



Tanta University
Faculty of Medicine
Department of Physiology.

Examination for (MSC 2nd Paper)

Course Title: Physiology

Total Assessment Marks:100

Course Code:

TMED.03:B03

Time Allowed:

Three Hours

Date: 12/4/2014

Term : Final

N.B the questions are in THREE pages

All the questions are to be answered :

	Marks
1- Mention: The effects of gravity on cardiovascular system.	15
2- Explain: The basic electric rhythm of GIT.	10
3- Describe: The mechanisms of respiratory adjustments during exercise.	10
4- Discuss: How the movement of Na ⁺ , glucose and HCO ₃ ⁻ occur in the proximal convoluted tubule.	10
5- State: How human can discriminate between many different odors .What are the mechanisms that make this possible?	10
6- Explain: Adrenergic receptors, chemical transmitters, agonists and its blockers.	10
7- Discuss: The role of urea in medullary osmotic gradient.	10

Case study: 74-year-old woman with a history of rheumatic fever while in her twenties, presented to her physician with complaints of "dyspnea" upon exertion. She also noted that the typical swelling she's had in her ankles for years has started to get worse over the past two months, making it especially difficult to get her shoes on toward the end of the day. In the past week, she's had a decreased appetite, some nausea and vomiting, and tenderness in the right upper quadrant of the abdomen. On physical examination, the jugular veins were noticeably distended.

1. On examination of the abdomen and find that she has "hepatomegaly" and a moderate degree of ascites & pitting edema. Explain these findings.
2. Which term more accurately describes the stress placed upon her heart -increased pre-load or increased after load?
3. What is the general term describing her condition& how might the body compensate for the above condition?
4. She is started on a medication called diuretics called lasix. Why was she given this medication, and how does it work?

Explain these findings

(10 marks)

→ **Look in the back**

Answer the following MCQ by the most probable one choice & write the statement in your answer paper: (15 marks)

Q.1. Which of the following does NOT apply to the alveoli at the base of the lungs?.

- a. They are less elastic than the alveoli at the apex.
- b. The pleural pressure is lower.
- c. At FRC they are less inflated than the alveoli at the apex.
- d. They are closed at RV.
- e. They have a greater volume change than alveoli at the apex during inspiration from FRC.

Q.2. Which of the following is INCORRECT concerning the efficiency of breathing and the oxygen consumption of the respiratory muscles?

- a. Efficiency is defined as the ratio of mechanical work done to move air to the amount of metabolic energy used by the respiratory muscles.
- b. The respiratory system uses less than 3% of the body's total oxygen consumption at rest.
- c. Respiratory muscles are more efficient than large muscle groups.
- d. Emphysema increases the oxygen requirement for respiratory muscles.
- e. Hyperventilation can increase the oxygen consumption of respiratory muscles to 30%.

Q.3. Which of the following statements about Hb is FALSE?

- a. A higher P50 than normal means that the O₂ binds less tightly to Hb.
- b. An increase in 2,3-DPG shifts the O₂ uptake curve to the left.
- c. An increase in PCO₂ causes a right shift of the O₂ uptake curve.
- d. A decrease in pH increases P50.
- e. An increase in temperature shifts the O₂ uptake curve to the right.

Q.4. Which of the following is FALSE concerning the relationships of the variables in diffusion of O₂ across a membrane?

- a. Doubling the thickness of the membrane would cut the total flow of O₂ in half.
- b. Doubling the area of the membrane would double the total flow of O₂.
- c. If you increased the alveolar concentration of O₂, you would increase the total flow of O₂ across the alveolar membrane.
- d. The lower the diffusion coefficient, the higher the total flow.
- e. Increasing the arterial concentration of O₂ would decrease the total flow of O₂.

Q.5. Sodium enters the cell during the upstroke of the action potential. What is the major mechanism for removing Na from the cell?

- a. It passively diffuses out of the cell.
- b. It is extruded via an ATP-dependent Na-K pump.
- c. It is extruded via an ATP-dependent Na-Ca pump.
- d. It is extruded via an ATP-independent Na-K pump.
- e. It is extruded via an ATP-independent Na⁺-Ca⁺⁺ pump.

