Table of Specifications (TOS) (Modified)
M. Phil Haematotechnology (Part-I)
"Paper-I"
Laboratory Safety and RBCs Disorders

Sr. #	Topics/Sub-topics	No. of MCQs	No. of SEQs
1	**Introduction to Haematology** ➢ Review of vascular system and Blood constituents	2	1
2	**Anatomy of Bone marrow and haematopoiesis** ➢ Blood formation in the body (Intra-uterine and extra-uterine) ➢ Factors governing haematopoiesis ➢ Stages of normal cell maturation	3	
3	**Safe methods of securing blood for analysis** ➢ Laboratory safety ➢ Safe handling of specimens ➢ Risk of communicable diseases such as HCV &HBV ➢ Exposure to reagents having toxic or carcinogenic nature	3	
4	**Quality control in Haematology and blood bank** ➢ Internal quality control measures ➢ External quality assessment	4	1
5	**Quality Assurance** ➢ Pre-analytical, Analytical and Post-analytical Components ➢ Proficiency Testing ➢ Establishment of Quality Control Limits ➢ Interpretation of Quality Control Charts ➢ Bulls Testing Algorithm ➢ Monitoring QC with Patient Specimens ➢ Detection of abnormal Test Results And Delta Checks	8	
6	**Anticoagulants for Haematology tests** ➢ Chemical anticoagulants ➢ Preparation and use of important anticoagulants ➢ Anticoagulation in blood banking	6	1
7	**Estimation of Haemoglobin Concentration** **Mannual methods** ➢ Cyanmethaemoglobin (HiCN) method ➢ Preparation of Calibration curves ➢ Acid haematin and alkaline haematin method Oxyhaemoglobin method **Automated methods** ➢ Other methods of haemoglobinometery	3	
8	**Enumeration of Erythrocytes (RBCs)** ➢ General Principles of RBC count ➢ Methods for estimation	3	

	➢ The hemocytometer, red cell pipette and diluting fluids ➢ Normal Values in different age groups ➢ Automation of RBCs		
9	**Haematocrit** ➢ Definition and principle of test procedures: Methods for estimation ➢ Correlation of hemoglobin, haematocrit, and erythrocyte count	**2**	
10	**Erythrocyte Sedimentation Rate** ➢ Principle and kinds of test procedures ➢ Normal values ➢ Significance of abnormal Values	**2**	**1**
11	**The Red Cell indices** ➢ Mean Corpuscular Volume (MCV) ➢ Mean Corpuscular Haemoglobin (MCH) ➢ Mean Corpuscular Haemoglobin Concentration (MCHC)	**3**	
12	**Preparation of Blood Smears** ➢ Preparation, drying & staining of smears ➢ Types of Stains & methods for preparation ➢ Criteria for good smear ➢ Variation in haemoglobin content and staining properties	**3**	
13	**Examination of stained smears** ➢ Define differential count ➢ Observation of erythrocytes ➢ Number of Platelets estimated ➢ Tabulation of Leukocytes ➢ Classification of leukocytes and normal ranges	**3**	
14	**Reticulocyte Count** ➢ Normal values for adults and infants ➢ Means of demonstrating reticulocytes, principle of the staining reaction ➢ Interpretation of findings & sources of error ➢ Preparation of stain	**2**	
15	**Lab Diagnosis of Anaemias** ➢ Introduction to anaemias ➢ Tests for Iron deficiency anaemia ➢ Tests for megaloblastic anaemia ➢ Tests for aplastic anaemia	**10**	**1**
16	**Tests for hemolytic anaemia** ➢ Congenital ➢ Acquired	**5**	**1**
17	**Investigations for Membranopahties** ➢ Introduction ➢ Osmotic fragility test ➢ Sucrose lysis test ➢ Ham's test	**3**	

18	**Investigations for Enzymopathies** ➢ Glucose –6-Phosphate dehydrogenase deficiency ➢ Pyruvate Kinase Deficiency	**3**	
19	**Investigation of Abnormal Hemoglobins and Thalassaemia** ➢ Hb Electrophoresis ➢ Estimation of Hb F ➢ Demonstration of Heinz Bodies ➢ Tests for Hb S ➢ Demonstration of Hb H ➢ Tests for Unstable Hb	**10**	**1**
20	**Paroxysmal Nocturnal Hemoglobinuria** ➢ Etiology and Pathogenesis ➢ Laboratory findings	**2**	
		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

Table of Specifications (TOS) (Modified)
M. Phil Haematotechnology (Part-I)
"Paper-II"
Disorders of Leucocytes and Platelets

Sr. #	Topics/Sub-topics	No. of MCQs	No. of SEQs
1	**Tests for non-malignant diseases of white cells** ➢ Tests for Infectious mononucleosis ➢ Monospot test ➢ Paul bunnel test	2	1
2	**Acute Leukemia** ➢ **Acute Lymphoblastic Leukemia** ➢ Classification ➢ Lab Diagnosis ➢ **Acute Myeloid Leukemia** ➢ Classification ➢ Lab Diagnosis	5	
3	**Myeloproliferative disorders** **Chronic Myeloid Leukemia** ➢ Introduction ➢ Lab Investigations ➢ Diagnostic Criteria ➢ Differentiation from Leukemoid Reaction	3	1
	➢ **Polycythemia Vera** ➢ Introduction ➢ Classification ➢ Lab Investigations ➢ Diagnostic Criteria	3	
	➢ **Essential Thrombocythemia** ➢ Introduction ➢ Lab Investigations ➢ Diagnostic Criteria	3	
	➢ **Myelofibrosis** ➢ Introduction ➢ Lab Investigations ➢ Diagnostic Criteria	3	
4	**Lymphoid Neoplasia** **Chronic Lymphocytic Leukemia** ➢ Introduction ➢ Lab Diagnosis ➢ Clinical Staging	3	1
5	**Introduction to Hodgkin and Non-Hodgkin Lymphomas** ➢ Classification ➢ Lab Diagnosis	4	

