

ABCP PERFUSION BASIC SCIENCE (PBSE) 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.

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

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- 1. Improperly placed venous cannula blocks which vessel?**
- A. Portal vein
 - B. Inferior vena cava
 - C. Renal vein
 - D. Hepatic vein
- 2. What measures prevent circuit air entrainment during CPB setup?**
- A. Keeping reservoir closed.
 - B. Use of high suction pressure.
 - C. Avoid venting.
 - D. Proper priming, leak checks, and effective venting of the reservoir.
- 3. How should DO₂ and SvO₂ trends be interpreted during CPB?**
- A. SvO₂ trends do not relate to DO₂.
 - B. DO₂ is independent of SvO₂.
 - C. Rising SvO₂ always indicates tissue hypoxia.
 - D. DO₂ is sufficient; rising SvO₂ suggests adequate delivery or reduced extraction; falling SvO₂ suggests inadequate DO₂ or high extraction.
- 4. 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
- 5. Sufentanil potency relative to fentanyl?**
- A. 5x
 - B. 10x
 - C. 20x
 - D. 100x

- 6. Halothane is known to cause which myocardial effect?**
- A. Tachycardia
 - B. Decreased contractility
 - C. No effect
 - D. Increased contractility
- 7. Which artery supplies the lower two-thirds of the spinal cord?**
- A. Anterior spinal artery
 - B. Posterior spinal artery
 - C. Intercostal artery
 - D. Arteria radicularis magna
- 8. What complement factor is activated by the CPB circuit?**
- A. C5
 - B. C1q
 - C. C4B
 - D. C3A
- 9. Among common plasma proteins, which is present in the lowest concentration?**
- A. Albumin
 - B. Immunoglobulins
 - C. Fibrinogen
 - D. Transferrin
- 10. What method is used to measure brain temperature?**
- A. Rectal thermometer
 - B. Tympanic probe
 - C. Oral thermometer
 - D. Skin thermometer

Answers

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

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Explanations

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1. Improperly placed venous cannula blocks which vessel?

- A. Portal vein
- B. Inferior vena cava
- C. Renal vein
- D. Hepatic vein**

When a venous cannula is placed improperly into a hepatic vein, it can block the liver's outflow. The hepatic veins are the vessels that drain blood from the liver into the inferior vena cava (IVC) just below the diaphragm. If the cannula occludes a hepatic vein, hepatic venous drainage is impeded, causing blood to back up in the liver and impair hepatic perfusion during perfusion or bypass. Blocking the portal vein would affect inflow to the liver rather than its outflow, so it's not the vessel whose obstruction is most likely from a misplaced venous cannula. The renal veins drain the kidneys into the IVC and are not directly involved in draining the liver. The IVC would affect systemic venous return broadly, but the question targets the specific hepatic drainage pathway, which is the hepatic vein.

2. What measures prevent circuit air entrainment during CPB setup?

- A. Keeping reservoir closed.
- B. Use of high suction pressure.
- C. Avoid venting.
- D. Proper priming, leak checks, and effective venting of the reservoir.**

Preventing air from entering the bypass circuit starts with thorough priming, confirming all connections are leak-free, and venting the reservoir effectively to remove any trapped air before starting bypass. Proper priming displaces air with liquid, leak checks ensure the system is airtight, and active venting of the reservoir allows any rising air to escape, preventing bubbles from entering the pump and patient. Keeping the reservoir closed, using high suction, or avoiding venting would all increase the chance of air remaining or being drawn into the circuit, which is why those are not suitable.

