

LSEP_1_T3_Revision exercise_Ans

1. Goblet cells are found in _____ and they secrete _____.
 - A. glandular epithelium; hormones.
 - B. glandular epithelium; sweat.
 - C. mucosal lining; mucus.**
 - D. mucosal lining; watery fluid.
 - E. serous membrane; watery fluid.

Goblet cells are mucus-secreting cells that are found on all mucosal linings e.g. the oral cavity, respiratory tract, gastrointestinal tract, lining of the vagina – Lecture 11: P.10

2. Epithelial tissue:
 - A. is highly vascularized.
 - B. is richly innervated.**
 - C. does not regenerate.
 - D. contains few cells in a matrix.
 - E. contains cells that adhere to one another through their basal surfaces.

Vascularized means that the tissue contains blood vessels. Epithelial tissue has no blood vessel. Refer to Lecture 11: P.13 for the characteristics of epithelial tissue.

3. Ciliated epithelium is found lining the
 - A. gastrointestinal tract.
 - B. renal tubules.
 - C. respiratory tract.**
 - D. skin surface.
 - E. urinary bladder.

The organelle cilia is found on the apical surface (the surface the face the lumen) of ciliated epithelium. The cilia are able to move and sweep substances along the surface of the cell. Ciliated epithelium is found in the respiratory tract to sweep mucus (with trapped dust and pathogens) towards the throat for swallowing. This is one of the defence mechanisms of the respiratory tract --> see the following youtube video for an animation: <https://www.youtube.com/watch?v=HMB6fIEaZwI> – Lecture 11: P.15

4. Which of the following is the most abundant type of tissue in the body?
 - A. Connective tissue**
 - B. Covering epithelial tissue
 - C. Glandular epithelial tissue
 - D. Muscle tissue
 - E. Nervous tissue

Refer to Lecture 11: P.15

5. Which of the following planes passes through the midline of the body and divides it into equal right and left halves?
 - A. The frontal plane
 - B. The median plane**
 - C. The oblique plane
 - D. The sagittal plane
 - E. The transverse plane
6. Which of the following planes divides the body into superior and inferior parts?
 - A. The coronal plane
 - B. The median plane
 - C. The oblique plane
 - D. The sagittal plane
 - E. The transverse plane**
7. Which of the following planes divide the body into the anterior and posterior parts?

- A. **The coronal plane**
- B. **The frontal plane**
- C. The median plane
- D. The oblique plane
- E. The transverse plane

Refer to Lecture 11: P.33 for Q5-7

8. Which of the following organs are found in the dorsal cavity of the body?
- A. The bladder and ureters
 - B. **The brain and spinal cord**
 - C. The heart and lungs
 - D. The kidneys and ureters
 - E. The liver and gall bladder

Refer to Lecture 11: P.28

9. Which of the following organs is found in the mediastinum?
- A. **The heart**
 - B. The liver
 - C. The lungs
 - D. The stomach
 - E. The uterus

Refer to Lecture 12: P.6

10. The epicardium is also known as the
- A. endocardium.
 - B. fibrous pericardium.
 - C. myocardium.
 - D. parietal pericardium.
 - E. **visceral pericardium.**

11. Which of the following describes the layers of and around the heart, from superficial to deep?
- A. Myocardium → fibrous pericardium → parietal pericardium → visceral pericardium
 - B. **Fibrous pericardium → parietal pericardium → visceral pericardium → myocardium**
 - C. Fibrous pericardium → visceral pericardium → parietal pericardium → myocardium
 - D. Parietal pericardium → fibrous pericardium → myocardium → visceral pericardium
 - E. Visceral pericardium → parietal pericardium → myocardium → fibrous pericardium

Q10-11: Refer to Lecture 12: P.7-8

12. The coronary arteries arise from:
- A. aortic arch.
 - B. **ascending aorta.**
 - C. descending aorta.
 - D. pulmonary trunk.
 - E. superior vena cava.