Q.6. Which of the following is NOT affected by the preload in the heart muscle?

- a. End systolic volume.
- b. End diastolic volume.
- c. Stroke Volume.
- d. Ejection fraction.
- e. Cardiac output.

Q.7. If you decrease a blood vessel's radius in half, by what fraction does the blood flow change?

- a. 1/2 .
- b. 1/4 .
- c. 1/8.
- d. 1/16.
- e. 1/32.

Q.8. The transport protein responsible for entry of glucose into the intestinal enterocyte is called:

- a. Glut-2 b. Glut-5 c. SGLT1
- d. SGLT2 e. SGLT5.

Q.9. Which of the following sphincters does NOT prevent reflux of material?

- a. Lower esophageal sphincter.
- b. Gastroduodenal sphincter..
- c. Ileocolonic sphincter.
- d. Internal anal sphincter.
- e. All the above .

Q.10. Stimulation of α adrenergic receptors causes:

- a. Contraction of constrictor papillae.
- b. Coronary vasodilatation.
- c. Hypoadrenalism tachycardia.
- d. Vasoconstrictor of skin vessels.
- e. Intestinal relaxation..

Q.11. Water handling by the kidney (% reabsorption):

- a. 93%.
- b. 94%.
- c. 99%.
- d. 99.4%.
- e. 80%.

Q.12. In chronic renal failure:

- a. Patients excrete small volumes of urine.
- b. Plasma potassium level is decreased.
- c. There is metabolic alkalosis.
- d. Blood urea nitrogen (BUN) and serum creatinine are normal.
- e. Patients cannot concentrate urine.

Q.13. The main barrier precluding the free passage of albumin across the glomerular capillary walls is formed by:

- a. The fenestrated glomerular endothelium
- b. Anionic proteoglycan clusters within the glomerular basement membrane
- c. The filtration slits in between visceral epithelial cells (podocytes)
- d. None are correct
- e. All are correct.

Q.14. The following are true about the lens:

- a. 90% of the weight of the lens is contributed by water.
- b. It has no sensory innervation
- c. The capsule is thicker posterior than anteriorly.
- d. It has an equatorial diameter of about 15 mm.
- e. In eyes dilated with atropine, the thickness of the lens is increased.

Q.15. With regard to the vitreous:

- a. Its water content is about 90%.
- b. Its volume is about 5ml in each eye.
- c. Its viscosity increases with age.
- d. Its viscosity is contributed by the presence of sodium hyaluronate.
- e. It is the main source of glucose for the retina

Chairman of the Department
Sahar elsawy

Handwritten signatures and initials:
- Sahar Elsawy
C C
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Tanta University
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Examination for (MSC 1st Paper)

Course Title: Physiology
Total Assessment Marks:100

Course Code:

TMED.03:B03
Time Allowed:
Three Hours

Date: 5/4 /2014

Term : Final

<u>All the questions are to be answered :</u>	Marks
1- Discuss: The Physiology of sleep and wakefulness.	(15)
2- Explain: The perception, modulation and the pathway of pain, how pain is different from other sensations.	(10)
3- Describe: Positive feedback loop, and give Examples of this in the body.	(10)
4- Compare: Role of platelets in health and diseases.	(10)
5- Mention: The endocrine basis of stunted growth	(10)
6- Name and describe: The functions of the proteins involved in muscle contraction.	(10)
7- Discuss: The control of testicular function.	(10)

Case study: A 77-year-old woman was cooking in the kitchen when she collapsed onto the floor. Her daughter called an ambulance and the woman was taken to the emergency room.

She had suffered a stroke, and slowly regained consciousness over the next two days.

However, when she woke up, she had the following signs and symptoms:

- paralysis of the right face and arm

- loss of sensation to touch on the skin of the right face and arm

- inability to answer questions but ability to understand what was said to her

- ability to write down her thoughts more easily than to speak them

1. Why was she paralyzed in the right face and arm?
2. What is the name of her language disorder, and what caused it?
3. Was this woman's dominant or nondominant hemisphere damaged? (10 Marks)

Answer the following MCQ by the most probable one choice& write the statement in your answer paper: (15 marks)

Q.1. How many T-tubules lie within a single skeletal muscle sarcomere?

