AFRICA UNIVERSITY
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"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE AND NATURAL SCIENCES

DEPARTMENT OF BIOMEDICAL AND LABORATORY SCIENCES

BACHELOR OF MEDICAL LABORATORY SCIENCES HONOURS

NSLS 200: BLOOD TRANSFUSION AND IMMUNOLOGY

NOVEMBER 2024

LECTURER: PROF. EMMANUEL OBEAGU

DURATION: 3 HOURS

INSTRUCTIONS

1. Write your candidate number on the space provided on top of each page
2. Answer **all** questions in sections A on the question paper.
3. Answer **all** questions in section B on separate answer sheets provided.
4. Answer any **3** questions in section C on separate answer sheets provided
5. Mark allocation for each question is indicated at the end of the question
6. Credit will be given for logical, systematic and neat presentations in sections B and C

SECTION A: MULTIPLE CHOICE QUESTIONS (20 MARKS)

Answer all questions by encircling the correct response T for TRUE or F for FALSE for each statement in all the questions

1. **What is the primary function of a blood bank?**
   - A) Drug development **T or F**
   - B) Blood collection and storage **T or F**
   - C) Disease diagnosis **T or F**
   - D) Vaccine administration **T or F**
   - E) Organ transplant
2. **Which component of blood is primarily responsible for oxygen transport?**
   - A) Plasma **T or F**
   - B) White blood cells **T or F**
   - C) Platelets **T or F**
   - D) Red blood cells **T or F**
   - E) Serum **T or F**
3. **What does the term "allogeneic donation" refer to?**
   - A) Donation from a family member **T or F**
   - B) Donation from oneself **T or F**
   - C) Donation from an unrelated donor **T or F**
   - D) Donation from a cadaver **T or F**
   - E) Donation for personal use **T or F**
4. **In blood banking, what does LISS stand for?**
   - A) Low Ionic Strength Solution **T or F**
   - B) Low Immunoglobulin Strength Solution **T or F**
   - C) Light Ionic Strength Solution **T or F**
   - D) Lipid Ion Strength Solution **T or F**
   - E) Low Insulin Strength Solution **T or F**
5. **What is the purpose of the Direct Coombs test?**
   - A) To detect antibodies in the serum **T or F**
   - B) To identify blood group **T or F**

C) To detect antibodies bound to the surface of red blood cells **T or F**

D) To check for infectious diseases **T or F**

E) To determine blood volume **T or F**

6. **Which blood component is used to treat Hemophilia A?**

A) Whole blood **T or F**

B) Platelets **T or F**

C) Cryoprecipitate **T or F**

D) Plasma **T or F**

E) Factor VIII **T or F**

7. **What is the shelf life of frozen plasma?**

A) 1 month **T or F**

B) 6 months **T or F**

C) 1 year **T or F**

D) 5 years **T or F**

E) 10 years **T or F**

8. **Which blood group system is most important for compatibility testing?**

A) MN system **T or F**

B) Lewis system **T or F**

C) ABO system **T or F**

D) Rh system **T or F**

E) P system **T or F**

9. **What is the function of albumin in blood banking?**

A) Oxygen transport **T or F**

B) Volume expansion **T or F**

C) Clotting factor replacement **T or F**

D) Antibody production **T or F**

E) Iron transport **T or F**

10. **Which antigen is associated with the Rh blood group system?**

A) A antigen **T or F**

B) B antigen **T or F**

C) D antigen **T or F**

D) H antigen **T or F**

E) O antigen **T or F**

11. **What is the primary method used for blood donor screening?**

A) Genetic testing **T or F**

B) Medical history questionnaire **T or F**

C) Urinalysis **T or F**

D) Blood pressure measurement **T or F**

E) Physical examination **T or F**

12. **Which of the following is a key component of the complement system?**

A) Hemoglobin **T or F**

B) Fibrinogen **T or F**

C) C3 convertase **T or F**

D) Myoglobin **T or F**

E) Albumin **T or F**

13. **What does the term "crossmatch" refer to in blood transfusion?**

A) Testing blood type **T or F**

B) Identifying donors **T or F**

C) Compatibility testing between donor and recipient blood **T or F**

D) Screening for infections **T or F**

E) Collecting blood samples **T or F**

14. **In the context of antigen-antibody interactions, what type of bond primarily facilitates binding?**

A) Ionic bonds **T or F**

B) Covalent bonds **T or F**

C) Hydrogen bonds **T or F**

D) Hydrophobic interactions **T or F**

E) All of the above **T or F**

15. **What is the purpose of using anti-D antibodies in blood banking?**

A) To identify A antigens **T or F**

B) To prevent Rh incompatibility **T or F**

C) To increase platelet count **T or F**

D) To identify blood type **T or F**

E) To enhance plasma volume **T or F**

16. **Which reagent is used for antibody screening during blood typing?**

A) Anti-A serum **T or F**

B) Anti-B serum **T or F**

C) Anti-D serum **T or F**

D) LISS **T or F**

E) Saline **T or F**

17. **What is the primary storage temperature for red blood cells?**

A) 0°C to 4°C **T or F**

B) -20°C **T or F**

C) 4°C to 6°C **T or F**

D) Room temperature **T or F**

E) -40°C **T or F**

18. **What does the term "agglutination" refer to?**

A) Clumping of cells **T or F**

B) Degradation of cells **T or F**

C) Separation of plasma **T or F**

D) Production of antibodies **T or F**

E) Activation of complement **T or F**

19. **Which blood component is most commonly used for patients with thrombocytopenia?**

A) Whole blood **T or F**

B) Fresh frozen plasma **T or F**

C) Platelets **T or F**

D) Cryoprecipitate **T or F**

E) Packed red blood cells **T or F**

20. **What is the main role of the Rh factor in blood transfusion?**

A) Oxygen delivery **T or F**

B) Clot formation **T or F**

C) Immune response regulation **T or F**

D) Preventing hemolytic reactions **T or F**

E) Increasing blood volume **T or F**

Answer: D) Preventing hemolytic reactions

SECTION B (20 MARKS)

Instructions

- **Answer all the questions in this section.**
- **Each question carries 5 marks.**

1. What is Rhogam? **5 marks**
2. List the observable effects of antigen-antibody reactions? **5 marks**
3. Outline the factors influencing antigen-antibody reactions **5 marks**
4. List the complement system's role in immunity and transfusion reactions **5 marks**

SECTION C: ESSAY QUESTIONS (60 MARS)

Instructions

- **Answer 3 questions out of 7 in this section.**
- **Each question carries 20 marks.**

1. What are ABO anomalies, and how can they lead to false results in blood typing? **20 marks**
2. Explain 2 techniques used for blood grouping **20 marks**
3. Describe the antibody screening process and its techniques **20 marks**
4. Discuss blood donor selection criteria and the significance of screening for infectious diseases **20 marks**
5. Explain the compatibility testing process, including major and minor crossmatching **20 marks**
6. What are the risks associated with blood transfusions and how can they be investigated? **20 marks**
7. Explain the pathophysiology of hemolytic disease of the newborn (HDN) and laboratory investigation **20 marks**