



SAUDI FELLOWSHIP TRAINING PROGRAM

HEMATOLOGY

Final Examination

Written Examination:

Exam Format:

The Saudi subspecialty fellowship and diplomas final written examination shall consist of one paper with 80-120 multiple-choice questions (single best answer out of four options). 10 unscored items can be added for pretesting purposes.

Passing Score:

The passing score is 70%. However, if the percentage of candidates passing the examination before final approval is less than 70%, the passing score must be lowered by one mark at a time aiming at achieving 70% passing rate or 65% passing score whichever comes first. Under no circumstances can the passing score be reduced below 65%.





Suggested References:

TEXT BOOKS:

- * Hematology, 7th Edition, Basic Principles and Practice by Ronald Hoffman
- * Wintrobe's Clinical Hematology Thirteenth Edition by John P. Greer
- * Williams Hematology, 9th Edition by Kenneth Kaushansky
- * ASH –SAP American Society of Hematology Self-Assessment Program, 6th edition
- * Dacie and Lewis Practical Haematology, 12th Edition, by Barbara Bain, Imelda Bates, Mike Laffan
- * Bone Marrow Pathology by Kathryn Foucar
- * WHO Classification of Tumours of Haematopoietic and Lymphoid Tissues, WHO Classification of Tumours, Revised 4th Edition. Edited by Swerdlow SH, Campo E, Harris NL, Jaffe ES, Pileri SA, Stein H, Thiele J, 2017.

JOURNALS:

- * Blood
- * Blood Review
- * British Journal of Hematology
- * Hemophilia
- * Journal of Thrombosis and Hemostasis
- * Hematology: ASH Education Program Book
- * New England Journal of Medicine
- * Bone Marrow Transplantation
- * Biology of Blood and Marrow Transplantation
- * Journal of Clinical Oncology
- * Leukemia & Lymphoma
- * Leukemia
- * The Lancet
- * Lancet Oncology

On-Line RESOURCES:

Uptodate.com
ASH Image Bank

Note:

This list is intended for use as a study aid only. SCFHS does not intend the list to imply endorsement of these specific references, nor are the exam questions necessarily taken solely from these sources.



Final Written Exam Blueprint Outlines:

No.	Sections	Percentage
1	Hematopoietic System	18%
2	Bleeding disorders	11%
3	Thrombosis	10%
3	Transfusion Medicine	7%
5	Myeloproliferative disorders and Leukemia	15%
6	Lymphoproliferative disorders	14%
7	Plasma Cell Neoplasm	10%
8	Pharmacology & complications of hematopoietic neoplasms	5%
9	Hematopoietic Cell Transplantation (HCT) & cellular therapy	10%
Total		100%

Notes:

- Blueprint distributions of the examination may differ up to +/-5% in each section.
- Percentages and content are subject to change at any time.
See the SCFHS website for the most up-to-date information.
- Research, Ethics, Professionalism, and Patient Safety are incorporated within various domains.





Main topics to be assessed under each major discipline are as follows:

❖ **Hematopoietic System 18%**

1. Normal Hematopoiesis

2. RBC

Red blood cell production disorders

Nutritional deficiencies

Anemia of chronic disease

Red cell aplasia and hypoplasia

Sideroblastic anemia

Red blood cell destruction disorders

Thalassemias

Alpha thalassemia

Beta thalassemia

Hemoglobin E disorders

Sickle cell disorders

Sickle cell trait

Sickle cell anemia (hemoglobin SS disease)

Hemoglobin SC disease and C hemoglobinopathy

Sickle cell- β_0 and sickle cell- β^+ -thalassemias

Non-sickle hemoglobinopathies

Autoimmune hemolytic anemias (AIHA)

Warm antibody-mediated autoimmune hemolytic anemia

Cold antibody-mediated autoimmune hemolytic anemia

Drug-induced hemolysis

Metabolic enzyme deficiency hemolytic anemias

Paroxysmal nocturnal hemoglobinuria

Red blood cell membrane disorders

Microangiopathic hemolytic anemias (other than TTP, HUS, or DIC)

