

[KD 064]

Sub. Code : 1401

4

Write short notes on :

(4 × 10 = 40)

- (a) Competitive genomic hybridisation
- (b) Cell-sorting
- (c) HFE gene
- (d) MLL rearrangements.

D.M. DEGREE EXAMINATION

(Higher Specialities)

(Revised Regulations)

Branch X — Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions

1. Discuss structure and function of von-Willebrand factor. Outline its role in pathogenesis of thrombotic thrombocytopenic purpura. (20)
2. Discuss biochemical and genetic control of apoptosis. Give an account of its relevance in normal haemopoiesis and haematological malignancies. (20)
3. Discuss structure and chemistry of DNA. Outline common molecular techniques giving their principles and applications in inherited haematological disorders. (20)

March-2002

[KG 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Discuss endothelium and its role in regulation of haemostasis. (20)
2. Enumerate common molecular techniques. Discuss molecular pathophysiology of chronic myeloid leukaemia, outlining its impact in development of newer therapies. (20)
3. Discuss common cytogenetic techniques and their applications in inherited haematological disorders. (20)
4. Write short notes on : (4 × 10 = 40)
 - (a) Genomic diversity
 - (b) Glycophorin
 - (c) Homocysteine cycle
 - (d) CD52.

[KH 064]

Sub. Code : 1401

4

Write short notes on :

(4 × 10 = 40)

D.M. DEGREE EXAMINATION

(Higher Specialities)

(Revised Regulations)

Branch X — Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIETIC**

Time : Three hours

Maximum : 100 marks

Answer ALL questions

1. Describe the mechanism of gene expression. Explain how the gene mutations cause haemoglobinopathies. (20)
2. Describe adhesion molecules. Explain how the defects in adhesion molecules cause disease giving any two examples. (20)
3. Describe the steps involved in complement system. Explain the basic defects in paroxysmal nocturnal haemoglobinuria and the laboratory tests that helps in evaluation of those defects. (20)

- (a) Survivin
- (b) Ceramide
- (c) Gene therapy
- (d) Mutations which cause resistance to activated Protein C.

[KK 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Clinical Haematology

Paper I — STRUCTURE AND FUNCTION OF THE
HEMOPOIETIC SYSTEM MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HOMOPOIESIS

Time : Three hours

Maximum : 100 marks

Theory : Two hours and
forty minutes

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

A. Essay Questions :

(2 × 15 = 30)

1. What is the current understanding of the mechanism of blood clotting and the pathogenesis of thrombophilia?

2. Describe the organization of the gene and its function. Describe the regulation of gene function.

B. Short notes :

(10 × 5 = 50)

1. Amegakaryocytic thrombocytopenia
2. Folic acid and thrombosis
3. PCR
4. Tyrosine kinase
5. NK cells
6. Dyskeratosis congenita
7. Protease activated receptors
8. ADAMTS
9. Gardos effect
10. Hypomethylating agents.

[KM 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Haematology

Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS

Time : Three hours

Maximum : 100 marks

Theory : Two hours and
forty minutes

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Essay Questions : (2 × 15 = 30)

(1) Structure and function of the bone marrow
microenvironment.

(2) Genetics of inherited thrombocytopenia.

II. Short notes : (10 × 5 = 50)

- (a) Applications of Real time PCR.
- (b) Interleukin 6 and its receptor.
- (c) Costimulatory molecules involved in T-cell
activation.
- (d) P-selectin.
- (e) Role of apoptosis in MDS.
- (f) Genetics of hereditary Sideroblastic
anaemia.
- (g) Classic pathway of Complement.
- (h) Thrombomodulin.
- (i) Thrombopoietin.
- (j) Congenital leukemia.

[KO 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS**

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Essay questions : (2 × 15 = 30)

(1) Discuss the concept of the haemopoietic stem cell.

(2) Define and classify oncogenes and discuss its implication in the pathogenesis of haematologic neoplasms.

