



UNIVERSITY OF GHANA

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**SECOND SEMESTER EXAMINATION, 2012-2013**  
**LEVEL 300: BACHELOR OF BIOMEDICAL ENGINEERING**

**BMEN 302: HUMAN BIOLOGY- II(2credits)**

Time Allowed-(2Hours)

Total marks: 100

**Instruction: Attempt all questions**

**Section A**

**Choose the Best Answer (Answer this section in the answer booklet)(30marks)**

1. A homeostatic imbalance:
  - a. must be restored by negative feedback mechanisms
  - b. is considered the cause of most diseases
  - c. is when the internal conditions of the body become more stable
  - d. only occur when positive feedback mechanisms are overwhelmed
2. Which of the following is an example of applied physiology:
  - a. measuring the length of the femur on a fetus using ultrasound
  - b. locating an injury to a tendon in the shoulder using CT imaging
  - c. describing the process of how a toxin interferes with nerve impulse conduction
  - d. identifying the types of cells found in a biopsy sample of lung tissue
  - e. none of the above
3. The sum of all chemical reactions in the body is termed:
  - a. homeostasis
  - b. physiology
  - c. dynamic feedback
  - d. metabolism
  - e. all the above
4. The term that refers to the percentage of packed erythrocytes per unit volume of blood is the:
  - a. Differential Count
  - b. Hemoglobin
  - c. Hematocrit
  - d. Hemopoiesis
  - e. None of the above
5. Which of the following is a circulating blood cell that is capable of differentiating into a plasma cell?
  - a. Neutrophil
  - b. Basophil
  - c. B Lymphocyte
  - d. T lymphocyte
  - e. Monocyte
6. The component of plasma responsible for maintaining the osmotic pressure of blood is:
  - a. Plasmin
  - b. Albumin
  - c. Fibrinogen
  - d. Gamma globulin
  - e. Plasminogen activator
7. Excessive destruction of erythrocytes is characteristic of:

- a. Thalassemia
  - b. Aplastic anemia
  - c. Pernicious anemia
  - d. Hemolytic Anemia
  - e. None of the above
8. The  $\text{Fe}^{3+}$  portion of the hemoglobin is eventually:
- a. Converted into transferrin in the large intestine
  - b. Converted into ferritin in the kidney
  - c. Excreted from the body
  - d. All of the above
  - e. None of the above
9. Hypoxia induces the kidneys to produce:
- a. Platelets
  - b. Thrombopoietin
  - c. Erythrocytes
  - d. Erythropoietin
  - e. Intrinsic Factor
10. The first phase of hemostasis is:
- a. Separation of globin and heme
  - b. Activation of Prothrombin
  - c. Platelet aggregation
  - d. Vascular Spasm
  - e. None of the above
11. An individual with type B+ blood has which of the following antibodies in their blood?
- a. anti-A and anti-O
  - b. anti-B and anti-Rh
  - c. anti-A
  - d. anti-B
  - e. anti-Rh
12. Which of the following is not a phase of hemostasis?
- a. Vascular spasm
  - b. Fibrinolysis
  - c. Platelet plug formation
  - d. Coagulation
  - e. None of the above
13. If there is a blockage between the AV node and the AV bundle, how will this affect the appearance of the EKG?
- a. PR interval would be smaller
  - b. QRS interval would be shorter
  - c. There Would Be More P Waves Than Qrs Complexes
  - d. There would be more QRS complexes than P waves
  - e. The T wave would be absent
14. A valve damaged by rheumatic fever fails to open completely. This is known as:
- a. Stenosis
  - b. Heart Block
  - c. Ischemia
  - d. Myocardial infarction
  - e. Fibrillation
15. Cardiac output is equal to:
- a.  $\text{HR} \times \text{SV}$
  - b.  $\text{HR}/\text{SV}$

- c. EDV - ESV
- d.  $(EDV-SV) \times HR$
- e.  $HR \times BP$

16. The hypothalamus is a ..... organ

- a. Endocrine
- b. Nervous
- c. Skeletal
- d. None of above
- e. All the above

17. Which of the following hormone stimulates powerful uterine contractions, which trigger labour and delivery of an infant?

