HEMATOLOGY BOC 7TH ED. PRACTICE EXAM (SAMPLE)

STUDY GUIDE



SAMPLE STUDY GUIDE WITH LIMITED QUESTIONS

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Introduction

Preparing for a certification exam can feel overwhelming, but with the right tools, it becomes an opportunity to build confidence, sharpen your skills, and move one step closer to your goals. At Examzify, we believe that effective exam preparation isn't just about memorization, it's about understanding the material, identifying knowledge gaps, and building the test-taking strategies that lead to success.

This guide was designed to help you do exactly that.

Whether you're preparing for a licensing exam, professional certification, or entry-level qualification, this book offers structured practice to reinforce key concepts. You'll find a wide range of multiple-choice questions, each followed by clear explanations to help you understand not just the right answer, but why it's correct.

The content in this guide is based on real-world exam objectives and aligned with the types of questions and topics commonly found on official tests. It's ideal for learners who want to:

- Practice answering questions under realistic conditions,
- Improve accuracy and speed,
- Review explanations to strengthen weak areas, and
- Approach the exam with greater confidence.

We recommend using this book not as a stand-alone study tool, but alongside other resources like flashcards, textbooks, or hands-on training. For best results, we recommend working through each question, reflecting on the explanation provided, and revisiting the topics that challenge you most.

Remember: successful test preparation isn't about getting every question right the first time, it's about learning from your mistakes and improving over time. Stay focused, trust the process, and know that every page you turn brings you closer to success.

Let's begin.

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How to Use This Guide

This guide is designed to help you study more effectively and approach your exam with confidence. Whether you're reviewing for the first time or doing a final refresh, here's how to get the most out of your Examzify study guide:

1. Start with a Diagnostic Review

Skim through the questions to get a sense of what you know and what you need to focus on. Your goal is to identify knowledge gaps early.

2. Study in Short, Focused Sessions

Break your study time into manageable blocks (e.g. 30 – 45 minutes). Review a handful of questions, reflect on the explanations.

3. Learn from the Explanations

After answering a question, always read the explanation, even if you got it right. It reinforces key points, corrects misunderstandings, and teaches subtle distinctions between similar answers.

4. Track Your Progress

Use bookmarks or notes (if reading digitally) to mark difficult questions. Revisit these regularly and track improvements over time.

5. Simulate the Real Exam

Once you're comfortable, try taking a full set of questions without pausing. Set a timer and simulate test-day conditions to build confidence and time management skills.

6. Repeat and Review

Don't just study once, repetition builds retention. Re-attempt questions after a few days and revisit explanations to reinforce learning. Pair this guide with other Examzify tools like flashcards, and digital practice tests to strengthen your preparation across formats.

There's no single right way to study, but consistent, thoughtful effort always wins. Use this guide flexibly, adapt the tips above to fit your pace and learning style. You've got this!

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Questions

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1. **Which preanalytical step is recommended when cold agglutinins may affect automated CBC results?**

   A. pre-warm sample

   B. chill sample on ice

   C. use diluent

   D. centrifuge at 4C

2. **A differential cell count showing 50–90% myeloblasts in peripheral blood is most typical of which condition?**

   A. Chronic Myelogenous Leukemia

   B. Primary Myelofibrosis

   C. Acute Myeloid Leukemia

   D. Erythroleukemia

3. **In the World Health Organization (WHO) classification, acute myelomonocytic leukemia would be named acute myeloid leukemia (AML):**

   A. With myelodysplastic-related changes

   B. With recurrent cytogenetic changes

   C. Not otherwise specified

   D. Therapy-related

4. **Which abnormal RBC morphology is associated with pyruvate kinase deficiency?**

   A. Acanthocytes

   B. Dacrytocytes

   C. Echinocytes

   D. Drepanocytes

5. **The hypoproliferative red cell population in the bone marrow of uremic patients is caused by which of the following?**

   A. Infiltration of bone marrow by toxic waste products

   B. Decreased levels of circulating erythropoietin

   C. Defective globin synthesis

   D. Overcrowding of bone marrow space by increased myeloid precursors

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6. The most appropriate screening test for Hgb S is:

A. Kleihauer-Betke

B. Dithionite solubility

C. Heat instability

D. Fluorescent spot

7. Which characteristics are common to hereditary spherocytosis, hereditary elliptocytosis, hereditary stomatocytosis, and paroxysmal nocturnal hemoglobinuria?

A. Autosomal dominant inheritance

B. Red cell membrane defects

C. Positive direct antiglobulin test

D. Measured platelet count

8. In a normal bone marrow aspirate, the average number of megakaryocytes per low-power field under 10x is approximately which value?

A. 5-10

B. 1-2

C. 20-30

D. 0-1

9. A leukocyte count and differential on a 40-year-old Caucasian man indicates which condition?

A. absolute lymphocytosis

B. relative neutrophilia

C. absolute neutropenia

D. leukopenia

10. Given the normal scattergram, the area indicated as a "6" represents which cell population?

A. monocytes

B. large unstained cells

C. platelet clumps

D. NRBCs

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Answers

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1. A
2. C
3. C
4. C
5. B
6. B
7. B
8. A
9. C
10. A

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Explanations

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1. Which preanalytical step is recommended when cold agglutinins may affect automated CBC results?