3. How should DO₂ and SvO₂ trends be interpreted during CPB?

- A. SvO₂ trends do not relate to DO₂.
- B. DO₂ is independent of SvO₂.
- C. Rising SvO₂ always indicates tissue hypoxia.
- D. DO₂ is sufficient; rising SvO₂ suggests adequate delivery or reduced extraction; falling SvO₂ suggests inadequate DO₂ or high extraction.**

Oxygen delivery must meet tissue oxygen demand on CPB, and SvO₂ shows the balance between delivery and consumption. When DO₂ is sufficient, tissues don't extract as much O₂ and SvO₂ stays normal or increases. A rising SvO₂ therefore points to adequate delivery or a reduction in oxygen extraction (for example from cooling or lower metabolic rate). Conversely, SvO₂ falling suggests DO₂ is inadequate or that tissues are extracting more O₂ to meet demand. So interpreting trends this way—DO₂ sufficient with SvO₂ rising; SvO₂ falling with potential DO₂ insufficiency or high extraction—is correct. Rising SvO₂ does not indicate tissue hypoxia; it typically argues against it.

4. 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.

5. Sufentanil potency relative to fentanyl?

- A. 5x
- B. 10x**
- C. 20x
- D. 100x

The main idea is comparing how much drug is needed to achieve the same analgesic effect. Sufentanil is significantly more potent than fentanyl, meaning a much smaller amount produces the same pain relief. This is due to its higher affinity for mu opioid receptors and greater lipophilicity, which allow it to bind more effectively and reach receptor sites rapidly. In clinical practice, sufentanil is commonly considered about ten times more potent than fentanyl, so roughly one-tenth the dose of fentanyl can achieve a similar effect. Keep in mind that exact multipliers can vary by context and reference, but tenfold is the typical exam-standard figure. This higher potency is paired with rapid onset, so dosing must be precise to avoid overdose.

6. Halothane is known to cause which myocardial effect?

- A. Tachycardia
- B. Decreased contractility**
- C. No effect
- D. Increased contractility

Halothane produces a negative inotropic effect, meaning it reduces the strength of the heart's contractions. This volatile anesthetic depresses myocardial contractility by dampening calcium availability and the myofilament response, so the heart contracts more weakly. As a result, stroke volume and cardiac output can fall, especially alongside vasodilation and other depressant effects. Tachycardia isn't the primary myocardial effect with halothane, and it doesn't cause no effect or increased contractility. So decreased contractility is the best answer.

7. Which artery supplies the lower two-thirds of the spinal cord?

- A. Anterior spinal artery
- B. Posterior spinal artery
- C. Intercostal artery
- D. Arteria radicularis magna**

The blood supply to the spinal cord is organized so the front two-thirds are fed mainly by the anterior spinal artery, while the back one-third is supplied by the posterior spinal arteries. For the lower portion of the cord, a large segmental medullary artery – the artery of Adamkiewicz, also called the great radicular artery – provides the major reinforcement to the anterior spinal artery. It usually arises from a left intercostal or lumbar artery around T9–L2 and travels to join the anterior spinal artery, delivering substantial blood flow to the lower thoracic and lumbar segments. Because this artery is the principal source boosting the anterior supply to the lower cord, it's the best answer for which vessel supplies the lower two-thirds of the spinal cord. The other options either feed the posterior third or are general segmental feeders rather than the key contributor to the lower cord's perfusion.

8. 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.

9. 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.

10. What method is used to measure brain temperature?

- A. Rectal thermometer
- B. Tympanic probe**
- C. Oral thermometer
- D. Skin thermometer

In this setting, the best way to estimate brain temperature is with a tympanic probe. The ear canal thermometer measures temperature close to the tympanic membrane, which lies near the brain and shares blood supply with the brain regions that regulate temperature. Because cerebral temperature changes with perfusion and metabolic activity rapidly, a tympanic reading provides a quick, noninvasive estimate of brain temperature and tends to track real cerebral temperature more closely than other sites. Rectal or oral thermometers mainly reflect core body temperature but can lag behind rapid brain temperature shifts, and skin temperature is highly influenced by ambient conditions and doesn't reliably mirror internal temperatures. So, the tympanic probe offers a practical balance of proximity to the brain, responsiveness, and noninvasiveness for monitoring brain temperature in this context.

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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:

<https://abcppbse.examzify.com>

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

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