ECHOCARDIOGRAPHY EXAM 2 PRACTICE TEST (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

1. **Which method is used to quantify left ventricular ejection fraction most accurately from transthoracic views?**
   A. Teichholz method
   B. Ellipsoid method
   C. 3D volumetric method
   D. Simpson's biplane method

2. **In the RVSP formula, the two terms are combined how to produce the final estimate?**
   A. They are subtracted
   B. They are multiplied
   C. They are added
   D. They are divided

3. **Which parameter is commonly used to assess the severity of aortic regurgitation on echocardiography?**
   A. Coronary flow velocity reserve
   B. Vena contracta width
   C. LV end-diastolic volume
   D. Aortic root diameter

4. **What is the principle of the PISA method and what are common pitfalls?**
   A. Flow convergence region forms a hemisphere; radius at aliasing used to compute EROA; pitfalls include assuming hemispheric flow, eccentric jets, and misplacement of measurement
   B. Flow convergence is a cylinder; EROA derived from jet area; pitfalls include jet direction
   C. PISA uses color Doppler to estimate regurg volume
   D. PISA does not require assuming flow pattern

5. **Which measurement is used to calculate the left ventricular outflow tract area for the continuity equation in assessing aortic stenosis?**
   A. Left ventricular outflow tract diameter
   B. Left ventricular outflow tract velocity
   C. Aortic root diameter
   D. Right ventricular outflow tract diameter

6. What regional wall-motion pattern would indicate an acute coronary syndrome on echocardiography?

A. Global hyperkinesis.

B. New regional wall-motion abnormality in a coronary territory.

C. Uniform akinesis of all walls.

D. Normal wall motion with preserved EF.

7. In hypertrophic cardiomyopathy, what is the mechanism of dynamic LVOT obstruction?

A. Dilation of the LVOT.

B. Fixed aortic valve stenosis.

C. Systolic anterior motion of the mitral valve causing dynamic LVOT obstruction.

D. Pulmonary valve stenosis.

8. Opening snap is a classic auscultatory finding in which condition?

A. Aortic stenosis

B. Tricuspid regurgitation

C. Mitral stenosis

D. Pulmonary hypertension

9. Eccentric valves are common in bicuspid aortic valves. True or False?

A. True

B. False

C. Not applicable

D. Only in elderly

10. How are pulmonary venous flow patterns used in diastolic function evaluation, and which change indicates elevated LV filling pressures?

A. S velocity decreases with elevated pressures; D and AR become prominent; augmented AR velocity >30 cm/s suggests elevated LV filling pressures.

B. S velocity increases with elevated pressures; D velocity decreases.

C. D velocity and AR velocity decrease with elevated pressures.

D. Pulmonary venous flow patterns are not useful in diastolic assessment.

Answers

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

Explanations

1. Which method is used to quantify left ventricular ejection fraction most accurately from transthoracic views?

A. Teichholz method

B. Ellipsoid method

C. 3D volumetric method

D. Simpson's biplane method

Accurately quantifying LV ejection fraction from transthoracic images hinges on estimating true ventricular volumes rather than relying on a single dimension or a fixed shape. Simpson's biplane method does this by tracing the endocardial border in two orthogonal apical views (typically 4-chamber and 2-chamber) and calculating volumes with the method of discs. By summing the volumes of many discs, it yields end-diastolic and end-systolic volumes, and EF is then EDV minus ESV divided by EDV. This approach better represents the actual LV shape and accommodates regional wall-motion abnormalities, reducing geometric bias and improving accuracy compared with methods that assume a specific geometry from a single view. The Teichholz method relies on a single dimension from one view and assumes a particular LV shape, which can be inaccurate in remodeled or irregular ventricles. The ellipsoid model imposes a fixed ellipsoidal form, also leading to errors when the ventricle deviates from that geometry. When high-quality 3D data are available, 3D volumetric assessment can be very accurate since it constructs volumes directly from the dataset without geometric assumptions, but in standard transthoracic practice, Simpson's biplane method remains the most reliable among commonly used 2D approaches.

2. In the RVSP formula, the two terms are combined how to produce the final estimate?

A. They are subtracted

B. They are multiplied

C. They are added

D. They are divided

In estimating RVSP, you combine the Doppler-derived pressure gradient with the right atrial pressure by adding them. The velocity of the tricuspid regurgitation jet gives the pressure difference between the right ventricle and right atrium through the simplified Bernoulli equation: ΔP = 4v^2. This gradient represents how much pressure the RV must generate above the RA during systole. To obtain the actual right ventricular systolic pressure, you add the estimated right atrial pressure to that gradient: RVSP ≈ 4(TRV)^2 + RAP. So the final estimate comes from summing the two terms, not subtracting, multiplying, or dividing. For example, if TRV is 3 m/s, the gradient is 36 mmHg; adding an RAP around 5–10 mmHg gives an RVSP in the ~41–46 mmHg range.

