water, allowing its re-absorption.

Q74 What is the role of the ascending limb of the Loop of Henle?

- A** Allows re-absorption of salts. ✓
- B** Allows re-absorption of water.
- C** Secretes glucose.
- D** Filters blood.

✓ **Correct Answer: A** Allows re-absorption of salts.

 **Explanation** The ascending limb of the Loop of Henle allows the re-absorption of salts.

Q75 The third step in urine formation, where ions, creatinine, and urea are secreted from blood into the filtrate, is called:

- A** Pressure filtration
- B** Selective re-absorption
- C** Tubular secretion ✓
- D** Osmosis

✓ **Correct Answer: C** Tubular secretion

 **Explanation** Tubular secretion involves the active transport of substances like ions, creatinine, and urea from the blood into the renal tubule to maintain blood pH and remove wastes.

Q76 What is the purpose of tubular secretion?

A To increase urine volume.

B To maintain blood at a normal pH (7.35 to 7.45). ✓

C To reabsorb glucose.

D To filter blood cells.

✓ **Correct Answer: B** To maintain blood at a normal pH (7.35 to 7.45).

 **Explanation** Tubular secretion helps regulate blood pH by secreting excess ions (like hydrogen and potassium) and other waste products into the filtrate.

Q77 What is the typical volume of urine produced by an average adult per day?

A 0.5 litres

B 1.4 litres ✓

C 3.0 litres

D 5.0 litres

✓ **Correct Answer: B** 1.4 litres

 **Explanation** The text states that the typical volume of urine produced by an average adult is around 1.4 litres per day.

Q78 What percentage of water is present in normal human urine?

A 50%

B 75%

C 95% ✓

D 99%

✓ Correct Answer: C 95%

Explanation Table 11.1 shows that normal urine composition is 95% water.

Q79 Which of the following is the most abundant solute in urine?

A Urea ✓

B Chloride ions

C Sodium ions

D Potassium ions

✓ Correct Answer: A Urea

Explanation According to the table, urea is present at 9.3 g/l, which is significantly higher than the other listed solutes.

7

Osmoregulation and Kidney Disorders

14 MCQs

Q80 What is osmoregulation?

- ☐ A Regulation of body temperature.
- ☒ B Regulation of the concentration of water and salts in blood and other body fluids. ✓
- ☐ C Regulation of blood glucose.
- ☐ D Removal of undigested food.

✓ **Correct Answer: B** Regulation of the concentration of water and salts in blood and other body fluids.

 **Explanation** Osmoregulation is the homeostatic control of water and electrolyte balance in the body.

Q81 When there is excess water in body fluids, the kidneys form:

- ☐ A Concentrated (hypertonic) urine
- ☒ B Dilute (hypotonic) urine ✓
- ☐ C No urine
- ☐ D Blood

✓ **Correct Answer: B** Dilute (hypotonic) urine

 **Explanation** To remove excess water, the kidneys filter more water and reabsorb less, producing a large amount of dilute (hypotonic) urine.

Q82 When there is a shortage of water in body fluids, the kidneys form:

A Dilute (hypotonic) urine

B Concentrated (hypertonic) urine ✓

C Large amounts of urine

D Glucose in urine

✓ **Correct Answer: B** Concentrated (hypertonic) urine

 **Explanation** To conserve water, the kidneys filter less water and increase reabsorption, producing a small amount of concentrated (hypertonic) urine.

Q83 What are kidney stones primarily made of?

A Blood clots

B Crystals of salts like calcium oxalate and uric acid ✓

C Proteins

D Glucose

✓ **Correct Answer: B** Crystals of salts like calcium oxalate and uric acid

 **Explanation** Kidney stones are hard deposits formed from concentrated urine, consisting of crystals of salts like calcium oxalate, calcium phosphate, and uric acid.

Q84 Which of the following is a major cause of kidney stones?

A High water intake

B Low intake of water ✓

C Eating too much sugar

D Excessive exercise

✓ **Correct Answer: B** Low intake of water

 **Explanation** Low water intake leads to concentrated urine, which promotes the formation of salt crystals and kidney stones.

