

Table of Specifications (ToS) (Modified)
M.Phil Haematology (Part-I)
“Paper-I”
Disorders of Red Cells, Platelets
Coagulation Factors and Thrombosis

Sr. #	Topics/subtopics	No. of MCQs	No. of SEQs
1	<i>Origin and development of blood cells</i> > Hematopoetic organs > Hematopoetic stem cells > Committed hematopoietic “progenitor cells > Hematopoietic growth factors/cytokines	02	
2	<i>Erythropoiesis</i> > Erythroid cells > Biosynthesis of hemoglobin > Control of erythropoiesis	01	
3	<i>The Mature red cell (shape, dimensions, structure)</i> > Hemoglobin and erythrocyte function > Energy metabolism	01	
4	<i>Destruction of erythrocytes</i> > Site and mechanisms of erythrocyte destruction > Hemoglobin catabolism > Laboratory evaluation of hemoglobin catabolism and bile pigments	02	
5	<u>DISORDERS OF RED CELLS</u> <i>General aspects of anemia</i> > Definition > Clinical manifestations > Pathophysiology > Classification and morphology > Diagnostic approach o Macrocytic anemia o Hypochromic microcytic anemia o Normochromic normocytic anemia	01	
	<i>Iron deficiency anemia</i> > Stages of development of iron deficiency > Etiology and pathogenesis > Clinical manifestations > Laboratory findings	03	01
	<i>Megaloblastic and other Macrocytic anemias</i> > Vitamin B12 and Folate deficiency (Causes, clinical findings, pathogenesis and laboratory diagnosis) > Pernicious anemia (Prevalence, Etiology and pathogenesis, Clinical manifestations & Laboratory findings)	03	

	<i>Anemia in pregnancy</i>		
	<i>Anemia unique to infancy and childhood</i>	01	
	<i>Sideroblastic Anemias</i> <ul style="list-style-type: none"> ➤ Heme synthesis in red cells ➤ Etiology ➤ Laboratory findings 	02	
	<i>Pancytopenia, Bone marrow failure syndromes, Congenital / Acquired</i> <ul style="list-style-type: none"> ➤ Pathophysiology ➤ Etiology ➤ Symptoms and signs ➤ Lab diagnosis 	02	01
	<i>Methemoglobinemia</i>		
	<i>Iron overload</i> <ul style="list-style-type: none"> ➤ Hemochromatosis 	01	
	<i>Porphyrias</i> <ul style="list-style-type: none"> ➤ Classification ➤ Causes ➤ Pathogenesis ➤ Diagnosis 		
	<i>Hemoglobinopathies</i> <i>The Abnormal Hemoglobins - General Principles</i> <ul style="list-style-type: none"> ➤ Classification ➤ Genetic mechanism and molecular pathology ➤ Pathophysiology ➤ Hemoglobin C disorders ➤ Hemoglobin D disorders ➤ Hemoglobin E disorders 	03	01
	<i>Sickle Cell Anemia</i> <ul style="list-style-type: none"> ➤ Hemoglobin S- prevalence and distribution ➤ Pathophysiology ➤ Clinical features ➤ Laboratory diagnosis ➤ Sickle cell trait ➤ Other sickling syndromes ➤ Prevention 	02	
	<i>Thalassemias and Related Disorders</i> <ul style="list-style-type: none"> ➤ Prevalence and geographic distribution ➤ Genetic mechanisms and molecular pathology ➤ Pathophysiology ➤ Clinical and laboratory features of <ul style="list-style-type: none"> ○ Alpha thalassemia ○ Beta thalassemia ○ Hereditary persistence of fetal hemoglobin ○ Hb Lepore syndromes ➤ Diagnosis and differential diagnosis ➤ Prevention 	03	