II. Short notes :

(10 × 5 = 50)

(a) The compliment system

(b) Progenitor cell leukemia

(c) Pseudo-genes

(d) Suicide cancer gene therapy

(e) Genetics of Thalassemia

(f) Interleukin - 2

(g) p 53 gene

(h) Function of CD₄ and CD₈

(i) Erythropoietin

**(j) Application of fish in haematology (FISH -
Fluorescence in situ hybridization Technique).**

[KP 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Clinical Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS**

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Essay Questions :

(1) Discuss the modern concept of haemopoietic cell differentiation to various functioning haemopoietic cells with evidences from cultural studies and implication of various growth factors in helping the differentiation process. (20)

(2) Vitamin B₁₂ and Folic Acid interaction and haemopoiesis. (15)

(3) Discuss the concept of gene therapy for haematological disorders. (15)

II. Short notes :

(6 × 5 = 30)

- (a) Congenital dyserythropoietic anaemia.
 - (b) Serum transferrin receptors.
 - (c) G-CSf.
 - (d) Standard Giemsa banded Karyotype in haematological malignancy.
 - (e) PCR reaction.
 - (f) Phagocytosis.
-

[KQ 064]

Sub. Code : 1401

D.M. DEGREE EXAMINATION.

(Higher Specialities)

(Revised Regulations)

Branch X — Clinical Haematology

**Paper I — STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY
AND GENETIC ASPECTS OF HAEMOPOIESIS**

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

I. Essay question : (20)

**1. Discuss the impact of translational research in
haematological disorders.**

II. Essay questions : (2 × 15 = 30)

1. Haematopoietic growth factors.

**2. Define “plasticity/transdifferentiation” potential of
stem cells in cardiac diseases.**

III. Short notes : (6 × 5 = 30)

1. Importance of BCR ABL in leukemias.

2. Gene therapy for β -thalassemia.

3. Bone marrow structure and function

4. Polymerase chain reaction.

5. Human leucocyte antigen (HLA) system.

6. Gene expression profiling by microarray analysis.

August 2008

[KT 064]

Sub. Code: 1401

D.M. DEGREE EXAMINATION

(Higher Specialities)

Branch X – Clinical Haematology

(Revised Regulations)

**Paper I – STRUCTURE AND FUNCTION OF THE HAEMOPOIETIC
SYSTEM, MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three hours

Maximum: 100 Marks

Answer ALL questions

Draw suitable diagrams wherever necessary.

I. Essays:

2 x 20 = 40

1. Discuss the changes in the site, morphology and nature of haemopoiesis from embryonic stage to adult life with suitable diagram.
2. Discuss the structure and function of different areas of a lymph node with suitable diagram.

II. Write short notes on:

10 x 6 = 60

1. Ferrokinetics, its application in haematology.
2. Erythropoietin.
3. Restriction Fragment length polymorphism.
4. Alternative pathway of complement activation.
5. Modern cell based theory of blood coagulation.
6. Euchromatin and Heterochromatin in a cell.
7. One carbon metabolism in haematology.
8. Histone and gene action.
9. Morphological change in myeloid cells in myelodysplasia.
10. Principles of sequencing a gene with known sequence.

August 2009

[KV 064]

Sub. Code: 1401

D.M. DEGREE EXAMINATION

(Higher Specialities)

Branch X – CLINICAL HAEMATOLOGY

(Revised Regulations)

**Paper I – STRUCTURE AND FUNCTION OF THE HAEMOPOIETIC
SYSTEM, MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three hours

Maximum: 100 Marks

Answer ALL questions

Draw suitable diagrams wherever necessary.

I. Essays:

2 x 20 = 40

1. Monocyte – Macrophage system.
2. Describe the coagulation cascade.

II. Write short notes on:

10 x 6 = 60

1. Anemia of inflammation.
2. Factor XIII.
3. RH blood group system.
4. PIG – A mutations.
5. Molecular pathogenesis of APML.
6. Pathogenesis of bone disease in myeloma.
7. NK Cell.
8. The cell cycle.
9. Immunoglobulin structure.
10. Hybridoma.

