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## University Examinations 2023/2024

SECOND YEAR SECOND SEMESTER EXAMINATION FOR THE DEGREE OF  
BACHELOR OF SCIENCE IN MEDICAL LABORATORY

### HML 3221: PRINCIPLES OF TRANSFUSION SCIENCE

DATE: APRIL 2024

TIME: 2 HOURS

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INSTRUCTIONS: ANSWER ALL QUESTIONS

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#### SECTION ONE: MULTIPLE CHOICE QUESTIONS (20 MARKS)

1. Which of the following best describes the role of albumin in blood transfusion?
  - a) Albumin is used as an anticoagulant during blood collection.
  - b) Albumin enhances the oxygen-carrying capacity of red blood cells.
  - c) Albumin is utilized to reduce nonspecific reactions in the crossmatching process.
  - d) Albumin aids in the preservation of blood products during storage.
2. The direct antiglobulin test is used to detect:
  - a) Red blood cell antibodies in the recipient's serum
  - b) Red blood cell antibodies on the surface of the recipient's red blood cells
  - c) White blood cell antibodies in the donor's plasma
  - d) White blood cell antibodies on the surface of the donor's white blood cells
3. ABO hemolytic disease of the newborn is most likely to occur in which situation?
  - a) When the mother is Rh-negative and the baby is Rh-positive
  - b) When the mother is O blood group and the baby is A or B blood group

- c) When the mother is Rh-positive and the baby is Rh-negative
  - d) When the mother is B blood group and the baby is A blood group
4. Which blood group antigens are present on the surface of red blood cells in the ABO system?
- a) A and B
  - b) A and D
  - c) B and O
  - d) O and D
5. What is the phenotype of an individual who is Rh-positive?
- a) dd
  - b) DD
  - c) Ad
  - d) Oo
6. Which of the following blood group antigens is most likely to elicit an immune response in a transfusion recipient?
- a) Rh factor
  - b) MNSs
  - c) Keli
  - d) Duffy
7. What is the purpose of pretransfusion testing?
- a) To identify the donor's blood group
  - b) To ensure compatibility between donor and recipient blood
  - c) To detect transfusion-related infections
  - d) Do determine the donor's eligibility for blood donation
8. Which blood product is primarily used to treat coagulation disorders?
- a) Whole blood
  - b) Red cell concentrates
  - c) Platelet concentrates
  - d) Fresh frozen plasma
9. What is the maximum duration for which whole blood can be stored under standard blood banking conditions?
- a) 14 days

- b) 21 days
  - c) 28 days
  - d) 35 days
10. Which transfusion reaction is characterized by sudden onset dyspnea, hypoxemia, and bilateral pulmonary infiltrates?
- a) Hemolytic transfusion reaction
  - b) Transfusion-related acute lung injury
  - c) Anaphylactic reaction
  - d) Septic shock
11. Which maternal antibody can cross the placenta and cause hemolytic disease of the fetus and newborn (HDFN)?
- a) Anti—A
  - b) Anti-B
  - c) Anti-Rh(D)
  - d) Anti-Keli
12. What is the optimal temperature for storing packed red blood cells?
- a) 2-6 °C
  - b) -20 °C
  - c) 25 °C
  - d) 37° C
13. Post-transfusion purpura is a delayed complication characterized by:
- a) Thrombocytopenia occurring within 24 hours of transfusion
  - b) Hemolysis due to ABO incompatibility
  - c) Immune-mediated destruction of platelets 5-10 days post-transfusion
  - d) Nephropathy following transfusion of contaminated blood
14. Which of the following is a recommended method for the disposal of unused blood products?
- a) Flushing down the sink with copious water
  - b) Incineration
  - c) Pouring into the general waste bin
  - d) Donating to research laboratories
15. What is the primary purpose of quality control in blood banking?

- a) To ensure efficient collection of blood from donors
  - b) To monitor the safety and efficacy of blood products
  - c) To increase the shelf life of stored blood products
  - d) To reduce the cost of blood transfusions
16. Blood warmers are used during transfusions to:
- a) Increase the rate of transfusion
  - b) Prevent hemolysis of red blood cells
  - c) Maintain the temperature of blood products
  - d) Improve the compatibility of donor blood with recipient
17. Antithrombin factor is derived from which blood component?
- a) Whole blood
  - b) Cryoprecipitate
  - c) Fresh frozen plasma
  - d) Platelets
18. Which of the following conditions would disqualify a potential blood donor?
- a) Controlled hypertension
  - b) History of heart surgery more than 5 years ago
  - c) Recent travel to a malaria-endemic region
  - d) Mild anemia with hemoglobin level of 11 g/dL
19. Which laboratory technique is commonly used for the detection and identification of antibodies in blood transfusion?
- a) Polymerase Chain Reaction (PCR)
  - b) Enzyme-Linked Immunosorbent Assay (ELISA)
  - c) Direct Antiglobulin Test (DAT)
  - d) Western Blotting
20. Which of the following best describes the importance of understanding blood group systems?
- a) To facilitate organ transplantation
  - b) To prevent hemolytic transfusion reactions
  - c) To guide prenatal care for Rh-negative mothers
  - d) All of the above

## **SECTION II: SHORT ANSWER QUESTIONS (40 MARKS)**

1. Describe the anticoagulants in blood donor bags (4 marks)
2. With examples, outline the characteristics of transfusion transmissible infections (6 marks)
3. Using a diagram, describe the ABO structural molecules (9 marks)
4. Describe the procedures for reverse blood grouping (10 marks)
5. Describe the stages in major cross match procedure (6 marks)
6. List the acute immune transfusion reactions (5 marks)

## **SECTION III: LONG ANSWER QUESTIONS (choose any two- 20 marks each)**

### **QUESTION ONE**

- a) Describe the direct antiglobulin test and its outcomes (10 marks)
- b) Describe the symptoms of hemolytic disease of new born during and after birth (10 marks)

### **QUESTION TWO**

Discuss blood and blood products (20 marks)

### **QUESTION THREE**

Discuss the blood donor selection process (20 marks)