Q85 What is "Lithotripsy"?

A Surgical removal of the kidney.

B Using non-electrical shock waves to break kidney stones. ✓

C Dialysis of the kidney.

D A kidney transplant.

✓ **Correct Answer: B** Using non-electrical shock waves to break kidney stones.

 **Explanation** Lithotripsy is a non-invasive medical procedure that uses shock waves to break dense kidney stones into sand-like particles that can be passed through urine.

Q86 What is the main cause of kidney failure mentioned in the text?

A Excessive water intake

B Diabetes mellitus and hypertension ✓

C Lack of exercise

D High protein diet

✓ **Correct Answer: B** Diabetes mellitus and hypertension

 **Explanation** The text identifies diabetes mellitus and hypertension as the leading causes of kidney failure.

Q87 What is dialysis?

A The cleaning of blood by artificial ways. ✓

B The surgical removal of the kidney.

C The transplantation of a kidney.

D The formation of urine.

✓ **Correct Answer: A** The cleaning of blood by artificial ways.

 **Explanation** Dialysis is a medical procedure that artificially removes waste products and excess fluid from the blood when the kidneys can no longer do so.

Q88 Which type of dialysis involves pumping dialysis fluid into the peritoneal cavity?

A Haemodialysis

B Peritoneal dialysis ✓

C Lithotripsy

D Transplant

✓ **Correct Answer: B** Peritoneal dialysis

 **Explanation** Peritoneal dialysis uses the peritoneum (the membrane lining the abdominal cavity) as a natural filter to remove wastes from the blood.

Q89 In haemodialysis, what is the apparatus called that contains long tubes acting as semi-permeable membranes?

A Dialyzer ✓

B Catheter

C Stethoscope

D Endoscope

✓ **Correct Answer: A** Dialyzer

 **Explanation** The dialyzer (artificial kidney) contains semi-permeable membranes that filter waste from the blood during haemodialysis.

Q90 What is a kidney transplant?

A Cleaning the blood using a machine.

B Replacing a damaged kidney with a healthy donor kidney. ✓

C Removing kidney stones.

D Dialysis of the kidney.

✓ **Correct Answer: B** Replacing a damaged kidney with a healthy donor kidney.

Explanation A kidney transplant is a surgical procedure to place a healthy kidney from a donor into a person whose kidneys are no longer functioning properly.

Q91 What is the average lifetime of a donated kidney?

A 1-2 years

B 5-8 years

C 10-15 years ✓

D 20-30 years

✓ **Correct Answer: C** 10-15 years

Explanation The text states that the average lifetime for a donated kidney is ten to fifteen years.

Q92 What are potential problems after a kidney transplant?

A Transplant rejection, infections, and imbalances in body salts. ✓

B Improved kidney function and overall health.

C Immediate formation of kidney stones.

D Complete loss of blood pressure.

✓ **Correct Answer: A** Transplant rejection, infections, and imbalances in body salts.

 **Explanation** The body's immune system may reject the new kidney (transplant rejection), and patients are susceptible to infections and electrolyte imbalances due to immunosuppressive drugs.

Q93 Which famous scientist is credited with writing an encyclopedia containing over 200 surgical medical instruments, including tools for stone removal?

A Abu Nasr al-Farabi

B Abu al-Qasim Al-Zahrawi (Albucasis) ✓

C Ibn Sina

D Al-Razi

✓ **Correct Answer: B** Abu al-Qasim Al-Zahrawi (Albucasis)

 **Explanation** The text highlights Al-Zahrawi's encyclopedia "Al-Tasrif," which contained over 200 surgical medical instruments he personally designed, including those for stone removal.

END OF CHAPTER 11

Keep Learning, Keep **Growing!**

You have completed all 93 MCQs on Homeostasis — from plant adaptations and skin to kidney structure, urine formation and disorders.

Revise the explanations regularly to master the chapter.

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