August 2011

[KZ 064]

Sub. Code: 1401

**DOCTORATE OF MEDICINE (D.M.) DEGREE EXAMINATION
(SUPER SPECIALITIES)**

BRANCH X – CLINICAL HAEMATOLOGY

**STRUCTURE AND FUNCTION OF THE HAEMOPOIETIC SYSTEM,
MOLECULAR BIOLOGY AND GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

**Time : 3 hours
(180 Min)**

Maximum : 100 marks

Answer ALL questions in the same order.

I. Elaborate on :

Pages (Max.)	Time (Max.)	Marks (Max.)
-------------------------	------------------------	-------------------------

- | | | | |
|--|----|----|----|
| 1. Describe the hematopoietic stem cell niche and its relevance to hematopoiesis as well pathogenesis of hematological diseases. | 11 | 35 | 15 |
| 2. Describe the current understanding of the platelet vessel wall interaction and give examples of the defects in the common platelet disorders. | 11 | 35 | 15 |

II. Write notes on :

- | | | | |
|---|---|----|---|
| 1. Clonogenic DNA (cDNA) | 4 | 10 | 7 |
| 2. Quantitative PCR | 4 | 10 | 7 |
| 3. Common mutations in the thalassemias and their detection methods | 4 | 10 | 7 |
| 4. bcr-abl translocation and mutations in this region. | 4 | 10 | 7 |
| 5. JAK 2 mutation | 4 | 10 | 7 |
| 6. Dendritic cells | 4 | 10 | 7 |
| 7. T cell gene receptor | 4 | 10 | 7 |
| 8. Platelet granules | 4 | 10 | 7 |
| 9. B cell ontogeny | 4 | 10 | 7 |
| 10. Mesenchymal stromal cells | 4 | 10 | 7 |

[LB 064]

AUGUST 2012

Sub. Code: 1401

D.M – CLINICAL HAEMATOLOGY

**Paper – I STRUCTURE AND FUNCTION OF THE HAEMOPOIETIC SYSTEM,
MOLECULAR BIOLOGY AND GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: 3 hours

Maximum: 100 marks

(180 Min) Answer ALL questions in the same order.

I. Elaborate on:

**Pages Time Marks
(Max.)(Max.)(Max.)**

- | | | | |
|--|----|----|----|
| 1. Discuss the molecular mechanisms underlying the regulation of systemic iron homeostasis with particular emphasis on the role of hepcidin. | 16 | 35 | 15 |
| 2. Describe the various stages of B cell lymphopoiesis including commitment and response to antigenic stimuli. | 16 | 35 | 15 |

II. Write notes on:

- | | | | |
|--|---|----|---|
| 1. Transcription factors involved in lineage selection by hematopoietic cells. | 4 | 10 | 7 |
| 2. Stem cell mobilization. | 4 | 10 | 7 |
| 3. Genetic defects in hemochromatosis. | 4 | 10 | 7 |
| 4. Locus control region. | 4 | 10 | 7 |
| 5. Telomere. | 4 | 10 | 7 |
| 6. Hematopoietic stem cell niche. | 4 | 10 | 7 |
| 7. WT1 antigen. | 4 | 10 | 7 |
| 8. "ALIP" in the bone marrow. | 4 | 10 | 7 |
| 9. Bone marrow microenvironment in multiple myeloma. | 4 | 10 | 7 |
| 10. PCR in molecular genetics. | 4 | 10 | 7 |

D.M. – CLINICAL HAEMATOLOGY
Paper – I STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC ASPECTS OF
HAEMOPOIESIS
Q.P.Code: 161401

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X15=30)

1. What is angiogenesis? Briefly explain its role in haematological diseases and drugs used to inhibit angiogenesis.
2. Classify immunosuppressive drugs and briefly explain their mechanism of action with special reference to Graft Versus Host Disease.

