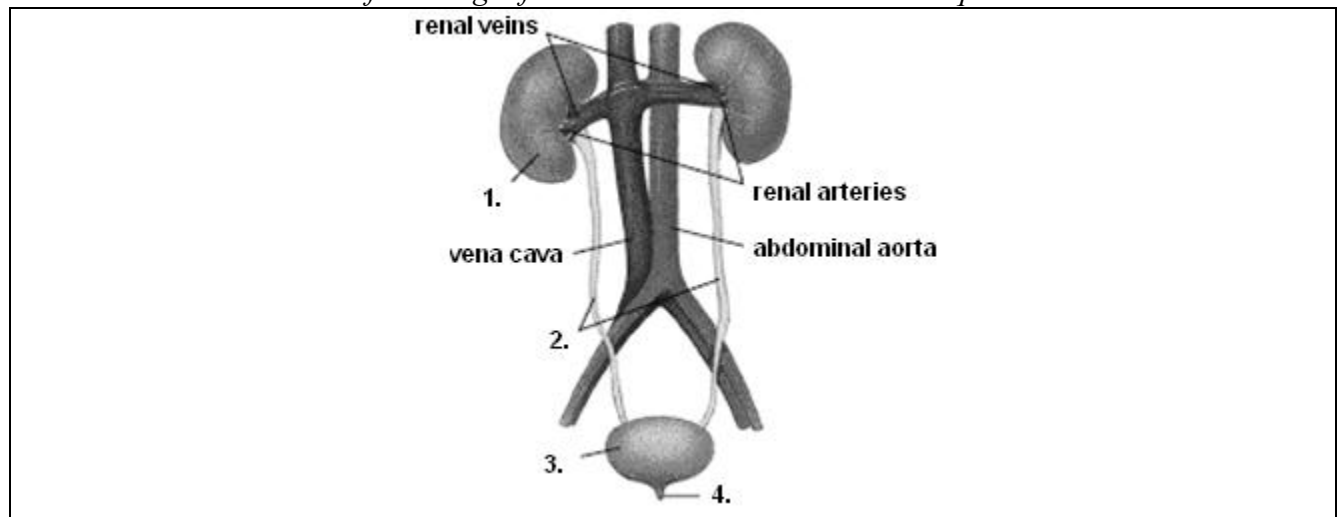


ASSESSMENT**Chapter 9 Test****BLM 9.4.1****Multiple Choice Questions**

- Decide which of the choices best completes the statement or answers the question.
 - Locate that question number on the separate answer sheet provided.
 - Use the procedure described by your teacher to answer each question. For example, “fill in the circle that corresponds to your choice” or “make an X over the letter corresponding to your choice.”
- Which of the following is NOT considered to be a process that eliminates metabolic waste products?
 - lungs exhaling carbon dioxide
 - elimination of solid wastes (feces) from the digestive system
 - removal of nitrogenous wastes in urine
 - excretion of urea in perspiration

Use the following information to answer the next two questions.



- Which row below includes a structure that is mismatched to its function?

Row	Structure	Function
a.	#1	production of urine
b.	#2	transport of urine
c.	#3	reabsorption of water
d.	#4	passage of urine to the environment