Refer to Lecture 12: P.16

13. Which of the following heart valves is located between the right atrium and right ventricle?
- A. The aortic valve.
 - B. The bicuspid valve.
 - C. The mitral valve.
 - D. The pulmonary valve.
 - E. **The tricuspid valve.**

It is also called the right atrioventricular (AV) valve - Lecture 12: P.11, Lecture 14: P.9

14. Mitral valve is also known as

- A. aortic valve.
- B. bicuspid valve.**
- C. right AV valve.
- D. semilunar valve.
- E. tricuspid valve.

It is also called the left atrioventricular (AV) valve.

15. Which of the following heart valves are also known as the semilunar valves?

- A. Aortic valve and bicuspid valve
- B. Aortic valve and pulmonary valve**
- C. Bicuspid valve and tricuspid valve
- D. Pulmonary valve and tricuspid valve
- E. Pulmonary valve and bicuspid valve

Refer to Lecture 12: P.14, Lecture 14: P.9

16. Which of the following heart valves are closed during ventricular systole?

- A. Aortic valve and bicuspid valve
- B. Aortic valve and pulmonary valve
- C. Bicuspid valve and tricuspid valve**
- D. Pulmonary valve and tricuspid valve
- E. Pulmonary valve and bicuspid valve

Systole refers to the contraction phase while diastole is the relaxation phase. Bicuspid and tricuspid valves are located between the atria and ventricle on the left and right, respectively. They close to prevent backflow of blood into the atria during contraction of ventricle – Lecture 12: P.14, Lecture 14: P.9

17. Tricuspid valve prevents backflow of blood into the

- A. left atrium during ventricular diastole.
- B. left atrium during ventricular systole.
- C. left ventricle during ventricular diastole.
- D. right ventricle during ventricular diastole.
- E. right atrium during ventricular systole.**

Systole refers to the contraction phase while diastole is the relaxation phase. Tricuspid valve is located between the right atrium and right ventricle. Therefore, its function is to prevent backflow of blood into right atrium during contraction of the right ventricle – Lecture 12: P.14, Lecture 14: P.9

18. Which structure of the conducting system of the heart carries electrical signal through the ventricular wall?

- A. Atrioventricular node
- B. Bundle of His
- C. Purkinje fibres**
- D. Sinoatrial node
- E. The bundle branches

Refer to lecture 12: P.18

19. Which structure of the conducting system normally initiates the electrical activity of the heart?

- A. Atrioventricular node
- B. Bundle of His
- C. Purkinje fibres
- D. Sinoatrial node**
- E. The bundle branches

The cells of the conducting system of the heart are able to generate electrical impulses automatically. However, as the rate of generated impulses is the fastest in the SA node, it dominates and is responsible for regulating

heart contraction rate. If the SA node fails to generate impulses, the AV node will take over and ventricular contraction rate will be governed by the rate of impulses generated by the AV node – lecture 12: P.18

20. Which of the following blood vessels contain oxygenated blood?

- A. Pulmonary arteries
- B. Pulmonary veins**
- C. Superior vena cava
- D. Inferior vena cava
- E. Umbilical arteries

Pulmonary veins carry oxygenated blood from the lungs to the left atrium. Pulmonary veins and the umbilical veins are the only veins that carry oxygenated blood. All other veins carries deoxygenated blood towards to heart – Lecture 14: P.4

21. Which of the follow statements is correct?

- A. Umbilical arteries deliver deoxygenated blood to the foetus.
- B. Umbilical arteries deliver oxygenated blood to the placenta.
- C. Umbilical vein delivers oxygenated blood to the foetus.**
- D. Umbilical vein delivers deoxygenated blood to the placenta.
- E. Umbilical vein delivers deoxygenated blood to the foetus.

