

# Echocardiography Exam 2 Practice Test (Sample)

## Study Guide



**Everything you need from our exam experts!**

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# Table of Contents

**Copyright** ..... 1

**Table of Contents** ..... 2

**Introduction** ..... 3

**How to Use This Guide** ..... 4

**Questions** ..... 5

**Answers** ..... 9

**Explanations** ..... 11

**Next Steps** ..... 17

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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. Mean gradient and RVSP or PAP measure what?**
  - A. Volumes**
  - B. Ejection fraction**
  - C. Valvular thickness**
  - D. Pressures**
  
- 2. What equation is used to calculate the pressure gradient across the aortic valve in aortic stenosis?**
  - A. Bernoulli's equation**
  - B. Pythagorean theorem**
  - C. Navier-Stokes equation**
  - D. Hooke's law**
  
- 3. In the RVSP calculation, which term is the additive component?**
  - A. The squared velocity term**
  - B. RAP**
  - C. The constant 4**
  - D. V**
  
- 4. What echocardiographic description corresponds to systolic bowing of the aortic valve leaflets that appears dome-like?**
  - A. Systolic bowing**
  - B. Diastolic flutter**
  - C. Prolapse**
  - D. Calcification**
  
- 5. Which finding on IVC assessment is most consistent with elevated right atrial pressure?**
  - A. Small IVC with >50% collapse.**
  - B. IVC diameter is not used to estimate RAP.**
  - C. Dilated IVC with minimal inspiratory collapse.**
  - D. IVC collapses completely during expiration.**

- 6. How is bubble contrast used to diagnose shunts such as PFO/ASD and what timing indicates a shunt?**
- A. Agitated saline with real-time imaging; bubbles in left heart within a few beats indicate intra-cardiac shunt (PFO/ASD), typically after Valsalva**
  - B. Contrast should appear in left heart immediately before right**
  - C. The presence of bubbles in left heart within several seconds indicates no shunt**
  - D. Bubbles cross from left to right heart only after exercise**
- 7. Which pattern of hypertrophy is typical in hypertrophic cardiomyopathy?**
- A. Asymmetric septal hypertrophy.**
  - B. Concentric LV hypertrophy with equal thickening.**
  - C. Diffuse LV dilation with wall thinning.**
  - D. No hypertrophy; normal wall thickness.**
- 8. Which statement about the transmitral E/A ratio is accurate?**
- A. It measures LV systolic function directly.**
  - B. It is unaffected by age.**
  - C. It reflects LV filling pattern and changes with age and diastolic dysfunction.**
  - D. It directly estimates left atrial pressure.**
- 9. Which statement best describes the role of 3D echocardiography and contrast when image quality is suboptimal?**
- A. 3D imaging is unnecessary and should be avoided.**
  - B. Contrast is never beneficial.**
  - C. Switching to 3D or using contrast can enhance endocardial border definition when 2D is suboptimal.**
  - D. There is no advantage to additional imaging techniques.**

**10. Parachute mitral valve is defined by which anatomic feature?**

- A. All chordae attach to a single papillary muscle**
- B. Two papillary muscles share chordae**
- C. Absence of papillary muscles**
- D. Fusion of papillary muscles**

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## Answers

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

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## **Explanations**

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## 1. Mean gradient and RVSP or PAP measure what?

- A. Volumes
- B. Ejection fraction
- C. Valvular thickness
- D. Pressures**

These measurements are about pressures in the heart and pulmonary circulation. The mean gradient across a valve reflects the pressure difference the ventricle must generate to push blood through a stenotic valve, so it directly indicates how high the pressure rise is across the valve during flow. Right ventricular systolic pressure (RVSP) and pulmonary artery pressure (PAP) are estimates of the pressure in the right heart and in the pulmonary arteries, respectively, often derived from Doppler measurements. They tell you how much pressure the right side of the heart and the lungs are experiencing, rather than how much blood volume is present, how well the heart is contracting (ejection fraction), or the thickness of valvular tissue. So the best answer is that these values measure pressures.