A. pre-warm sample

B. chill sample on ice

C. use diluent

D. centrifuge at 4C

Cold agglutinins are IgM autoantibodies that bind red cells at temperatures below body temperature, causing red cells to clump. In automated CBCs, this clumping disrupts cell counting and can yield falsely low red cell counts and altered indices. The most effective preanalytical step is to pre-warm the specimen to 37°C before analysis and keep it warm during measurement. Warming prevents the antibody from binding to cells during handling, so the cells remain dispersed and the analyzer can generate accurate results. Chilling the sample would promote agglutination and worsen interference, and methods like simply adding diluent don't address the underlying issue.

2. A differential cell count showing 50–90% myeloblasts in peripheral blood is most typical of which condition?

A. Chronic Myelogenous Leukemia

B. Primary Myelofibrosis

C. Acute Myeloid Leukemia

D. Erythroleukemia

A high proportion of myeloblasts in the peripheral blood points to an acute leukemic process driven by malignant myeloid precursors. Acute myeloid leukemia is defined by a clonal expansion of myeloid blasts, with the presence of 20% or more blasts in the bone marrow or peripheral blood. When the blood shows 50–90% myeloblasts, it reflects a rapidly advancing disease where hematopoiesis is dominated by immature myeloid cells, leading to cytopenias and disease symptoms. This rapid, blast-predominant picture distinguishes AML from other myeloid disorders. Chronic myeloid leukemia typically features a predominance of mature granulocytes with less immediate blast burden, though blasts can rise in blast crisis. Primary myelofibrosis involves marrow fibrosis with extramedullary hematopoiesis and characteristic teardrop erythrocytes rather than a dominant circulating blast population. Erythroleukemia (ME) shows a significant erythroid component with blasts, but the hallmark here isn't a high percentage of myeloblasts in the peripheral blood. Thus, a peripheral blood showing 50–90% myeloblasts most typifies acute myeloid leukemia.

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3. In the World Health Organization (WHO) classification, acute myelomonocytic leukemia would be named acute myeloid leukemia (AML):

A. With myelodysplastic-related changes

B. With recurrent cytogenetic changes

C. Not otherwise specified

D. Therapy-related

In WHO classification, AML is organized by underlying genetic/molecular features and clinical history, not by morphology alone. The main categories are AML with recurrent cytogenetic changes, AML with myelodysplasia-related changes, therapy-related AML, and AML not otherwise specified. Acute myelomonocytic leukemia is a FAB term (M4) that does not become its own WHO category. If there is no defining cytogenetic abnormality, no prior myelodysplastic syndrome or dysplasia qualifying for AML-MDS, and no therapy-related exposure, the diagnosis is AML not otherwise specified. If dysplasia in one or more cell lines or a recognized MDS-related abnormality were present, it would be reclassified under AML with myelodysplasia-related changes; if a specific recurrent cytogenetic change were identified, it would fall under AML with recurrent cytogenetic changes; and if there was therapy-related exposure, it would be therapy-related AML.

4. Which abnormal RBC morphology is associated with pyruvate kinase deficiency?

A. Acanthocytes

B. Dacrytocytes

C. Echinocytes

D. Drepanocytes

Pyruvate kinase deficiency reduces ATP production in red blood cells because the RBCs rely on glycolysis for their energy. When ATP is depleted, the membrane and cytoskeletal skeleton become unstable, leading to a predictable change in shape called echinocytes (burr cells) on the smear. These echinocytes have evenly spaced, small, projective spicules and reflect the energy-shortened state of the cell membrane. This morphology is distinct from other RBC shapes. Acanthocytes have irregular, uneven projections and are seen in conditions like abetalipoproteinemia or liver disease. Dacrytocytes (teardrop cells) appear in marrow infiltration disorders such as myelofibrosis. Drepanocytes are sickle-shaped cells seen in sickle cell disease with deoxygenation or Hb variants. So the characteristic burr-like, evenly spiculated appearance points to pyruvate kinase deficiency.

5. The hypoproliferative red cell population in the bone marrow of uremic patients is caused by which of the following?

A. Infiltration of bone marrow by toxic waste products

B. Decreased levels of circulating erythropoietin

C. Defective globin synthesis

D. Overcrowding of bone marrow space by increased myeloid precursors

The key idea here is that the anemia seen in uremia is primarily due to a deficiency of erythropoietin produced by the diseased kidneys. Erythropoietin is the hormone that stimulates the bone marrow to produce red blood cells. When kidney function is impaired, erythropoietin production falls, leading to reduced stimulation of erythroid precursors and a hypoproliferative red cell population in the marrow. This explains the typical normocytic, normochromic anemia with a low reticulocyte count often seen in chronic kidney disease. Other options don't fit as well. Infiltration by toxic waste products can affect the marrow but is not the classic cause of the hypoproliferative erythroid lineage in uremia. Defective globin synthesis would cause a hemoglobinopathy rather than a marrow hypoproliferation driven by EPO loss. Overcrowding of marrow by myeloid precursors would not explain the reduced production of red cells from a physiologic standpoint in uremia.