Umbilical arteries carry deoxygenated blood from the foetus to the placenta for oxygenation while umbilical vein carries oxygenated blood from the placental to the foetus – Lecture 14: P.4

22. Which of the following blood vessels do not have the ability to constrict or dilate?

- A. Arteries
- B. Arterioles
- C. Capillaries**
- D. Venules
- E. Veins

Capillaries are made of a single layer of endothelial cells and they do not have any smooth muscle around them – Lecture 14: P.13

23. Which of the following vessels act as blood reservoir?

- A. Arteries
- B. Arterioles
- C. Capillaries
- D. Veins**
- E. Lymph vessels

Veins are capacitance vessels that are able to distend and store blood – Lecture 14: P.13

24. Which of the following blood vessels are major resistance vessels for controlling blood flow to organs?

- A. Arteries
- B. Arterioles**
- C. Capillaries
- D. Venules
- E. Veins

Arterioles are resistance vessels that confer the most resistance to blood flow. Blood flow to individual vessels is controlled by regulating the size of the arterioles in individual organs. Blood flow to an organ increases when the arterioles in the organ dilate so that resistance drops – Lecture 14: P.13

25. Which of the following lymphoid tissues is the site of production of lymphocytes?

- A. The bone marrow**
- B. The thymus
- C. The spleen
- D. The tonsils
- E. The adenoids

In adult, all blood cells, including lymphocytes, are made in the red bone marrow.

26. Which of the following structures do B cells mature in?

- A. The tonsils
- B. The yolk sac
- C. The thymus
- D. The bone marrow**
- E. The spleen

T lymphocytes matures in the thymus and B-lymphocytes mature in the bone marrow and therefore their name – lecture 12: P.25

27. Which of the following people would have the lowest body water content?

- A. A female athlete
- B. A male athlete
- C. An infant
- D. An older adult with BMI of 20
- E. An older adult with BMI of 30**

Body water decreases with increasing fat content (in female and with aging) – Lecture 13: P.4

28. Which of the following fluid compartments has the highest volume?

- A. Extracellular fluid
- B. Interstitial fluid
- C. Intracellular fluid**
- D. Intravascular fluid
- E. Transcellular fluid

Intracellular fluid constitutes 2/3 of total body water – Lecture 13: P.22

29. How many molecule(s) of O₂ can one haemoglobin molecule carries?

- A. 1
- B. 2
- C. 3
- D. 4**
- E. 8

Each iron ion on the heam group binds one O₂ molecules. Each Hb molecule contains 4 heam groups, therefore, 1 Hb molecule binds 4 O₂ molecules – Lecture 13: P.17

30. Which of the following solution has the highest osmolality?

- A. Isotonic solution
- B. Hypotonic solution
- C. Hypertonic solution**
- D. Plasma
- E. Pure water

Isotonic, hypotonic and hypertonic solution has the same, lower and higher osmolality as plasma, respectively. Pure water has the lowest osmolality i.e. 0 mOsmol/kg – Lecture 13: P.8.

31. Hyponatremia may be treated by infusing

- A. 0.45% NaCl solution
- B. 0.9% NaCl solution
- C. 3% NaCl solution**
- D. 5% dextrose solution
- E. Albumin 5% solution

Hyponatremia should be treated with a hypertonic solution (i.e. 3% NaCl). Option A is a hypotonic solution. Option B & D are isotonic solution. Option E is a plasma volume expander – Lecture 13: P.8 & 11.

32. Which of the following solutions is a plasma expander for infusion to a hypovolemic patient?

- A. 0.45% NaCl solution
- B. 0.9% NaCl solution
- C. 3% NaCl solution
- D. 5% dextrose solution
- E. **Albumin 5% solution**

Albumin is a colloid, which are relatively large molecules that suspend (instead of dissolve) in a solution. Due to their larger size, they cannot cross capillary wall. Therefore, colloids remain in the plasma to help keep water in the blood vessel to expand the blood volume to maintain blood pressure – Lecture 13: P.11

33. Which of the following white blood cells is the most abundant in the blood?

- A. Basophil
- B. Eosinophil
- C. Lymphocyte
- D. Monocyte
- E. **Neutrophil**

Ref: Lecture 13: P.19

34. Which of the following white blood cells release histamine when they are activated?

- A. **Basophil**
- B. Eosinophil
- C. Lymphocyte
- D. Monocyte
- E. Neutrophil

Ref: Lecture 13: P.22

35. The majority of lymphocytes are found in the

- A. blood.
- B. bone marrow.
- C. **lymphoid tissues.**
- D. tissue.
- E. thymus.

Ref: Lecture 13: P.23 and that's also why lymphocytes are called lymphocytes.