- a. Antidiuretic hormone
- b. Thyroxine
- c. Prolactin
- d. Oxytocin
- e. None of the above

18. In abnormal Haemoglobin Hb S (sickle cell anaemia), amino acid Valine replaces ..... at a point in each  $\beta$  chain.

- a. Glycine
- b. Glutamic acid
- c. Guanine
- d. Aspartic acid
- e. None of the above

19. Which one of the following statement is wrong?

- a. Rh+ people can donate to only Rh+
- b. Rh- individuals can receive only from Rh- people
- c. Rh+ people can receive from both Rh- and Rh+
- d. Rh- people can donate to only Rh+
- e. All the above

20. Which type of Heart sound generated by blood turbulence is associated with the closure of the semilunar valves (aortic and pulmonary valves).

- a. Heart sound S1
- b. Heart sound S2
- c. Heart sound S3
- d. Heart sound S4
- e. None of the above

21. High percentage of saliva fluid is secreted by

- a. Parotid
- b. Submandibular
- c. Sublingual
- d. Parathyroid
- e. All the above

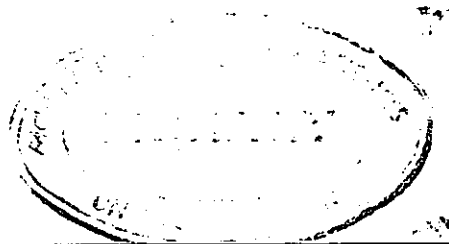
22. The outermost region of the kidney is called the .....

- a. Medulla
- b. Capsule
- c. Cortex
- d. Pyramids
- e. None of the above

23. Steroids, one of the two major hormone classes is made up of.....

- a. Protein
- b. Carbohydrates
- c. Cholesterol
- d. Phospholipids

- e. None of the above
24. A hematocrit of 80 would be considered:
- a. Polycythemia
  - b. Anemia
  - c. Thrombocytopenia
  - d. Leukemia
  - e. None of the above
25. Diffusion of water molecules through plasma membrane.
- a. Facilitate diffusion
  - b. Trancytosis
  - c. Osmosis
  - d. Active transport
  - e. None of the above
26. In the pancreas which type of cell produces glucagon?
- a. Gamma
  - b. Beta
  - c. Delta
  - d. Alpha
  - e. All the above
27. Exchange of gases between blood in systemic capillaries and tissue cells is.
- a. External respiration
  - b. Internal respiration
  - c. Cellular respiration
  - d. None of the above
  - e. All the above
28. During forced inhalation in breathing particular type of muscle elevates the first two ribs.
- a. Scalene muscle
  - b. Sternocleidomastoid muscle
  - c. Serratus anterior muscle
  - d. Deltoid
  - e. None of the above
29. A pattern of shallow chest breathing which consist of upward and outward movement of chest due to contraction of the external intercostal muscles.
- a. Eupnea
  - b. Costal breathing
  - c. Hyperpnea
  - d. Orthopnea
  - e. Platypnea
30. Which part of the embryoblast will become the central nervous system during development
- a. Ectoderm
  - b. Mesoderm
  - c. Endoderm
  - d. None of the above
  - e. All the above



**SECTION B (Answer this section in the answer booklet) (70marks)**

**Answer all Questions: (please draw the diagram as it needed)**

1. a) Define Human Physiology and Pathophysiology(3marks)  
  
b) Draw the block diagram and explain the control of Homeostasis and the different components of the feedback system.  
(12 marks)
2. a) List and describe several ways in which the circulatory system functions in homeostasis(5marks)  
b) Explain in detail about blood circulation and exchanging the nutrients to cells and returned towards heart. (10marks)
3. a) Explain how a blood clot forms and how it helps prevent bleeding? (10marks)  
b) Define the following terms i) Leukemia ii) RhoGAM iii) Erythroblastosisfetalis(3marks)
4. a) Describe in details inspiration and expiration. (10marks)  
b) Smoking irritates the trachea and bronchi, causing mucus to build up and paralyze the cilia. How do these changes affect the lung?  
(4 marks)
5. a) Draw the various parts of the urinary system.Describe what each one does for urine production?  
(7marks)  
b) Describe the three ways in which the kidney filters the blood? (6 marks)

