ABCP Perfusion Basic Science (PBSE) Practice Exam (Sample)

Study Guide

Everything you need from our exam experts!

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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.

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!

Questions

1. Among common plasma proteins, which is present in the lowest concentration?

A. Albumin

B. Immunoglobulins

C. Fibrinogen

D. Transferrin

2. What complement factor is activated by the CPB circuit?

A. C5

B. C1q

C. C4B

D. C3A

3. Which drug shown to protect the brain from CPB ischemia?

A. Halothane

B. Nifedipine

C. Chlorpromazine

D. Pentothal

4. Acute Aneurysm (dissection) mimics which cardiac event?

A. Angina

B. Heart failure

C. Acute MI

D. Atrial fibrillation

5. Which value best describes a normal SvO2 range?

A. 60-65%

B. 70-75%

C. 80-85%

D. 50-60%

6. Insulin is secreted by which cells?

A. Beta-cells in the islet of Langerhans in the pancreas tail

B. Alpha-cells in the islet of Langerhans

C. Delta-cells

D. Acinar cells

7. When are serum glucose levels the highest?

A. Cooling phase of CPB

B. Rewarding phase of CPB

C. Rewarming phase of CPB

D. Weaning from CPB

8. Normal serum osmolarity is approximately:

A. ~250 mOsm/L

B. ~300 mOsm/L

C. ~350 mOsm/L

D. ~400 mOsm/L

9. Which of the following best describes the protamine dose relative to heparin in reversal?

A. 0.5 mg per 100 units

B. 1 mg per 100 units

C. 2 mg per 100 units

D. 5 mg per 100 units

10. Hyperaldosteronism is characterized by excessive production of which hormone?

A. Epinephrine

B. Aldosterone

C. Cortisol

D. Insulin

Answers

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

Explanations

1. Among common plasma proteins, which is present in the lowest concentration?

A. Albumin

B. Immunoglobulins

C. Fibrinogen

D. Transferrin

The question tests how the body prioritizes different plasma proteins based on their functions, which drives their normal concentrations. Albumin is the most abundant protein in plasma and is essential for maintaining oncotic pressure and serving as a carrier for many substances. Immunoglobulins (antibodies) are also present in substantial amounts to provide immune defense. Transferrin, which transports iron, is present but at a relatively modest level. Fibrinogen, a coagulation factor that becomes fibrin during clot formation, is kept at a lower baseline concentration in circulating plasma. Given these roles, fibrinogen is present in the lowest concentration among the listed proteins.

2. What complement factor is activated by the CPB circuit?

A. C5

B. C1q

C. C4B

D. C3A

Exposure of blood to the artificial surfaces of a CPB circuit activates the complement system, mainly via the alternative pathway, leading to cleavage of C3 into C3a and C3b. C3a acts as an anaphylatoxin, driving vasodilation, increased vascular permeability, and chemotaxis. Thus, the complement factor activated by the CPB circuit is C3A. The other options involve pathways or steps that aren't the primary initial activation on CPB surfaces: C1q starts the classical pathway, C4B is part of the classical/lectin pathways downstream, and C5 is produced later in the cascade as a downstream product.

3. Which drug shown to protect the brain from CPB ischemia?

A. Halothane

B. Nifedipine

C. Chlorpromazine

D. Pentothal

The brain protection strategy during CPB ischemia centers on lowering the brain's metabolic demands so neurons can tolerate reduced blood flow longer. Thiopental (Pentothal) is a potent barbiturate that strongly enhances GABAergic inhibition, which massively depresses CNS activity and reduces cerebral metabolic rate for oxygen. This metabolic suppression also lowers cerebral blood flow and helps limit excitotoxic injury and edema during periods of ischemia. Because of this profound reduction in neuronal energy use, thiopental has been used to provide neuroprotection during CPB. The other options don't offer the same reliable reduction in cerebral metabolic demand or can even raise intracranial pressure or have unclear protective effects in this setting.

4. Acute Aneurysm (dissection) mimics which cardiac event?

A. Angina

B. Heart failure

C. Acute MI

D. Atrial fibrillation

Acute aortic dissection can present with chest pain and ECG/troponin changes that closely resemble an acute myocardial infarction. The dissection can extend to the coronary ostia and cause myocardial ischemia, producing changes on the ECG and elevated cardiac biomarkers similar to an MI. This overlap in presentation is why the scenario is often mistaken for an acute MI, making the distinction crucial because the underlying problem is aortic pathology, not coronary artery occlusion. Briefly, while angina can cause chest pain, it usually lacks the sudden, severe, potentially tearing quality and rapid progression seen with dissection and may not produce the same dramatic ECG/troponin findings. Heart failure centers on symptoms like dyspnea and edema rather than abrupt chest pain with MI-like ECG changes. Atrial fibrillation presents with irregular pulse and palpitations rather than the chest pain and ischemic ECG/biomarker pattern typical of MI.