36. Which of the following white blood cells helps fight parasitic worms?

- A. Basophil
- B. **Eosinophil**
- C. Lymphocyte
- D. Monocyte
- E. Neutrophil

Ref: Lecture 13: P.21

37. Which of the following mineral is essential for formation of red blood cells?

- A. Magnesium
- B. Iodine
- C. **Iron**
- D. Selenium
- E. Zinc

Iron is found in the haem group of haemoglobin which is the major component of RBCs - Lecture 13: P.17

38. Which of the following sites have lymph that contains the highest lipid content?

- A. The axilla
- B. The heart
- C. The kidney
- D. The large intestine
- E. The small intestine**

Lacteals are lymph vessels found in the villi of small intestine for absorption of dietary fat - Lecture 12: P.24

SAQ

1. The circulation systems in the human body consists of two circulations.
 - a. What are the TWO circulations?
 - b. Which circulation has lower pressure and lower resistance?
 - c. Which blood vessel carries blood away from the right ventricle?
 - d. Which heart chamber receives deoxygenated blood from the body?
 - e. Which blood vessel delivers blood from the upper part of the body to the heart?
 - f. Which chamber(s) of the heart contain oxygenated blood?
 - g. Explain why blood supply to most organs in the body is in-parallel with each other.

Suggested Ans – refer to lecture 14: P.6-12

- a. *Pulmonary circulation and systemic circulation*
- b. *Pulmonary circulation*
- c. *Pulmonary trunk and pulmonary arteries*
- d. *Right atrium*
- e. *Superior vena cava*
- f. *Left atrium and left ventricle*
- g. *Parallel blood supply ensures that each organ receives blood of the same composition (e.g. O₂, CO₂ and glucose concentration, pH) and all the organs are subjected to similar arterial pressure and blood flow to individual organs can be regulated by controlling the resistance of individual organ (through vasoconstriction and vasodilation). Also, the parallel arrangement of the vessels greatly reduce the total resistance to blood flow as oppose to in-series arrangement (refer to lecture 6).*

2. Pulse pressure can be changed in normal physiological and pathological conditions.
 - a. What is pulse pressure?
 - b. What are the factors that affects pulse pressure?
 - c. Explain why pulse pressure is increased during exercise.
 - d. Aortic regurgitation is a condition where the aortic valve cannot not close completely leading to back flow of blood into the left ventricle during ventricular diastole. Explain the change to pulse pressure in patients with aortic regurgitation.
 - e. Aortic stenosis is a condition where aortic valves cannot open fully leading to a higher resistance for the left ventricle to pump blood into the aorta. Explain the change to pulse pressure in patients with aortic stenosis.

Suggested Ans – refer to lecture 14: P.16-20

- a. *Pulse pressure is the difference between systolic pressure and diastolic pressure, i.e. systolic pressure – diastolic pressure.*
- b. *Contraction force of the heart (affects systolic pressure) and the resistance of blood vessels (affects both systolic and diastolic pressure)*
- c. *Pulse pressure is increased (widened) due to*
 1. *increase in systolic pressure as a result of the increase in contraction force of the heart*
 2. *reduction in diastolic pressure due to reduction in total peripheral resistance as a result of vasodilation of the blood vessels in some tissues like the skin, skeletal muscle and cardiac muscles.*
- d. *The pulse pressure would be widened in patients with aortic regurgitation due to reduction in diastolic pressure as the blood leaves the aorta more rapidly than normal due to regurgitation of blood into the ventricle. (Suppl info: indeed the systolic pressure is also increased instead of remaining the same due to the increased amount of blood in the ventricle before contraction happens i.e. increased end diastolic volume (EDV), the higher the EDV the stronger the heart contracts. For blood flow (cardiac output), as both systolic and diastolic pressure is changed, blood flow remains the same if the condition is not very serious. However, the patient with chronic aortic regurgitation, they could develop heart failure and CO is reduced)*
- e. *The pulse pressure would be narrowed in patients with aortic stenosis as less blood is pumped into the aorta resulting in a reduction in systolic pressure. As the systolic pressure drops, the blood flow (cardiac output) drops in this case.*

Please also complete the Anatomy revision exercise!