Non-autoimmune, acquired hemolytic anemias

Erythrocytosis

Porphyrias

Hemochromatosis

3. WBC

Granulocyte dysfunction disorders

Granulocytopenia

Lymphocytopenia and lymphocyte dysfunction syndromes

Leukocytosis

Eosinophilia

4. BM failure

Aplastic anemia

Inherited aplastic anemia

Acquired aplastic anemia

Pancytopenia

❖ **Bleeding disorders 11%**



1- Platelet and megakaryocyte disorders

Inherited disorders of platelet function

Acquired disorders of platelet function

Drug-induced disorders

Non-drug-induced disorders

Thrombocytopenia

Inherited thrombocytopenia

Acquired thrombocytopenia

Immune thrombocytopenic purpura (ITP)

Drug-induced thrombocytopenia

Thrombotic thrombocytopenic purpura (TTP)

Hemolytic uremic syndrome (HUS)

Thrombocytopenia secondary to liver disease and splenic disorders

Thrombocytosis

2- Hemostasis

Molecular basis of coagulation and hemostatic agents

Normal hemostasis

Laboratory evaluation

Hemostatic drugs

3- Inherited bleeding disorders (non-platelet)

Von Willebrand disease

Types 1, 2A, 2M, 2N, and 3

Type 2B

Modifiers of von Willebrand factor levels

Hemophilias A and B

Hemophilia A

Hemophilia B

Factor XI deficiency

Factor deficiencies other than factor XI

Inherited vascular abnormalities

4- Acquired bleeding disorders (non-platelet)

Factor inhibitors

Disseminated intravascular coagulation (DIC)

Acquired vascular abnormalities

Secondary acquired factor deficiencies

❖ Thrombosis 10%

1- Molecular basis of natural anticoagulants, fibrinolytic

Pathway and anticoagulant therapy

Normal anticoagulant and fibrinolytic mechanisms

Laboratory evaluation

Anticoagulant drugs





2- Thrombotic disorders

- Inherited thrombotic disorders
- Factor V Leiden and prothrombin G20210A
- Deficiencies of natural anticoagulants
(Antithrombin, proteins C and S)
- Disorders involving cysteine and homocysteine metabolism

3- Acquired thrombotic disorders

- Heparin-induced thrombocytopenia (HIT)
- Anti-phospholipid antibody syndrome (APS)
- Cancer-related thrombotic disorders

4- Thromboembolism at unusual sites

5- Thrombosis management (non-disease-specific)

6- Complications of thrombotic disorders

❖ Transfusion medicine 7%

1- Clinical indications for the use of blood products

- Red blood cell preparations
- Platelet preparations
- Granulocyte preparations
- Fresh frozen plasma
- Cryoprecipitate

2- Risks associated with blood products

- Risks associated with administration
 - Allergic reactions
 - Nonanaphylactic allergic reactions
 - IgA deficiency
 - Anaphylactic reactions
 - Graft-versus-host disease
 - Electrolyte disturbances
 - Infectious organisms
 - Alloimmunizations
 - Transfusion reactions
 - Hemolytic reactions
 - Febrile reactions
 - Transfusion-related acute lung injury (TRALI)
 - Transfusion-related circulatory overload (TACO)
 - Post-transfusion purpura and other risks associated with administration
- Risks associated with therapeutic apheresis procedures

❖ Myeloproliferative disorders and Leukemia 15%

1- Myeloproliferative neoplasms

- Chronic myeloid leukemia
- Polycythemia vera and secondary erythrocytosis
- Primary myelofibrosis
- Essential thrombocythemia
- Mastocytosis
- Chronic neutrophilic leukemia





2- Acute myeloid leukemias (AML)

- Acute promyelocytic leukemia
- AML with recurrent genetic abnormalities
- Therapy-related myeloid neoplasms
- Myeloid sarcoma
- AML with myelodysplasia-related changes
- AML not otherwise specified