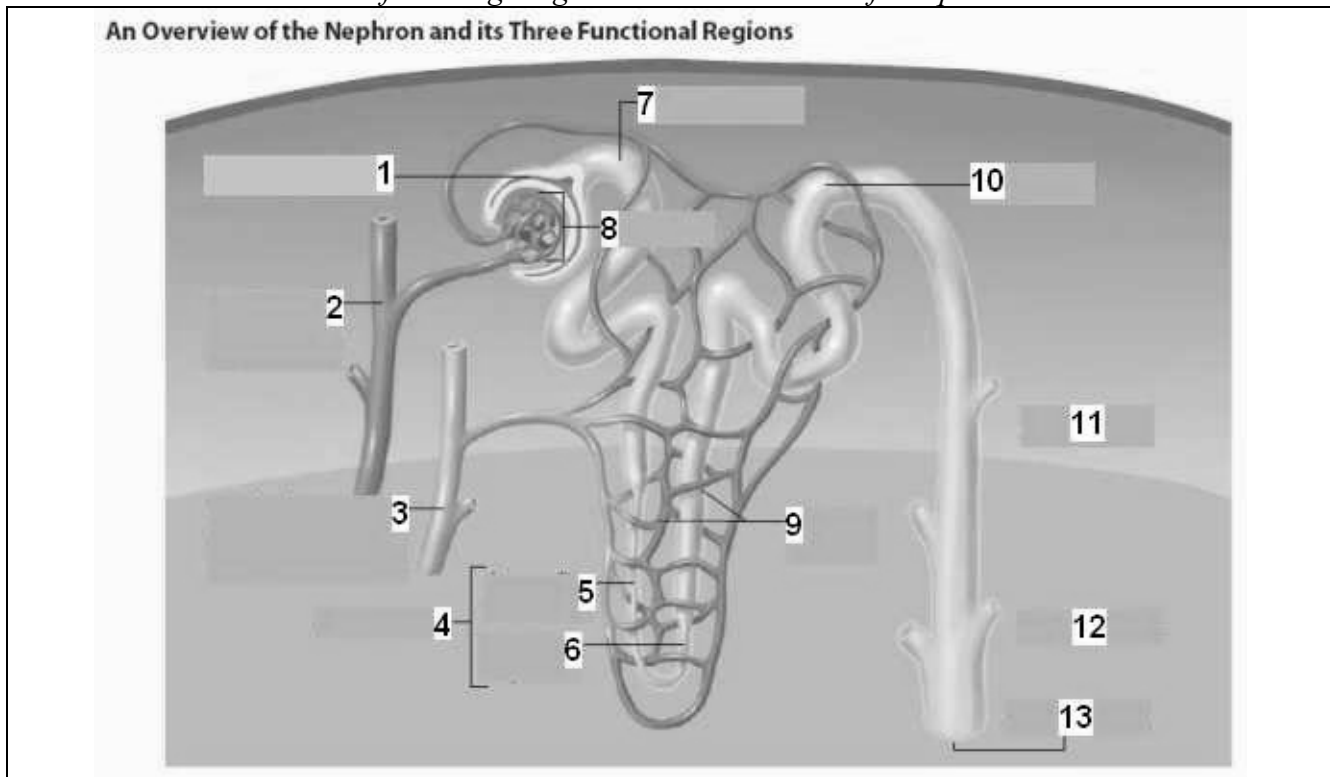
- The structure that provides a common opening for both the excretory and reproductive systems in males is labelled number ____ in the diagram above.
 - 1
 - 2
 - 3
 - 4

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4. Urine is produced from blood that enters the kidney through the
- renal artery.
 - renal vein.
 - coronary artery.
 - inferior vena cava.
5. Which row below indicates a mismatch between the processes and the functions of the kidney?

Row	Process	Function
a.	excretion of metabolic wastes	rids the body of urea and uric acid
b.	maintaining the water-salt balance	helps regulate blood volume
c.	maintaining the acid-base balance	rids the body of nitrogenous wastes
d.	regulating salt balance in the blood	reabsorption of various ions including Na^+

Use the following diagram to answer the next four questions.



6. Identify the row below that correctly identifies the number and name of the structure into which the filtrate first passes.

Row	Number	Name
a.	8	glomerulus
b.	7	proximal tubule
c.	2	renal artery
d.	1	Bowman's capsule

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7. Identify the row below that correctly identifies the number and the name of the structure that carries urine into the renal pelvis.

Row	Number	Name
a.	13	collecting duct
b.	4	loop of Henle
c.	3	renal vein
d.	11	renal cortex

8. Tubular secretion of glucose from the glomerular filtrate into the capillary bed surrounding the nephron occurs in which of the following?
- distal tubule
 - glomerular capsule
 - proximal tubule
 - loop of Henle

9. The high level of Na^+ ions in the tissues of the renal medulla is primarily the result of active transport of Na^+ ions out of which of the following?

Row	Number	Name
a.	5	descending loop of Henle
b.	6	ascending loop of Henle
c.	13	collecting duct
d.	7	proximal tubule

Numerical Response Question

- Record your answer on the answer sheet provided.
- If an answer is a value between 0 and 1 (e.g., 0.25), then be sure to record the 0 before the decimal place.

Use the following information to answer the next question.

Some of the steps in urine formation are listed below:

- tubular secretion
- tubular reabsorption
- filtration
- excretion of urine

1. The order that these events occur in the kidney is ____, ____, ____, and _____. Record your **four-digit** answer in the numerical response section on the answer sheet.

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Use the following information to answer the next question.

Some of the structures of the nephron are listed below.