<p><u>Hemolytic Anemias : General Consideration</u></p> <ul style="list-style-type: none"> ➤ Definition ➤ Classification ➤ Clinical manifestations ➤ Laboratory diagnosis 	01	01
<p><u>Hereditary Spherocytosis And Other Membrane Disorders</u></p> <p>Genetics Pathogenesis Clinical features Laboratory diagnosis</p> <ul style="list-style-type: none"> ○ Hereditary elliptocytosis ○ Hereditary stomatocytosis 	02	
<p><u>Hereditary Hemolytic Anemias associated with abnormalities of erythrocyte glycolysis and nucleotide metabolism</u></p> <p><u>G-6 PD deficiency</u></p> <ul style="list-style-type: none"> ➤ Genetics and distribution ➤ The enzyme and its variants ➤ Pathophysiology ➤ Clinical features ➤ Diagnosis 	03	01
<p><u>Related disorders of hexose mono phosphate shunt and glutathione metabolism</u></p>		
<p><u>Pyruvate kinase deficiency</u></p> <ul style="list-style-type: none"> ➤ Geographic distribution ➤ Genetics ➤ Pathophysiology ➤ Clinical features ➤ Diagnosis 		
<p><u>Abnormalities of purine and pyrimidine nucleotide metabolism</u></p>		
<p><u>Immune Hemolytic Anemias</u></p> <p><u>Mechanisms of immune destruction of RBC</u></p> <ul style="list-style-type: none"> ➤ Complement system ➤ Destruction of IgM and IgG antibodies ➤ Demonstration of anti-red cell antibodies 	02	
<p><u>Allo-immune hemolytic disease of fetus and newborn.</u></p> <ul style="list-style-type: none"> ➤ Pathogenesis of maternal Rh allo-immunization ➤ Pathogenesis of Rh hemolytic disease and other fetal hemolytic disease ➤ Severity of Rh hemolytic disease ➤ Antibody detection and measurement ➤ Other hemolytic disorders ➤ Prevention 	02	
<p><u>Auto-immune hemolytic anemia</u></p> <ul style="list-style-type: none"> ➤ Classification ➤ Etiology ➤ Clinical features ➤ Laboratory Diagnosis 	01	

	<p><i>Acquired Hemolytic Anemias</i></p> <ul style="list-style-type: none"> ➤ Infectious agents <ul style="list-style-type: none"> ○ Malaria ○ Other infections ➤ Chemical agents, drugs & venoms ➤ Physical agents ➤ Red cell fragmentation syndromes <ul style="list-style-type: none"> ○ Large vessel abnormalities ○ Small vessel disease ○ Thrombotic microangiopathy ○ Malignant hypertension ➤ March hemoglobinuria 	03	
	<p><i>Paroxysmal Nocturnal Hemoglobinuria</i></p> <ul style="list-style-type: none"> ➤ Etiology and pathogenesis ➤ Clinical manifestations ➤ Laboratory findings ➤ Differential diagnosis 	02	
	<p><i>Acute Post Hemorrhagic Anemia</i></p> <ul style="list-style-type: none"> ➤ Clinical description ➤ Pathophysiology ➤ Hematological finding ➤ Diagnosis 		
	<p><i>Congenital Dyserythropoietic Anemias</i></p> <ul style="list-style-type: none"> ➤ Type I, Type II, Type III, Other Variants ➤ Pathogenesis ➤ Clinical and hematological findings ➤ Diagnosis 	02	

Sr. no.	Topics/subtopics	No. of MCQs	No. of SEQs
	<p><i>Platelets and Megakaryocytes</i></p> <ul style="list-style-type: none"> ➤ Megakaryocytes ➤ Platelet formation and release ➤ Platelet structural and functional anatomy ➤ Platelet physiology ➤ Platelet function <ul style="list-style-type: none"> ○ Platelet adhesion ○ Platelet aggregation ○ Platelet release reaction ○ Pathologic role of platelets in hemostasis and thrombosis ➤ Platelet antigens 	03	
	<p><i>Blood Coagulation And Fibrinolysis</i></p> <ul style="list-style-type: none"> ➤ Normal coagulation cascade ➤ Clotting factors <ul style="list-style-type: none"> ○ Structure and function of all factors ➤ Natural inhibitors of coagulation system <ul style="list-style-type: none"> ○ Protein C and protein S pathway ○ Anticoagulant proteins ○ Alpha₂ macrogloblin, serine protease inhibitors, Anti thrombin III, ○ Protein C inhibitor ○ Heparin Co factor II ○ Tissue factor pathway inhibitor ○ Fibrinolytic system ○ Inhibitors of fibrinolytic system ○ Physiologic regulation of fibrinolysis ➤ Role of fibrinolytic process in preventing thrombosis 	04	
	<p><i>Endothelium and Regulation Of Hemostasis</i></p> <ul style="list-style-type: none"> ➤ Endothelial cell structure ➤ Anti-thrombotic properties of endothelium ➤ Pro-thrombotic properties of endothelium 	02	