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6. The most appropriate screening test for Hgb S is:

A. Kleihauer-Betke

B. Dithionite solubility

C. Heat instability

D. Fluorescent spot

The key idea is that HbS can be identified by a test that takes advantage of its behavior when deoxygenated: HbS polymerizes and becomes insoluble, causing turbidity. The dithionite solubility (sodium dithionite) test deoxygenates the hemoglobin in a blood sample; HbS-containing samples turn turbid because the deoxygenated HbS polymers precipitate, while HbA-containing samples remain clear. This makes the dithionite solubility test a fast, inexpensive, and practical first-line screen for sickle hemoglobin in many labs, suitable for screening large numbers of individuals. If the test is positive, it is usually followed by confirmatory methods such as electrophoresis or HPLC to identify HbS and determine zygosity. The other options don't fit the screening purpose for HbS: Kleihauer-Betke detects fetal red cells in maternal blood, not HbS; heat stability tests are for unstable hemoglobins that precipitate with heat; the fluorescent spot test is not the standard, widely used screening test for HbS in most settings and has limitations.

7. Which characteristics are common to hereditary spherocytosis, hereditary elliptocytosis, hereditary stomatocytosis, and paroxysmal nocturnal hemoglobinuria?

A. Autosomal dominant inheritance

B. Red cell membrane defects

C. Positive direct antiglobulin test

D. Measured platelet count

These conditions all involve abnormalities of the red cell membrane. In hereditary spherocytosis the membrane skeleton proteins (like spectrin and ankyrin) are defective, causing loss of membrane and spherical red cells that hemolyze easily. In hereditary elliptocytosis similar membrane-cytoskeleton defects produce elongated, elliptical cells. In hereditary stomatocytosis, changes in membrane permeability or its attachment to the skeleton give stomatocytes with altered shape. In paroxysmal nocturnal hemoglobinuria, there is a loss of GPI-anchored surface proteins (such as CD55 and CD59) on red cells, making them more susceptible to complement-mediated lysis. The common thread is red cell membrane defects, rather than inheritance pattern, a positive direct antiglobulin test, or platelet count.

8. In a normal bone marrow aspirate, the average number of megakaryocytes per low-power field under 10x is approximately which value?

A. 5-10

B. 1-2

C. 20-30

D. 0-1

Megakaryocytes are the large cells in marrow responsible for platelet production, and a normal marrow shows them in modest but noticeable numbers when scanned at low power (10x). In a healthy aspirate, you typically observe about five to ten megakaryocytes per low-power field. This range reflects balanced megakaryopoiesis without crowding the field. Seeing only zero to one per field would suggest reduced megakaryopoiesis or hypocellularity, while seeing twenty to thirty per field would be unusually high and raise concern for proliferation or a reactive process. So, the approximate normal value is five to ten per low-power field.

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9. A leukocyte count and differential on a 40-year-old Caucasian man indicates which condition?

A. absolute lymphocytosis

B. relative neutrophilia

C. absolute neutropenia

D. leukopenia

Interpreting a leukocyte count with differential hinges on the absolute number of neutrophils, not just the percent. The key idea is the absolute neutrophil count (ANC), which is obtained by multiplying the total white blood cell count by the fraction that are neutrophils (including bands). If this absolute number falls below about 1.5 x 10^9/L, neutropenia is present. So, even if the neutrophil percentage seems normal or even high, you must look at the actual neutrophil count. Absolute neutropenia means the neutrophil cells are reduced in number, which raises infection risk. This differs from relative neutrophilia, where the percentage of neutrophils is high but the actual neutrophil count may be normal or elevated, and from leukopenia, which simply denotes a low total white blood cell count without specifying which cell line is decreased.

10. Given the normal scattergram, the area indicated as a "6" represents which cell population?

A. monocytes

B. large unstained cells

C. platelet clumps

D. NRBCs

In a WBC differential scattergram, cells are separated by size (forward scatter) and internal complexity/granularity (side scatter), sometimes with a fluorescence signal reflecting nucleic acid content. Monocytes are intermediate in size and have more cytoplasmic complexity than lymphocytes but less than granulocytes, placing them in a distinct mid-range region on the scattergram. The area labeled with 6 corresponds to this monocyte cluster in a normal scattergram, reflecting their characteristic position between smaller lymphocytes and larger granulocytes. Platelet clumps, large unstained cells, and NRBCs occupy other regions because they have different size, granularity, or nucleic acid properties, so they don't fall into this monocyte region.

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Next Steps

Congratulations on reaching the final section of this guide. You've taken a meaningful step toward passing your certification exam and advancing your career.

As you continue preparing, remember that consistent practice, review, and self-reflection are key to success. Make time to revisit difficult topics, simulate exam conditions, and track your progress along the way.

If you need help, have suggestions, or want to share feedback, we'd love to hear from you. Reach out to our team at hello@examzify.com.

Or visit your dedicated course page for more study tools and resources:

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We wish you the very best on your exam journey. You've got this!

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