II. Write notes on:

(10X7=70)

1. Prion diseases.
2. Gene therapy.
3. JAK inhibitors.
4. Carfilzomib.
5. Comparative genome hybridization (CGH).
6. Complement system.
7. Gap PCR.
8. FLT3 inhibitors.
9. Confirmation sensitive gel electrophoresis (CSGE).
10. Role of multimer analysis in von Willebrand disease.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Describe normal iron metabolism and describe the important proteins that are involved in it.
2. Describe in detail the current understanding of the sub-clonal architecture in acute myeloid leukemia and its relevance to diagnosis, prognostication, treatment and minimal residual disease detection.

II. Write notes on: **(10 x 7 = 70)**

1. Heme biosynthesis.
2. NK cells.
3. Heat shock proteins.
4. Variable number of tandem repeats in molecular diagnosis.
5. Serine proteases in hematology.
6. Interferon.
7. Notch signaling.
8. VLA-4 and stem cell mobilization.
9. JAK-STAT pathway.
10. Integrins.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss the structure and function of the von Willebrand factor and its role in pathogenesis of thrombotic microangiopathy.
2. Describe erythropoiesis and its molecular control.

II. Write notes on: **(10 x 7 = 70)**

1. Homing of hematopoietic stem cells.
2. Granulocyte colony stimulating factor.
3. Mechanism of iron absorption.
4. Locus control region.
5. Telomere.
6. Rh antigens.
7. Endonucleases.
8. Thrombopoietin.
9. Leucocyte adhesion molecules.
10. Epigenetics.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECLULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss the role of the microenvironment in CLL.
2. Discuss the impact of molecular genetic markers on treatment of AML.

II. Write notes on: **(10 x 7 = 70)**

1. Pathophysiology of TTP.
2. Pathophysiology of anemia of chronic disease.
3. Classification of Polycythemia.
4. Mechanism of drug induced Hemolytic anemia.
5. NK cell.
6. Integrins.
7. APC resistance.
8. Lymphocytopenia.
9. Normal bone marrow aspirate.
10. Granulocyte transfusions.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss recent developments in the understanding of role of epigenetics development and prognostication of myeloid malignancies.
2. Describe the molecular basis of Paroxysmal Nocturnal Hemoglobinuria and its relevance on disease biology, diagnosis and management.

II. Write notes on: **(10 x 7 = 70)**

1. Micro RNA.
2. Structural changes in red cell membrane in Hereditary spherocytosis.
3. Ribosomes.
4. Effect of hepcidin on iron homeostasis.
5. Hemoglobin structure.
6. Reactive oxygen species.
7. F IX gene.
8. Tumor angiogenesis.
9. NK cells.
10. Role of microenvironment in leukemia.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss recent developments in the understanding of the genomic landscape of myeloproliferative neoplasms (MPN) and its relevance.
2. Describe the molecular basis of Fanconi anemia and its relevance on disease biology, diagnosis and management.

II. Write notes on: **(10 x 7 = 70)**

1. Epigenetics.
2. Structure of the red cell membrane.
3. Warburg effect in oncology.
4. Interferon.
5. Hypoxia and erythropoiesis.
6. Reactive oxygen species.
7. FVIII gene.
8. Hemoglobin structure.
9. Erythropoietin.
10. Selectins and neutrophils.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P.Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss lymphoid ontogeny with reference to development of T cells and their role in immune response.
2. Describe platelet structure and the role of the platelet in primary hemostasis.

II. Write notes on: **(10 x 7 = 70)**

1. Hepcidin.
2. Immunoglobulin gene re-arrangement.
3. Tyrosine Kinases.
4. Fibrinogen.
5. CD34 antigen.
6. Structure of hemoglobin.
7. Transcription factors.
8. Mesenchymal stromal cell.
9. Role of Vitamin B12 in hematopoiesis.
10. The Natural Killer cell.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – BASIC SCIENCES – STRUCTURE AND FUNCTION OF
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Mention the structure and function of von Willebrand factor and its role in pathogenesis of Thrombotic thrombocytopenic purpura. Discuss the laboratory evaluation of TTP.
2. Discuss the molecular pathogenesis of APML. Mention briefly the risk categorization and the common drugs used in treatment of APML.