1. proximal tubule
2. distal tubule
3. loop of Henle
4. glomerular capsule
5. collecting duct

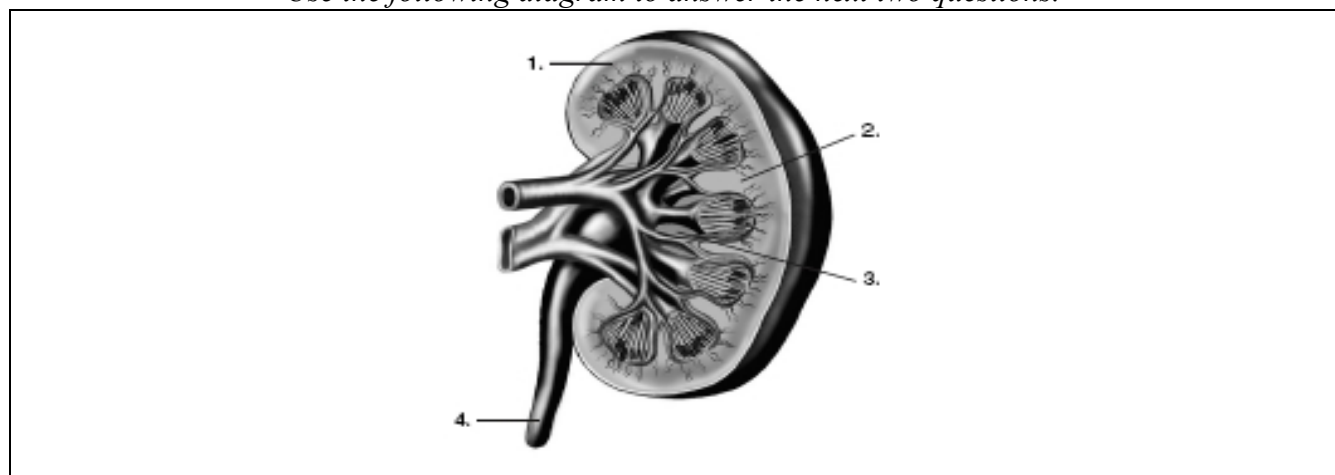
2. The path that a molecule of urea would follow from the renal artery to the renal pelvis is _____, _____, _____, and _____. Record your **five-digit** answer in the numerical response section on the answer sheet.

Multiple Choice Questions

10. Which of the following statements is INCORRECT?
- a. Water is found in the glomerular filtrate.
 - b. Water is reabsorbed from the collecting duct by active transport.
 - c. A person with diabetes insipidus loses between 4 L and 8 L of water per day.
 - d. The amount of water lost in urine is controlled by osmoreceptors in the hypothalamus.
11. Which of the following statements describes the structural difference between the urinary system of males and females?
- a. The urethra in males is longer than it is in females.
 - b. The ureters in females are shorter than they are in males.
 - c. In females, the urethra serves both the urinary and excretory systems.
 - d. In males, the ureters bypass the urinary bladder.
12. The excretion of concentrated (hypertonic) urine in humans is associated primarily with the action of antidiuretic hormone (ADH) and the following structure(s):
- a. glomerular capsule and proximal tubule.
 - b. proximal tubule only.
 - c. the descending loop of Henle and the collecting duct.
 - d. the distal tubule and the collecting duct.
13. Which of the following materials would not normally be found in glomerular filtrate?
- a. water
 - b. protein
 - c. urea
 - d. glucose

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Use the following diagram to answer the next two questions.



14. Which row below indicates the area where the reabsorption of amino acids occurs and the area where the passive movement of water out of the collecting ducts takes place?

Row	Reabsorption Amino Acids	Movement of Water Out of Collecting Duct
a.	3	3
b.	4	1
c.	1	2
d.	2	4

15. Which row below indicates the area where urine is collected and the structure where urine passes into the urinary bladder?

Row	Urine First Collects	Structure where Urine Passes into Urinary Bladder
a.	1	2
b.	2	1
c.	4	3
d.	3	4

16. If the blood is too acidic (low pH), the kidneys respond by
- excreting hydrogen ions (H^+) and reabsorbing bicarbonate ions (HCO_3^-).
 - excreting bicarbonate ions (HCO_3^-) and reabsorbing hydrogen ions (H^+).
 - absorbing both hydrogen ions (H^+) and bicarbonate ions (HCO_3^-).
 - excreting both hydrogen ions (H^+) and bicarbonate ions (HCO_3^-).

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17. By which transport process are most molecules secreted from the blood into the distal tubule?
- osmosis
 - diffusion
 - active transport
 - passive transport
18. The general term used to describe the state in which the kidneys cannot maintain homeostasis due to damage of the nephrons is
- renal insufficiency.
 - kidney stones.
 - hemodialysis.
 - peritoneal dialysis.

Use the following information to answer the next three questions.