3. Which parameter is commonly used to assess the severity of aortic regurgitation on echocardiography?

A. Coronary flow velocity reserve

B. Vena contracta width

C. LV end-diastolic volume

D. Aortic root diameter

Vena contracta width is used because it measures the narrowest part of the regurgitant jet right after it exits the aortic valve, which reflects the size of the regurgitant orifice. The wider this narrowest region, the more blood is leaking back into the left ventricle, so it directly correlates with the severity of aortic regurgitation. In practice, a small width suggests mild AR, a mid-range width suggests moderate AR, and a wide width indicates severe AR. Example thresholds commonly used are roughly under 3 mm for mild, about 3–6 mm for moderate, and greater than around 6 mm for severe AR, though exact cutoffs can vary slightly by protocol. This makes vena contracta width a straightforward, reproducible metric on color Doppler. Other measurements exist, but they serve different purposes. Coronary flow velocity reserve assesses coronary microvascular function, not AR severity. LV end-diastolic volume shows remodeling from chronic AR but does not quantify how severe the leak is at the valve. Aortic root diameter indicates the size of the aortic root and potential etiologies of AR, not the current regurgitant strength.

4. What is the principle of the PISA method and what are common pitfalls?

A. Flow convergence region forms a hemisphere; radius at aliasing used to compute EROA; pitfalls include assuming hemispheric flow, eccentric jets, and misplacement of measurement

B. Flow convergence is a cylinder; EROA derived from jet area; pitfalls include jet direction

C. PISA uses color Doppler to estimate regurg volume

D. PISA does not require assuming flow pattern

PISA relies on flow convergence proximal to a regurgitant orifice. As blood accelerates toward the orifice, the velocity increases until it reaches a defined aliasing velocity, creating an isovelocity surface whose near-hemispherical shape is the basis for a simple flow calculation. By measuring the radius r of that first-encountered aliasing surface on color Doppler and using the known aliasing velocity Va, you estimate the flow rate through the orifice with Q = 2π r^2 Va. This flow rate is then related to the regurgitant jet by dividing by the peak velocity of the regurgitant jet Vmax measured with continuous-wave Doppler, giving the effective regurgitant orifice area: EROA = Q / Vmax = (2π r^2 Va) / Vmax. In practice, this means you place the sample window to capture the flow convergence, measure the radius at the first aliasing contour, and apply the formula to obtain EROA and, subsequently, regurgitant volume. Common pitfalls to avoid include assuming the flow convergence forms a perfect hemisphere, since actual flow can be distorted by jet direction, LV geometry, or multiple jets; eccentric or laminar jets and misalignment of the Doppler beam can bias the measured radius and Va, leading to under- or overestimation of EROA; and mistimed or incorrect placement of the measurement plane or use of an inappropriate aliasing velocity can distort Q. Being mindful of these factors helps ensure the PISA estimate reflects the true regurgitant flow.

5. Which measurement is used to calculate the left ventricular outflow tract area for the continuity equation in assessing aortic stenosis?

A. Left ventricular outflow tract diameter

B. Left ventricular outflow tract velocity

C. Aortic root diameter

D. Right ventricular outflow tract diameter

The measurement used to calculate the LVOT area in the continuity equation is the LVOT diameter. The cross-sectional area of the LVOT is derived from this diameter with the formula area = π(D^2)/4, because stroke volume equals LVOT area times the LVOT velocity-time integral (VTI). The LVOT diameter is measured in the parasternal long-axis view, inner-edge to inner-edge, just below the aortic valve, in systole. The LVOT velocity gives the VTI for flow, not the area. The aortic root diameter and the RVOT diameter aren't used in this LVOT area calculation. Since the area scales with the square of the diameter, tiny measurement errors in the LVOT diameter can lead to large errors in the calculated aortic valve area.