5. Which value best describes a normal SvO2 range?

A. 60-65%

B. 70-75%

C. 80-85%

D. 50-60%

Normal mixed venous oxygen saturation (SvO2) reflects the balance between oxygen delivery and tissue oxygen demand. In healthy conditions, SvO2 is typically in the mid-60s up to about 75% (often cited as 65-75%, with some sources extending toward 80%). The range around 70-75% best represents the typical normal value, aligning with the common clinical reference for a balanced delivery and consumption of oxygen. SvO2 is measured in the pulmonary artery and depends on several factors: cardiac output, hemoglobin level and its oxygen-carrying capacity, arterial oxygen content, and the tissues' rate of oxygen use. If SvO2 drops, it suggests higher tissue extraction due to reduced delivery or increased consumption. If SvO2 rises, it can indicate reduced extraction or an excess of delivery relative to consumption.

6. Insulin is secreted by which cells?

A. Beta-cells in the islet of Langerhans in the pancreas tail

B. Alpha-cells in the islet of Langerhans

C. Delta-cells

D. Acinar cells

Insulin is secreted by beta cells in the islets of Langerhans in the pancreas. These endocrine cells respond to rising blood glucose by releasing insulin, which promotes glucose uptake into muscle and adipose tissue and inhibits glucose production by the liver, helping to lower blood sugar. The other cell types have different roles: alpha cells produce glucagon, which raises blood glucose; delta cells secrete somatostatin, which modulates endocrine release; acinar cells are part of the exocrine pancreas and secrete digestive enzymes, not hormones.

7. When are serum glucose levels the highest?

A. Cooling phase of CPB

B. Rewarding phase of CPB

C. Rewarming phase of CPB

D. Weaning from CPB

During rewarming, the body's stress response ramps up and metabolism speeds back up as normothermia returns. This involves a surge of catecholamines and cortisol and a rise in inflammatory mediators, which increases hepatic glucose production (glycogenolysis and gluconeogenesis) and reduces insulin sensitivity. The result is a rapid rise in blood glucose, often reaching its highest levels during this rewarming phase. Cooling lowers metabolic demand, so glucose use stays relatively lower, and weaning from CPB follows after glucose has already peaked during rewarming.

8. Normal serum osmolarity is approximately:

A. ~250 mOsm/L

B. ~300 mOsm/L

C. ~350 mOsm/L

D. ~400 mOsm/L

Normal serum osmolality reflects the concentration of solutes that influence water movement in the extracellular space, and the main driver is sodium with its accompanying ions. With a typical serum sodium around 140 mEq/L, the osmotic contribution from sodium and its partners is about 280 mOsm/kg. Adding normal glucose (~90 mg/dL, about 5 mOsm/kg) and urea/BUN (~14 mg/dL, about 5 mOsm/kg) brings the total to roughly 290–300 mOsm/kg. Clinically, this centers near 300 mOsm/L, so that value best matches normal. Values much lower or higher would indicate abnormalities in sodium, glucose, or urea levels.

9. Which of the following best describes the protamine dose relative to heparin in reversal?

A. 0.5 mg per 100 units

B. 1 mg per 100 units

C. 2 mg per 100 units

D. 5 mg per 100 units

Protamine reverses heparin by forming a stable complex, and the dosing is guided by a rough 1:1 ratio by units of heparin given. For every 100 units of heparin, about 1 mg of protamine is used to neutralize it. This balance aims to stop excessive anticoagulation without tipping into protamine overdosage, which can cause its own adverse effects and even coagulopathy. So the best choice is 1 mg of protamine per 100 units of heparin. Under-dosing (less than 1 mg per 100 units) risks residual heparin and bleeding; over-dosing (more protamine than needed) risks adverse reactions and potential interference with clotting. In practice, the exact amount may be adjusted based on the patient's response and intraoperative coagulation monitoring.

10. Hyperaldosteronism is characterized by excessive production of which hormone?

A. Epinephrine

B. Aldosterone

C. Cortisol

D. Insulin

Hyperaldosteronism involves excess production of aldosterone, the mineralocorticoid from the adrenal cortex. Aldosterone acts on the kidney to increase sodium reabsorption and potassium (and hydrogen) ion excretion in the distal tubule and collecting duct, raising extracellular fluid volume and often blood pressure, while causing hypokalemia and metabolic alkalosis. Epinephrine, cortisol, and insulin come from different organs and have distinct roles: epinephrine from the adrenal medulla mediates acute stress responses, cortisol from the adrenal cortex supports metabolism and stress adaptation, and insulin from the pancreas lowers blood glucose. So, the hormone in excess in hyperaldosteronism is aldosterone.

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:

https://abcppbse.examzify.com

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