II. Write notes on: **(10 x 7 = 70)**

1. Role of apheresis in management of hematological disorders.
2. Basic defects in PNH and laboratory tests that help in evaluation of those defects.
3. Molecular and genetic aspects of Fanconi anemia.
4. Angiogenesis and its role in hematological disorders.
5. Minimal residual disease.
6. Unstable haemoglobins.
7. Induced Pluripotent stem cells.
8. Flow cytometry in non malignant haematological diseases.
9. Physiological regulators of coagulation process.
10. Prognostic scoring systems in myeloproliferative neoplasm.

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Describe normal pathway of heme synthesis and its relevance in hematology.
2. Describe in detail the current understanding of the mechanisms of resistance to tyrosine kinase inhibitors in chronic myeloid leukemia and strategies that could potentially overcome it.

II. Write notes on: **(10 x 7 = 70)**

1. Myeloid derived suppressor cells.
2. Gamma delta T cells.
3. Targeting the microenvironment in chronic lymphocytic leukemia.
4. Mixed chimerism post stem cell transplantation in nonmalignant hematological diseases.
5. Normal metabolism of Arsenic trioxide.
6. Wnt signaling pathway.
7. Molecular biology of stem cell homing.
8. Warburg phenomenon.
9. Post transcriptional regulation.
10. Somatic uniparental disomy.

(LR 064)

**NOVEMBER2020
(AUGUST 2020 SESSION)**

Sub. Code: 1401

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECLULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Discuss the normal process of thrombopoiesis, its cytokine regulation and how drugs are used to stimulate thrombopoiesis.
2. Discuss the components of the hematopoietic stem cell niche and its role in stem cell mobilization.

II. Write notes on:

(10 x 7 = 70)

1. Alternate splicing
2. Phagocytosis
3. Dendritic cell
4. GATA 1
5. Prognostic significance of somatic mutations in myelodysplastic syndrome
6. T regulatory cells
7. Natural killer cells
8. Chronic neutrophilic leukemia
9. Fibrinolytic system
10. Mesenchymal stromal cells

(DM 0821)

AUGUST 2021

Sub. Code: 1401

D.M. – CLINICAL HAEMATOLOGY

**Paper I – STRUCTURE AND FUNCTION OF THE HEMOPOIETIC
SYSTEM MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on: **(2 x 15 = 30)**

1. Discuss the normal process of hematopoiesis that occurs from the embryo to adulthood. Describe in detail how hematopoiesis is regulated.
2. Discuss the process of iron absorption and distribution in the normal human body. Describe the role of hepcidin in the regulation of Iron.

II. Write notes on: **(10 x 7 = 70)**

1. Adhesion molecules.
2. Caspases.
3. Role of erythropoietin in erythropoiesis.
4. Telomere length measurement.
5. prognostic significance of somatic mutations in myelodysplastic syndrome.
6. HFE gene.
7. Natural killer cells.
8. Chronic neutrophilic leukemia.
9. Fibrinolytic system.
10. Micro RNA's.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[DM 0822]

AUGUST 2022

Sub. Code :1401

D.M. – CLINICAL HAEMATOLOGY

**Paper I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF THE
HEMOPOIETIC SYSTEM MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the molecular basis of haemoglobin switching after birth and its possible manipulation for treatment of major haemoglobin disorders.
2. Discuss B cell differentiation and immunoglobulin gene arrangement in normal cells. Mention some of the aberrations in this process in diseases.

II. Write notes on:

(10 x 7 = 70)

1. Granulocyte macrophage colony stimulating factor.
2. CD34 and its significance.
3. Platelet adhesion.
4. Natural anticoagulants.
5. CD3 T cell receptor.
6. The red cell membrane.
7. Von Willebrand factor.
8. TNF alpha.
9. Immunoglobulin M.
10. Gamma delta T cells.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[DM 0823]

AUGUST 2023

Sub. Code :1401

D.M. – CLINICAL HAEMATOLOGY

**PAPER I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF THE
HEMOPOIETIC SYSTEM MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Ribosome Biogenesis Disorder (RBD):
 - a) Structure and function of ribosome
 - b) Pathogenesis of RBD
 - c) Describe clinical features of two ribosome biogenesis disorder.
2. Positron emission tomography – computerized tomography (PET-CT) scan in Hodgkin's lymphoma (HD):
 - a) Principle of PET-CT scans
 - b) Role in staging and response assessment in HD and
 - c) Role of Total metabolic tumour volume in prognosis of HD.