	<p><u>Disorders of Hemostasis and coagulation</u></p> <p><i>Diagnostic Approach to the Bleeding Disorders</i></p> <ul style="list-style-type: none"> ➤ Clinical evaluation of the bleeding patient ➤ Laboratory methods for the study of hemostasis and blood coagulation. ➤ Bleeding and coagulation time ➤ PT and APTT ➤ Factor assays ➤ Tests for inhibitors of coagulation 	03	01
	<p><i>Bleeding Disorders Caused By Vascular Abnormalities</i></p> <ul style="list-style-type: none"> ➤ Classification ➤ Pathophysiology 	02	
	<p><i>Thrombocytopenia</i></p> <ul style="list-style-type: none"> ➤ Classification ➤ Causes of thrombocytopenia ➤ Pathophysiology of immunological platelet destruction ➤ Thrombotic thrombocytopenic purpura ➤ Other forms of non-immunologic platelet destruction 	04	
	<p><i>Thrombocytosis</i></p>	02	
	<p><i>Qualitative Disorders Of Platelet Function</i></p> <ul style="list-style-type: none"> ➤ Bernard Soulier syndrome ➤ Glanzmann's thrombasthenia ➤ Storage pool disease ➤ Abnormal platelet mechanism ➤ Acquired disorder of platelet function 	04	
	<p><i>Inherited Coagulation Disorders</i></p> <ul style="list-style-type: none"> ➤ Hemophilia A ➤ Von Willebrand's disease ➤ Hemophilia B ➤ Factor XIII deficiency ➤ Prothrombin deficiency ➤ Factor V deficiency ➤ Factor VII deficiency ➤ Factor X deficiency ➤ Factor XI and XII deficiency ➤ Pre kallikarein deficiency 	04	01
	<p><i>Acquired Coagulation Disorders</i></p> <ul style="list-style-type: none"> ➤ Deficiency of vitamin k dependent factors ➤ Liver disease ➤ Disseminated intravascular coagulation ➤ Primary fibrinolysis ➤ Pathologic inhibitors of coagulation 	04	

	<i>Thrombosis and Anti Thrombotic Drugs</i> ➤ Pathophysiology of thrombosis ➤ Inherited thrombotic disorders ➤ Anti-thrombotic drugs ➤ Laboratory evaluation & monitoring of anticoagulant therapy	03	
		80	07
	Total Marks	80	70

MCQ's = 80

Total Marks = 80

Time = 90 Minutes

SEQ's = 7

Total Marks = 70

Time = 90 Minutes

Total Marks of the Paper = 150

Total Time = 3 Hours



Dr. Shahida Mohsin
 M.B.B.S, M.S, (Belgium)
 F C P S Haematology (CPSP)
 Professor of Haematology
 University of Health Sciences Lahore

Table Of Specifications (ToS) (Modified)

M.Phil Haematology (Part-I)

“Paper-II”

Non-Malignant and Malignant Disorders of Leucocytes and Transfusion Medicine

Sr. #	Topics/Sub-topics	No. of MCQs	No. of SEQs
1.	Variations Of Leukocytes In Disease		
➤	Abnormalities of the Neutrophils ➤ Neutropenia and neutrophilia ➤ Qualitative disorders of neutrophils	02	
➤	Abnormalities of the Eosinophils & Basophils ➤ Eosinopenia and Eosinophilia ➤ Basophilia	02	
➤	Abnormalities of the monocyte macrophage system ➤ The lysosomal storage diseases ➤ Gaucher disease ➤ Niemann Pick disease ➤ Fabry's disease	02	
➤	Abnormalities of the lymphocytes ➤ Langerhans cell histiocytosis ➤ Infectious mononucleosis	02	
2.	Disorders of the Spleen ➤ Structure and function of spleen ➤ Causes of splenomegaly ➤ Hematological findings in splenomegaly / Hypersplenism ➤ Indications and complications of splenectomy	03	
3.	Hematologic Malignancies ➤ General aspects ➤ Molecular genetics ➤ Complications	03	
4.	Classification and Differentiation of Acute Leukemias ➤ Acute Lymphoblastic Leukemia ➤ Clinical features ➤ Laboratory diagnosis ➤ Differential diagnosis ➤ Acute Myelogenous Leukemia ➤ Clinical presentation ➤ Classification ➤ Lab diagnosis including cytogenetics ➤ Special issues	07	1
5.	The Myelodysplastic Syndromes ➤ Classification ➤ Pathogenesis and genetic features ➤ Clinical findings ➤ Laboratory diagnosis	05	1