3- Myelodysplastic syndromes (MDS) and chronic myelomonocytic leukemia

- Myelodysplastic syndromes
- Chronic myelomonocytic leukemia

4- Myeloid and lymphoid neoplasms with eosinophilia and abnormalities of *PDGFRA*, *PDGFRB*, or *FGFR1*

❖ Lymphoproliferative disorders 14%

1- B-cell neoplasms

- B-cell acute lymphoblastic leukemia/lymphoma (B-ALL)
- Lymphoplasmacytic lymphoma
- Chronic lymphoid leukemias
 - Chronic lymphocytic leukemia/small lymphocytic lymphoma
 - Monoclonal B-cell lymphocytosis
 - Hairy cell leukemia
 - B-cell prolymphocytic leukemia
- Non-Hodgkin lymphomas, B-cell
 - Diffuse large B-cell lymphoma
 - Follicular lymphoma
 - Mantle cell lymphoma
 - Marginal zone B-cell and mucosa-associated lymphoid tissue (MALT) lymphomas
 - Burkitt and Burkitt-like lymphomas
 - Primary central nervous system lymphoma
- General lymphoma issues (not specific to lymphoma type)

2- Immunodeficiency-associated lymphoproliferative disorders

- Post-transplantation lymphoproliferative disorders
- Lymphomas associated with HIV infection or primary immune disorders
- Lymphoproliferative disorders associated with iatrogenic immunodeficiency

3- T-cell and NK-cell neoplasms

- T-cell acute lymphoblastic leukemia/lymphoma (T-ALL)
- Cutaneous T-cell lymphoma (mycosis fungoides and Sezary syndrome)
- T-cell lymphomas
- Adult T-cell leukemia/lymphoma
- Large granular lymphocyte leukemia

4- Hodgkin lymphoma

- Classical Hodgkin lymphoma
- Nodular lymphocyte-predominant Hodgkin lymphoma





5- Histiocytic and dendritic cell neoplasms

❖ Plasma cell neoplasms 10%

- 1- Multiple myeloma
- 2- Plasmacytomas
- 3- Amyloidosis
- 4- Castleman disease
- 5- Monoclonal gammopathy of undetermined significance (MGUS)

❖ Pharmacology & complications of hematopoietic neoplasms 5%

1- Complications of hematologic malignancies

- Hemophagocytic syndrome
- Tumor lysis syndrome
- Spinal cord compression
- Paraneoplastic disorders

2- Pharmacology

- Toxicities and complications, including cytopenic complications
- Drug dosing and dose modifications

❖ Hematopoietic Cell Transplantation (HCT) and CAR-T Cell Therapy 10%

1- Stem cell biology and engraftment

- Biology of hematopoiesis and hematopoietic cell transplantation
- Tumor immunology
- Biologic and immunologic relationship between donor and host

2- Hematopoietic cell transplantation in the management of hematologic diseases

- Autologous transplantation
- Syngeneic transplantation
- Allogeneic transplantation
- Reduced-intensity allogeneic transplantation
- Haplo-identical transplantation
- Cord blood transplantation

3- Conditioning regimens

- Components
- Toxicities

4- Collecting and handling cells for transplantation

- Bone marrow
- Peripheral blood
- Mobilization
- Donor complications of cell collection





5- Prophylaxis and supportive care

Preventing infectious disease

Pharmacologic prevention

Environmental prevention

Immunosuppressive therapy for graft-versus-host disease (GVHD)

Graft-versus-host disease

T-cell depletion

Complications of immunosuppressive therapy

Transfusion and blood product issues related to transplantation

6- Complications after hematopoietic cell transplantation

Marrow engraftment failure

Graft-versus-host disease, clinical

Acute

Chronic

Opportunistic infections

Hepatic sinusoidal obstruction syndrome

Management of relapse

Late effects

7- Biology of CAR-T cell therapy, indications and complications