Component	Plasma	Glomerular Filtrate	Urine
urea	0.03	0.03	2.00
uric acid	0.004	0.004	0.05
glucose	0.10	0.10	0.00
amino acids	0.05	0.05	0.00
salts	0.72	0.72	1.50
proteins	8.00	0.00	0.00

Table 1: Composition of Plasma, Glomerular Filtrate, and Urine (g/100 mL fluid) of a Healthy Adult

19. The two components listed above that are completely reabsorbed from the glomerular filtrate before it becomes urine are
- urea and uric acid.
 - proteins and amino acids.
 - glucose and amino acids.
 - urea and glucose.
20. Which of the following statements is CORRECT?
- Glucose is the only component of the filtrate to be completely reabsorbed and returned to the cardiovascular system.
 - Uric acid is the most abundant component found in the urine.
 - Glomerular filtrate can be described as plasma without the proteins.
 - Most of the urea found in the filtrate is reabsorbed and returned to the cardiovascular system.

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Use the following additional information to answer the next question.

Nitrogenous Wastes

The function of the kidney is to remove the metabolic waste products, including nitrogenous wastes.

3. What is the concentration of the two nitrogenous waste products listed in the table on the previous page, expressed to three digits? Record the concentration of the waste excreted in the greater amount first and then the concentration of the nitrogenous waste secreted in the lower amount. Record your answers to **two decimal places** in **highest-to-lowest numerical order** in the numerical-response section on the answer sheet.

Answer: _____; _____
nitrogenous waste (greater concentration) nitrogenous waste (lower concentration)

Multiple Choice Questions

21. Identify the statement that explains the homeostatic response of an adult body that is well-hydrated.

Row	Receptor	Response
a.	osmoreceptors stimulate the release of ADH	collecting duct becomes more permeable to water
b.	osmoreceptors stimulate the release of ADH	collecting duct becomes less permeable to water
c.	osmoreceptors inhibit the release of ADH	collecting duct becomes more permeable to water
d.	osmoreceptors inhibit the release of ADH	collecting duct becomes less permeable to water

22. Which of the following is NOT a symptom of a urinary tract infection?
- a. the development of crystalline formations in the kidney
 - b. painful burning sensation during urination
 - c. a need to urinate frequently even if no urine is present
 - d. bloody or brown urine is produced
23. During a routine medical exam a doctor ordered a urinalysis. The glucose test strip turned a “dark colour.” Which row best describes the results of this test and what problem, if any, that the doctor might suspect?

Row	Result of Test	Problem Associated
a.	no glucose	normal, no problems
b.	large amounts of glucose	diabetes mellitus
c.	large amounts of glucose	diabetes insipidus
d.	no glucose	renal insufficiency

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Use the following information to answer the next question.

Renal Insufficiency

A person with renal insufficiency is likely to undergo the treatment described below.

“In this treatment, a catheter (flexible tube) is surgically inserted into the abdominal cavity and dialysate may be delivered, removed, and replaced. Because the dialysate is always present, the blood is continuously filtered.”

24. This treatment is called
- kidney transplant.
 - peritoneal dialysis.
 - hemodialysis.
 - ultrasound technology.
25. Which of the following statements describing kidney transplants is **INCORRECT**?
- A minimally invasive surgical technique used to remove the kidney is called laparoscopy.
 - The success rate for kidney transplants from living donors is generally higher than the success rate for transplants from cadaveric donors.
 - Anti-rejection medications include antibodies that, when used as a pretreatment, may prevent the body from rejecting the transplant.
 - In Canada there is an over-supply of kidneys that are available for kidney transplants.

Written Response

Use the information below to answer the next questions.

Glomerular Diseases

Glomerular diseases, such as glomerulonephritis, result in damage to the glomeruli in the nephrons of the kidney.

Signs and symptoms of glomerulonephritis may depend on whether one has the acute or chronic form, and the cause. The first indication that something is wrong may come from symptoms or from the results of a routine urinalysis. Signs and symptoms may include:

- cola-coloured or diluted iced-tea-coloured urine from red blood cells in the urine (hematuria)
- foam in the toilet water from protein in the urine (proteinuria)
- high blood pressure (hypertension)
- fluid retention (edema) with swelling evident in the face, hands, feet, and abdomen
- fatigue from anemia or kidney failure
- less frequent urination than usual

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1. a) **Explain** how glomerular disease (glomerulonephritis) can result in high blood pressure and **why** high blood pressure can do further damage to the kidneys. (3 marks)

- b) **Explain** why the urine of a healthy person does not contain protein or red blood cells, and **describe** how protein and red blood cells enter the urine of a person who has glomerulonephritis. (4 marks)

- c) Explain how the hormone **aldosterone** raises blood pressure. (3 marks)

- d) **Define** the term dialysis and **describe** the movement of dissolved substances. (3 marks)

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e) Using a **diagram** or a **sketch**, **explain** how hemodialysis (artificial kidney) is used to purify the blood of a person who has end-stage renal disease. (6 marks)



f) **Describe** the impact on the life of a person who must undergo hemodialysis. (4 marks)
