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MANIPAL ACADEMY OF HIGHER EDUCATION
MD (IMMUNOHEMATOLOGY AND BLOOD TRANSFUSION) DEGREE
EXAMINATION – JULY 2023

PAPER I

Monday, July 03, 2023

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ Answer all the questions.

✍ Long Essays:

1. A 25-year-old male patient met with a road traffic accident and was brought to the emergency triage with severe bleeding.
 - 1A. Explain the hemodynamics of blood flow and estimation of blood loss
 - 1B. Classify hemorrhagic Shock
 - 1C. Describe the pathophysiology of coagulopathy in shock

(5+5+5 = 15 marks)

2. A neonate has to undergo cardiac surgery and needs top up transfusion pre-operatively to build up the hemoglobin level.
 - 2A. Discuss the red cell storage lesions that are applicable for the above case scenario
 - 2B. What are Extracellular vesicles and mention the storage conditions promoting its formation?

(10+5 = 15 marks)

3. **Write short notes on:**

- 3A. Role of platelets in hemostasis.
- 3B. The processes of mitosis and meiosis, and outline the differences between them.
- 3C. Red cell membrane structure and function.
- 3D. Describe the process of iron metabolism
- 3E. Discuss the role of complement system in immunity.
- 3F. Granulocyte antigen system
- 3G. Synthesis of ATP and its role in blood storage
- 3H. Define and classify cytokines and discuss their role in febrile non hemolytic transfusion reaction.
- 3I. Blood doping and novel biomarkers
- 3J. Transfusion Associated Circulatory overload

(7 marks × 10 = 70 marks)



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PAPER II

Tuesday, July 04, 2023

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

Answer all the questions.

Long Essays:

1. A 12 year old patient with thalassemia major, multiply transfused is admitted to receive routine blood transfusion. On pre-transfusion testing, the cross-matching is found to be incompatible with donor RBC unit

1A. Discuss the causes for incompatible crossmatch.

1B. Discuss the approach to patient with multiple alloantibodies

1C. Mention the strategies that can be adopted to prevent Alloimmunization

(5+5+5 = 15 marks)

2. Discuss the HLA system under following headings:

2A. Nomenclature of HLA antigens and alleles

2B. Methods of detection of HLA antigens and alleles

(5+10 = 15 marks)

3. **Write short notes on:**

3A. Rouleaux and saline replacement

3B. ISBT 700 series and 901 series

3C. Non-invasive fetal blood grouping

3D. Adsorption technique in immunohematology

3E. Monocyte monolayer assay

3F. Platelet crossmatch

3G. Resolution of ABO discrepancy

3H. H blood group system

3I. Drug induced autoimmune hemolytic anemia

3J. Blocked D phenomenon

(7 marks × 10 = 70 marks)



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PAPER III

Wednesday, July 05, 2023

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer all the questions.**

✍ **Long Questions:**

1. 62 year old female patient is admitted to Orthopedic unit for total hip replacement surgery. She belongs to Jehovah's witness and is a known case of Type 2 diabetes. She is on Aspirin 75mg daily for the last 2 years as antithrombotic prophylaxis. Her preoperative Hb is 7.6 g/dL, HCT of 20.4%, and Blood group- O Negative.

1A. Discuss the pre and perioperative blood management of the above case.

1B. Discuss the legal and ethical issue related to this scenario.

(15 marks)

2. Discuss the diagnosis and management of Thrombotic micro-angiopathy with a special emphasis on therapeutic apheresis procedures.

(15 marks)

3. **Write Short Note on:**

3A. National plasma policy.

3B. Cryopreservation of stem cells.

3C. Differentiate between TRALI and TACO.

3D. Donor motivation, recruitment and retention strategies.

3E. Process flow mapping of component laboratory.

3F. Different approaches to do a root cause analysis.

3G. Neonatal thrombocytopenia – Differential diagnosis, Investigations and Treatment.

3H. Washed PRBCs – Indications, Advantages and Disadvantages.

3I. Transfusion in critical care; Trigger and special requirements

3J. Factors affecting the yield of apheresis platelet concentrate

(7 marks × 10 = 70 marks)



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DEGREE EXAMINATION – JULY 2023

PAPER IV

Thursday, July 06, 2023

Time: 14:00 – 17:00 Hrs.

Max. Marks: 100

✍ **Answer all the questions.**

✍ **Long questions:**

1. Describe Apheresis machines under following subheadings:

- 1A. Different types of apheresis machines and their working principle
- 1B. Implementation of Apheresis program in your setup

(10+5 = 15 marks)

2. Describe Pathogen Inactivation technology under following subheadings:

- 2A. Definition, Rationale and Risks associated
- 2B. Different methods with advantages and disadvantages
- 2C. Applications and Quality control

(5+5+5 = 15 marks)

3. **Write Short Notes on:**

- 3A. Types of dendritic cells and its functions
- 3B. Fluidics and optics of flow-cytometry
- 3C. Interleukin -11
- 3D. Individual versus mini-pool NAT (nucleic acid testing)
- 3E. Low molecular weight heparin
- 3F. Transfusion strategy in ABO mismatch HSCT (hematopoietic stem cell transplantation)
- 3G. Donor Lymphocyte Infusion
- 3H. Blood Bag time temperature Indicator
- 3I. Noninvasive Fetal Blood Grouping
- 3J. Vectors in gene therapy

(7 marks × 10 = 70 marks)