- a. 1.
- b. 2.
- c. 3.
- d. 4.
- e. 6.

Q.2. Approximately what percentage of body heat is generated by muscle tissue:

- a. 15% .
- b. 30% .
- c. 55% .
- d. 20% .
- e. 85% .

Q.3. Which of the following does NOT occur in a muscle during contraction:

- a. Thick and thin filaments bind to each other.
- b. Muscle fibers stretch.
- c. Thick and thin filaments "slide" past each other.
- d. Muscle fibers shorten 98%.
- e. The Z-lines move further apart.

Q.4. In an athlete under basal conditions one would expect:

- a. Increased stroke volume.
- b. Increased heart rate.
- c. Decreased ventricular filling.
- d. Increased arterial pressure.
- e. Increased peripheral resistance.



Look in the back

Q.5. All of the following will tend to stimulate sweating EXCEPT:

- a. Increased body core temperature.
- b. Heating the hypothalamic regulation centre.
- c. Increasing the temperature regulation "set point".
- d. Activating the cutaneous warm receptors.
- e. Activation of sympathetic nervous system.

Q.6. A deficiency of ACTH secretion would greatly diminish.

- a. The synthesis of aldosterone.
- b. The synthesis of testosterone in a man.
- c. The secretion of cortisol.
- d. The secretion of estradiol.
- e. All of the above.

Q.7. Renshaw cell inhibition of alpha motoneurone is an example of:

- a. Negative feedback inhibition.
- b. Feedforward inhibition.
- c. Presynaptic inhibition.
- d. Indirect inhibition.
- e. Forward inhibition.

Q.8. In parathyroid cells, calcium regulates expression and release of parathyroid hormone (PTH) by binding to:

- a. A nuclear receptor in the supergene family that includes steroid hormone receptors, the thyroid hormone receptor, and a number of "orphan" receptors.
- b. A transmembrane protein receptor that activates a G-protein-mediated signal cascade.
- c. The golgi bodies where PTH is stored, and stimulating their fusion with exocytotic vesicles.
- d. A calcium-binding domain in the extracellular matrix, inducing a structural change in the matrix.
- e. A glycoprotein in the gap junction between parathyroid cells, mediating transcytotic calcium flux.

Q.9. Melatonin is a hormone produced in the pineal gland. It can be used to treat symptoms of sleep disorders and seasonal affective disorder because:

- a. It is normally produced only in the light.

- b. It increases production of serotonin.
- c. It increases production of tryptophan.
- d. Its peak production is normally at night.
- e. It activates the brainstem.

Q.10. The most important functional process that monocytes carry out is:

- a. Coagulation.
- b. Antibody formation.
- c. Phagocytosis.
- d. Heparin secretion.
- e. Urea absorption.

Q.11. Endothelial cells synthesise:

- a. Fibrinogen.
- b. Factor 10.
- c. None of above.
- d. Factor 8.
- e. Factor 12.

Q.12. The anticoagulant dicoumarol acts by:

- a. Forming an insoluble salt with calcium.
- b. Competitive inhibition of vitamin K.
- c. Inhibition of thrombin action.
- d. Inhibition of phospholipid action.
- e. Inhibition of platelet factors.

Q.13. Regarding hyperglycaemia: Which of the following is untrue? It causes:

- a. Increased H⁺.
- b. Increased Na⁺(?K⁺).
- c. Increased urine output.
- d. Increased ECF (or blood volume).
- e. Increased glucagon.

Q.14. Which of the following hormone peaks during the mid-luteal phase?

- a. Inhibin.
- b. Activin.
- c. Follistatin.
- d. Relaxin.
- e. Progesterone.

Q.15. Correct statements about human growth hormone include which of the following?

- a. It is synthesized in the hypothalamus.
- b. It stimulates production of somatomedins by the liver.
- c. Its release is stimulated by somatostatin.
- d. It causes a decrease in lipolysis.
- e. It is deficient in acromegaly.

Chairman of the Department
Sahar elsawy