II. Write notes on:

(10 x 7 = 70)

1. Telomeres: Role in disease and cancer.
2. Janus kinase.
3. Bi-specific T cell engager.
4. Waterfall plot.
5. Tumour lysis syndrome.
6. TMPRSS6 (Matriptase-2).
7. COVID-19 and coagulation.
8. KIR genotyping.
9. Enteric microbiota in GVHD.
10. Alternate complement pathway and its regulators.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[DM 0124]

JANUARY 2024

Sub. Code :1401

D.M. – CLINICAL HAEMATOLOGY

**PAPER I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF
HEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the T cell differentiation and TCR gene rearrangement in normal cells. Mention some of the aberrations in this process in diseases.
2. Describe the DNA repair pathways in normal cells. Describe clinical features of some disorders caused by defects in the DNA repair pathways.

II. Write notes on:

(10 x 7 = 70)

1. Gamma delta T cells.
2. Thrombopoiesis.
3. Interleukin-6.
4. Stem cell niche.
5. CRISPR.
6. Vectors for gene therapy.
7. Immune checkpoint receptors.
8. TPMT and NUD15.
9. Calreticulin.
10. Antibody drug conjugates.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[DM 0824]

AUGUST 2024

Sub. Code :1401

D.M. – CLINICAL HAEMATOLOGY

**PAPER I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF
HEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Cytokine signaling pathways and its relevance to therapeutics in hematology.
2. Cell death along with its relevance to hematologic disease.

II. Write notes on:

(10 x 7 = 70)

1. Microenvironment.
2. Antigen presenting cells.
3. Biology of Aplastic anemia.
4. Iron homeostasis.
5. Granulocytes.
6. PCR.
7. B cell development.
8. Immune tolerance.
9. Epigenetic regulation and hematology.
10. Erythropoiesis.

THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY

[DM 0225]

FEBRUARY 2025

Sub. Code :1401

D.M. – CLINICAL HAEMATOLOGY

**PAPER I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF THE
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY AND
GENETIC ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Classical coagulation cascade Vs the Cell-Based Model of Coagulation.
2. B-Cell Ontogeny and relation to lymphoma biology.

II. Write notes on:

(10 x 7 = 70)

1. Telomere.
2. Complement system.
3. JAK-STAT pathway.
4. Rh antigens.
5. Mechanism of iron absorption.
6. Hemoglobin structure.
7. Immune checkpoint inhibitors.
8. Bi-specific T cell engagers.
9. Plerixafor.
10. Euchromatin and Heterochromatin in a cell.

D.M. – CLINICAL HAEMATOLOGY

**PAPER I – BASIC SCIENCES - STRUCTURE AND FUNCTION OF
HAEMOPOIETIC SYSTEM, MOLECULAR BIOLOGY AND GENETIC
ASPECTS OF HAEMOPOIESIS**

Q.P. Code: 161401

Time: Three Hours

Maximum: 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the pathophysiology of Fanconi anaemia. What is complementation testing and how is it used in Fanconi anaemia.
2. Discuss the commonly seen mutations in Myeloproliferative neoplasms and how these correlate with disease manifestation.

II. Write notes on:

(10 x 7 = 70)

1. GATA – related haematological disorders.
2. Immunoglobulin structure.
3. Immune reconstitution post allogeneic stem cell transplant.
4. Factor VIII structure and function.
5. Thrombin.
6. CRISPR technology.
7. Pathophysiology of Vitamin B12 deficiency and Folate Trap.
8. Pathophysiology of acute Graft versus host disease.
9. High risk cytogenetic abnormalities in multiple myeloma and how they affect prognosis.
10. Diagnosis of sickle cell anaemia.