## 2. What equation is used to calculate the pressure gradient across the aortic valve in aortic stenosis?

- A. Bernoulli's equation**
- B. Pythagorean theorem
- C. Navier-Stokes equation
- D. Hooke's law

The main idea is that the pressure drop across a stenotic aortic valve can be inferred from how fast blood jets through the narrowed opening. In clinical echo, we use Bernoulli's principle: the pressure difference equals the kinetic energy change of the flow. The common practical form is  $\Delta P \approx 4v^2$ , where  $\Delta P$  is the gradient in mmHg and  $v$  is the peak velocity through the valve in meters per second measured by Doppler. This comes from energy conservation for incompressible, nonviscous flow, often with the upstream velocity neglected because it's small compared to the jet velocity. A more exact version would be  $\Delta P = 4(v^2 - v_{\text{upstream}}^2)$  if you want to include upstream flow. The other equations aren't used here because they don't describe how pressure relates to flow velocity in the heart: the Pythagorean theorem is for geometry, Navier-Stokes is a general fluid dynamics framework not practical for this quick estimate, and Hooke's law relates stress and strain in solids.

## 3. In the RVSP calculation, which term is the additive component?

- A. The squared velocity term
- B. RAP**
- C. The constant 4
- D. V

In estimating right ventricular systolic pressure, the additive component is the right atrial pressure. The RVSP is approximated by the pressure gradient across the tricuspid valve, given by the simplified Bernoulli equation as 4 times the TR jet velocity squared, plus the right atrial pressure:  $RVSP \approx 4(TRV)^2 + RAP$ . The squared velocity term ( $4(TRV)^2$ ) is the gradient, not an additive term, and the constant 4 is just part of that gradient calculation. The velocity itself is the TR jet speed, not the additive component.

**4. What echocardiographic description corresponds to systolic bowing of the aortic valve leaflets that appears dome-like?**

- A. Systolic bowing**
- B. Diastolic flutter**
- C. Prolapse**
- D. Calcification**

During systole, the aortic valve cusps open to allow blood to exit the left ventricle. If the leaflets bend into a curved, dome-like shape as they open, that motion is described as systolic bowing. This term specifically captures the dome-like configuration seen with systolic leaflet excursion. The other terms refer to different leaflet behaviors: diastolic flutter describes leaflet flutter during diastole (often with regurgitation), prolapse implies abnormal displacement of a cusp from its normal position, and calcification denotes calcified, stiff leaflets that alter mobility. Because the description emphasizes a dome-shaped bowing of the leaflets during systole, the correct description is systolic bowing.

**5. Which finding on IVC assessment is most consistent with elevated right atrial pressure?**

- A. Small IVC with >50% collapse.**
- B. IVC diameter is not used to estimate RAP.**
- C. Dilated IVC with minimal inspiratory collapse.**
- D. IVC collapses completely during expiration.**

Estimating right atrial pressure noninvasively relies on how the inferior vena cava behaves with breathing. When the right atrial pressure is high, the IVC stays distended and does not collapse much during inspiration. That pattern—a dilated IVC with minimal inspiratory collapse—best indicates elevated right atrial pressure. In contrast, a small IVC that collapses more than half with inspiration points to normal or low RAP, because the venous system can readily collapse when RA pressure isn't elevated. And while IVC size helps estimate RAP, saying it isn't used would be incorrect. An IVC that collapses completely during expiration is not typical for elevated RAP; that would suggest very low RA pressure.

**6. How is bubble contrast used to diagnose shunts such as PFO/ASD and what timing indicates a shunt?**

**A. Agitated saline with real-time imaging; bubbles in left heart within a few beats indicate intra-cardiac shunt (PFO/ASD), typically after Valsalva**

**B. Contrast should appear in left heart immediately before right**

**C. The presence of bubbles in left heart within several seconds indicates no shunt**

**D. Bubbles cross from left to right heart only after exercise**

Bubble contrast uses agitated saline to create tiny intravascular bubbles that travel through the right heart first. If there is a pathway from right to left, such as a PFO or ASD, these bubbles can cross into the left atrium (and ventricle) and become visible after a short delay—typically within a few cardiac cycles—especially when a Valsalva maneuver is performed to transiently raise right atrial pressure and provoke the shunt. This rapid appearance in the left heart is what identifies an intra-cardiac shunt. If there is no intracardiac shunt, the bubbles stay in the right heart or only appear in the left heart after they pass through the lungs, which takes longer and may show a delayed or absent left-sided opacification. That's why timing matters: a left-heart appearance within a few beats indicates an intra-cardiac shunt like PFO/ASD, whereas a later appearance suggests a pulmonary pathway or no shunt at all. Real-time imaging during the test, with provocative maneuvers such as Valsalva, enhances detection.