6.	<p>Myeloproliferative Disorders</p> <ul style="list-style-type: none"> a) Chronic Myeloid Leukemia <ul style="list-style-type: none"> ➤ Clinical presentation and course ➤ Cellular and molecular pathogenesis ➤ Laboratory diagnosis b) Polycythemia Vera <ul style="list-style-type: none"> ➤ Clinical features ➤ Cytogenesis ➤ Pathogenesis ➤ Laboratory diagnosis c) Myelofibrosis <ul style="list-style-type: none"> ➤ Etiology and pathogenesis ➤ Laboratory diagnosis ➤ Differential diagnosis ➤ Treatment d) Essential Thrombocythemia <ul style="list-style-type: none"> ➤ Etiology and pathogenesis ➤ Laboratory diagnosis ➤ Cytogenetics ➤ Differential diagnosis 	07	1
7.	<p>Lymphoproliferative Disorders</p> <ul style="list-style-type: none"> a) Chronic Lymphocytic Leukemia <ul style="list-style-type: none"> ➤ Etiology ➤ Clinical and laboratory findings ➤ Laboratory diagnosis ➤ Staging b) Hairy Cell Leukemia c) Non – Hodgkin Lymphomas <ul style="list-style-type: none"> ➤ Etiology and cytogenetic studies ➤ Classification ➤ Morphology ➤ Clinical features ➤ Prognostic factors d) Hodgkin Disease <ul style="list-style-type: none"> ➤ Etiology and pathogenesis ➤ Clinical features ➤ Classifications ➤ Staging e) Cutaneous T cell Lymphoma; Mycosis Fungoides and Sezary Syndrome 	07	1

8.	Plasma Cell Dyscrasias General Considerations <ul style="list-style-type: none"> a) Multiple Myeloma <ul style="list-style-type: none"> ➤ Etiology , cytogenetics and pathogenesis ➤ Clinical manifestations ➤ Laboratory diagnosis b) Waldenstrom Macroglobulinemia c) Heavy Chain Disease <ul style="list-style-type: none"> ➤ Clinical features ➤ Lab diagnosis d) Amyloidosis <ul style="list-style-type: none"> ➤ Physical and chemical nature of amyloid fibrils ➤ Pathogenesis ➤ Clinical findings ➤ Laboratory diagnosis e) Cryoglobulin and cryoglobulinemia <ul style="list-style-type: none"> ➤ Classification ➤ Clinical findings ➤ Laboratory diagnosis 	05	1
----	--	----	---

2. Principles and Practice Of Transfusion Medicine

1.	Transfusion of blood and blood components <ul style="list-style-type: none"> ➤ Donor selection ➤ Blood donation and collection ➤ Collection process ➤ Red cell preservation ➤ Anticoagulants ➤ Components and fractionation of blood ➤ Blood components ➤ Plasma fractionation products ➤ Frozen RBC ➤ Autologous blood transfusion ➤ Indications of blood transfusion ➤ Exchange transfusion 	12	1
----	--	----	---

2.	Platelet Transfusion <ul style="list-style-type: none"> ➤ Indications of platelet transfusion ➤ Selection of platelet donors ➤ Preparation of platelet concentrates ➤ Platelet storage ➤ Frozen platelet 	05	1/2
3.	Granulocyte Transfusion <ul style="list-style-type: none"> ➤ Indications ➤ Selection of donors ➤ Preparation of granulocytes for transfusion ➤ Storage ➤ Dosage ➤ Adverse effects 	03	
4.	Transfusion of Plasma And Plasma Derivatives. <ul style="list-style-type: none"> ➤ Fresh frozen plasma ➤ Anti-hemophilic factor ➤ Factor concentrates ➤ Albumin ➤ Immunoglobulin preparation- indications and dosage 	04	
5.	Adverse Effects Of Blood Transfusion <ul style="list-style-type: none"> ➤ Immunologic reactions ➤ Non immunologic reactions ➤ Infectious complications (diseases transmitted) <ul style="list-style-type: none"> • Hepatitis B,C,D,A,E • HIV, Cytomegalovirus, EB Virus • Malaria and other parasitic infection 	06	1/2
6.	Therapeutic Aphaeresis	02	
7.	Hemopoietic Stem Cell Transplantation <ul style="list-style-type: none"> ➤ Hemopoietic stem cells ➤ Sources ➤ Indications ➤ Engraftment ➤ Complications ➤ Graft versus host disease ➤ Infectious diseases 	03	
		80	07
	TOTAL MARKS	80	70

MCQ's = 80

Total Marks = 80

Time = 90 Minutes

SEQ's = 7

Total Marks = 70

Time = 90 Minutes

Total Marks of the Paper = 150

Total Time = 3 Hours

Shahida

Dr. Shahida Mohsin
M.B.B.S, M.S. (Belgium)
F C P S Haematology (CPSP)
Professor of Haematology
University of Health Sciences Lahore