6	**Myelodysplastic syndromes** ➢ Introduction ➢ Classification ➢ Lab Diagnosis	5	
7	**Plasma cell dyscrasias** ➢ Introduction ➢ Multiple Myeloma & Lab Diagnosis ➢ Waldenstromes Macroglobulinemia ➢ Lab Diagnosis ➢ Light chain & heavy chain disease	5	
8	**Tests to evaluate the Haematostatic status** ➢ Hess test ➢ Bleeding time by Duke's and Ivy's method ➢ Whole blood clotting time ➢ Prothrombin time (PT) ➢ Partial thrombolastin time (PTTK) ➢ Thrombin time ➢ Mixing studies ➢ Measurement of FDP & D-dimers ➢ Measurement of Fibrinogen ➢ Factor Assays	10	1
9	**Platelet Function studies** ➢ Aggregation patterns by ADP, Collagen, Adrenaline, Restocitin and Arachidonic acid	5	1
10	**Thrombophilia** ➢ Causes ➢ Lab Investigations	3	
11	**Bone Marrow Aspiration** ➢ Equipment required for the process ➢ Preparation of smears ➢ Processing & staining of bone marrow smears	5	
12	**Special stains in Haematology** ➢ Sudan Black B ➢ MPO ➢ PAS ➢ Non-Specific Esterase ➢ Specific Esterase ➢ NAP Staning ➢ Acid Phosphatase ➢ Perl's stain	6	1
13	**Bone Marrow Examination** Bone marrow Aspiration ➢ Procedure ➢ Staining of bone marrow smears ➢ Examination of Aspirated Bone Marrow smear ➢ Differential cell counts and Myelogram	3	1

	Bone marrow Trephine biopsy ➢ Bone marrow trephine needles ➢ Preservation of biopsy		
14	**Immunophenotyping** ➢ Instrumentation ➢ Sample Requirements ➢ Sample Processing ➢ Role in ALL, AML, CLL, Non-Hodgkin Lymphomas.	8	
15	**Introduction to Molecular Techniques** ➢ BCR-ABL RT-PCR ➢ Southern Blot Analysis in Lymphoproliferative Disorders ➢ FISH	4	
		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

Table of Specifications (TOS) (Modified)
M. Phil Haematotechnology (Part-II)
Transfusion Medicine Minor

Sr. #	Topics/Sub-topics	No. of MCQs	No. of SEQs
1.	**Requirement of a standard blood bank** ➢ Area ➢ Staff ➢ Equipment ➢ Reagents	1	
2.	**Donors** ➢ Donor selection criteria ➢ Collection techniques ➢ Adverse reactions	6	
3.	**Processing** ➢ Labeling ➢ Storage of blood ➢ Screening for Transfusion transmitted disease	3	
4.	**Storage** ➢ Anticoagulants/preservatives ➢ Storage/refrigeration requirements ➢ Transportation ➢ Properties of stored products	4	
5.	**Blood Components** ➢ Red blood cells ➢ Fresh frozen plasma ➢ Cryoprecipitated AHF ➢ Platelets ➢ Plasma ➢ Leukocyte-reduced components ➢ Red blood cells deglycerolized ➢ Apheresis products ➢ Whole blood ➢ Washed red blood cells ➢ Gamma irradiated components ➢ Hematopoietic progenitors	10	
6.	**Autologous Donors**	1	
7.	**Quality Assurance** ➢ Blood samples ➢ Reagents ➢ Test procedures	6	
8.	**Blood Group Systems** **Genetics**	14	

	➢ Basic ➢ Molecular ➢ Inheritance of blood groups **Chemistry, Antigens** ➢ ABO ➢ Lewis ➢ Rh ➢ MNS ➢ P, Globoside ➢ Ii ➢ Kell ➢ Kidd ➢ Duffy ➢ Lutheran ➢ Other ➢ Antigens of high incidence ➢ Antigens of low incidence ➢ HLA ➢ Platelet specific ➢ Granulocyte specific		
9.	**Immunology** **Immunoglobulins** ➢ Classes and subclasses ➢ Structure ➢ Biologic and physiochemical	4	
10	**Antigen-Antibody Interactions** ➢ Principles ➢ Testing ➢ Principles ➢ Methods	6	
11	**Complement** ➢ Classical and alternative pathway mechanisms ➢ Biologic properties	2	
12	**Serologic and Molecular Testing** **Routine Tests** ➢ Blood grouping tests ➢ Compatibility tests ➢ Antibody detection ➢ Crossmatch ➢ Antibody identification/clinical significance ➢ Antiglobulin testing ➢ Direct and indirect	15	
13	**Reagents** ➢ Antiglobulin sera ➢ Blood grouping sera ➢ Reagent red cells	5	

14	**Application of Special Tests and Reagents** ➢ Enzymes ➢ Enhancement media ➢ Lectins ➢ Adsorptions ➢ Elutions ➢ Titrations ➢ Solid phase ➢ Column agglutination test ➢ Microtechniques	8	
15	**Adverse Effects of Transfusion** ➢ RBC/platelet destruction ➢ Physiology Detection (serologic, biochemical, clinical) ➢ Leukocyte/plasma protein reactions ➢ Non-immunologic reactions ➢ Disease transmission ➢ Graft vs. host disease	10	
16	**Investigations of Haemolytic Transfusion reactios**	5	
	Total Marks	**100**	

MCQ's = 100 **Total Marks = 100** **Time = 120 Minutes**