6. What regional wall-motion pattern would indicate an acute coronary syndrome on echocardiography?

A. Global hyperkinesis.

B. New regional wall-motion abnormality in a coronary territory.

C. Uniform akinesis of all walls.

D. Normal wall motion with preserved EF.

The key idea is that acute coronary syndrome shows up on echocardiography as a new regional wall-motion abnormality in the coronary artery's territory. When a coronary artery acutely occludes, the myocardium it feeds becomes ischemic and fails to move normally in that specific region, leading to hypokinesis (reduced movement), akinesis (no movement), or even dyskinesis (paradoxical motion) in that localized area. This focal change, rather than a uniform pattern across the whole ventricle, is what points to an acute process. If the entire heart were akinetic, that would suggest global myocardial dysfunction such as severe diffuse ischemia or cardiogenic shock, not a localized ACS event. Global hyperkinesis isn't characteristic of ACS either, and normal wall motion with preserved ejection fraction would not indicate an acute ischemic event.

7. In hypertrophic cardiomyopathy, what is the mechanism of dynamic LVOT obstruction?

A. Dilation of the LVOT.

B. Fixed aortic valve stenosis.

C. Systolic anterior motion of the mitral valve causing dynamic LVOT obstruction.

D. Pulmonary valve stenosis.

Dynamic LVOT obstruction in hypertrophic cardiomyopathy arises when the mitral valve's anterior leaflet moves toward the hypertrophied septum during systole (systolic anterior motion). This SAM pulls the mitral leaflet into the outflow tract as blood rushes past, narrowing the LVOT and often producing mitral regurgitation as the leaflet contacts the septum. The obstruction is dynamic because it depends on loading and contractility: anything that reduces preload or afterload or increases contractility worsens SAM and the obstruction, while conditions that increase LV volume or afterload can lessen it. This mechanism is distinct from fixed obstructions like aortic or pulmonary valve stenosis or from simple dilation of the LVOT, which would not produce the same systolic, flow dependent narrowing.

8. Opening snap is a classic auscultatory finding in which condition?

A. Aortic stenosis

B. Tricuspid regurgitation

C. Mitral stenosis

D. Pulmonary hypertension

Opening snap reflects abrupt opening of a stiff mitral valve early in diastole, seen in mitral stenosis. In this condition the leaflets are thickened and tethered, so they resist opening until left atrial pressure pushes them apart; when they finally yield, the sudden tensing of the valve apparatus produces a brief, high-frequency sound just after the second heart sound. This is best heard at the apex with the patient in the left lateral decubitus position, early in diastole, before the diastolic rumble of mitral stenosis. The finding points to mitral stenosis and is not typically produced by aortic stenosis, tricuspid regurgitation, or isolated pulmonary hypertension, which have different auscultatory patterns.

9. Eccentric valves are common in bicuspid aortic valves. True or False?

A. True

B. False

C. Not applicable

D. Only in elderly

In bicuspid aortic valve, the two cusps create an asymmetric opening rather than a circular, central one. This makes the valve orifice elliptical or slit-like and offset within the annulus, so the blood flow jet is directed eccentrically rather than straight ahead. On echocardiography you'll often see this as a noncentral (eccentric) systolic jet and an uneven coaptation of the leaflets, sometimes with a raphe contributing to the asymmetry. Because the valve anatomy is inherently asymmetric, eccentric flow is a common finding in BAV regardless of age, whereas a normal tricuspid valve opens centrally. So the statement is true.

10. How are pulmonary venous flow patterns used in diastolic function evaluation, and which change indicates elevated LV filling pressures?

A. S velocity decreases with elevated pressures; D and AR become prominent; augmented AR velocity >30 cm/s suggests elevated LV filling pressures.

B. S velocity increases with elevated pressures; D velocity decreases.

C. D velocity and AR velocity decrease with elevated pressures.

D. Pulmonary venous flow patterns are not useful in diastolic assessment.

Pulmonary venous Doppler flow reflects left atrial pressure and how the ventricle fills during diastole. The S wave is forward flow during LV systole, the D wave is forward flow during LV diastole, and the AR wave is the atrial reversal flow that occurs during atrial contraction. In a normal state, the S wave is typically larger than the D wave, and the AR signal is modest. When LV filling pressures are elevated, the left atrial pressure rises and the systolic forward flow from the pulmonary veins into the atrium diminishes, so the S velocity falls. At the same time, the demand and impact of atrial contraction increase the retrograde flow, making the D and especially the atrial reversal (AR) components more prominent. A key quantitative cue is that the AR velocity often becomes markedly elevated, with values above about 30 cm/s indicating elevated LV filling pressures. This combination—reduced S and increased D and AR, with a high AR velocity—best aligns with diastolic dysfunction with elevated filling pressures. The idea that S would increase with higher pressures is not correct, and the pattern isn't accurately described as D and AR decreasing. Pulmonary venous flow patterns are indeed useful in this assessment.

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://echocardiography2.examzify.com

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