**7. Which pattern of hypertrophy is typical in hypertrophic cardiomyopathy?**

**A. Asymmetric septal hypertrophy.**

**B. Concentric LV hypertrophy with equal thickening.**

**C. Diffuse LV dilation with wall thinning.**

**D. No hypertrophy; normal wall thickness.**

Hypertrophic cardiomyopathy typically shows asymmetric thickening of the interventricular septum. This focal septal hypertrophy is usually most pronounced in the basal to mid-septal region, making the septum thicker than the posterior wall. This pattern distinguishes it from uniform, concentric thickening seen with long-standing hypertension or aortic stenosis, and from diffuse dilation with thinning seen in dilated cardiomyopathy. The asymmetric septal hypertrophy often narrows the left ventricular outflow tract and can cause dynamic obstruction, especially with systolic anterior motion of the mitral valve. So, the hallmark pattern is asymmetric septal hypertrophy.

**8. Which statement about the transmitral E/A ratio is accurate?**

- A. It measures LV systolic function directly.**
- B. It is unaffected by age.**
- C. It reflects LV filling pattern and changes with age and diastolic dysfunction.**
- D. It directly estimates left atrial pressure.**

The transmitral E/A ratio is a Doppler index of how the left ventricle fills during diastole. The E wave reflects early, passive filling, while the A wave reflects filling that occurs with atrial contraction. This ratio mainly tells us about the LV filling pattern, which is governed by relaxation and chamber compliance, and it changes as people age as well as with diastolic dysfunction. That's why the correct statement is that the E/A ratio reflects LV filling pattern and changes with age and diastolic dysfunction. In younger, healthy hearts the E wave tends to exceed the A wave ( $E/A > 1$ ), indicating efficient early filling. With aging or impaired relaxation, the E wave diminishes and the A wave becomes more prominent, lowering the ratio. In different stages of diastolic dysfunction, the pattern evolves from reduced E (with a low E/A) to pseudonormal patterns as filling pressures rise, and finally to a restrictive pattern with a very high E due to elevated filling pressures. This ratio does not measure LV systolic function directly, is not unaffected by age, and does not provide a direct estimate of left atrial pressure, though it can be influenced by loading conditions and should be interpreted alongside other diastolic parameters.

**9. Which statement best describes the role of 3D echocardiography and contrast when image quality is suboptimal?**

- A. 3D imaging is unnecessary and should be avoided.**
- B. Contrast is never beneficial.**
- C. Switching to 3D or using contrast can enhance endocardial border definition when 2D is suboptimal.**
- D. There is no advantage to additional imaging techniques.**

When 2D image quality is suboptimal, the aim is to improve the delineation of the endocardial borders to get accurate measurements of chamber size and function. 3D echocardiography offers true volumetric data and a more complete view of the ventricular endocardial surface, reducing the reliance on geometric assumptions that can distort volumes and ejection fraction with 2D. It helps overcome issues like foreshortening or off-axis views by providing broader, more representative data of the cavity. Contrast agents, on the other hand, increase the echogenicity of the blood pool, sharpening the interface between blood and myocardium and making the endocardial border easier to see when 2D windows are poor. Using contrast within a 3D dataset can further enhance border definition and improve measurement accuracy. So, opting to switch to 3D or use contrast when 2D quality is suboptimal is beneficial. The other statements imply no benefit or unnecessary imaging, which isn't the case since these tools specifically address limitations of 2D imaging to improve diagnostic quality.

**10. Parachute mitral valve is defined by which anatomic feature?**

- A. All chordae attach to a single papillary muscle**
- B. Two papillary muscles share chordae**
- C. Absence of papillary muscles**
- D. Fusion of papillary muscles**

The key idea is how the chordae tendineae connect to the papillary muscles. In parachute mitral valve, all chordae radiate from a single papillary muscle, so the leaflets are tethered to one hub rather than to multiple papillary muscles. This creates a parachute-like appearance and can limit leaflet motion, potentially causing mitral stenosis or regurgitation. The other patterns—two papillary muscles sharing chordae, absence of papillary muscles, or fusion of papillary muscles—do not produce that single-point chordal attachment, which is why they don't define parachute mitral valve.

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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](mailto:hello@examzify.com).**

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

**<https://echocardiography2.examzify.com>**

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

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