

EPRI Heat Transfer & Fluid Flow Practice Test (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

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- 1. Which Reynolds number range is associated with turbulent flow according to the material?**
 - A. $Re < 2100$**
 - B. $Re > 2300$**
 - C. $2100 < Re < 2300$**
 - D. $Re = 3000$**

- 2. In the equation $Q = UA\Delta T_{lm}$, what does U denote?**
 - A. Overall Heat Transfer Coefficient**
 - B. Heat Transfer Rate**
 - C. Temperature Difference**
 - D. Surface Area**

- 3. Gas binding in a pump system is most commonly caused by which of the following?**
 - A. Cavitation**
 - B. Inadequate venting or entrained gases in the liquid**
 - C. Excessive prime**
 - D. High ambient temperature**

- 4. Which heat exchanger type is bent into a U shape with the inlet and outlet on the same end and a divider plate separating inlet from outlet?**
 - A. U-Tube**
 - B. Straight Tube**
 - C. Shell and Tube Type Heat Exchanger**
 - D. Multi-Pass HXR**

- 5. The description given describes which concept: energy added as heat to a working fluid, its passage through a turbine, and electricity generation in a nuclear plant?**
 - A. Thermodynamic Cycle**
 - B. Heat Transfer**
 - C. Power Plant Operation**
 - D. Nuclear Reactor**

- 6. What term refers to the minimum fluid energy at the pump inlet specified by the manufacturer?**
- A. Required Net Positive Suction Head**
 - B. Available Net Positive Suction Head**
 - C. Static Head**
 - D. NPSH Margin**
- 7. What type of heat exchanger does cooling/heating fluid REMAIN in gaseous or liquid phase?**
- A. Single Phase**
 - B. Two-Phase**
 - C. Condensing**
 - D. Evaporating**
- 8. What type of heat exchangers have no physical contact between the two fluids and are separated by a metallic tube wall boundary?**
- A. Indirect Contact**
 - B. Direct Contact**
 - C. Crossflow**
 - D. Parallel Flow**
- 9. Parallel pumps are useful when varying flows are required because you can use which options?**
- A. A, B, or A&B**
 - B. C And D**
 - C. Only A**
 - D. Only B**
- 10. What is the freezing point of water in Kelvin?**
- A. 273.15**
 - B. 0**
 - C. 373.15**
 - D. 671.67**

Answers

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

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Explanations

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1. Which Reynolds number range is associated with turbulent flow according to the material?

- A. $Re < 2100$
- B. $Re > 2300$**
- C. $2100 < Re < 2300$
- D. $Re = 3000$

Reynolds number measures the balance between inertial forces and viscous forces in a pipe flow. When inertia dominates, the smooth layers lose stability and the flow becomes turbulent. In this material, that turbulent regime is associated with Reynolds numbers greater than 2300, so $Re > 2300$ covers the turbulent range. A value like $Re = 3000$ sits in this turbulent region. Below about 2100 the flow is typically laminar, and the interval around 2100-2300 is often a transitional zone where the flow can switch between laminar and turbulent depending on disturbances.

2. In the equation $Q = UA\Delta T_{lm}$, what does U denote?

- A. Overall Heat Transfer Coefficient**
- B. Heat Transfer Rate
- C. Temperature Difference
- D. Surface Area

U denotes the overall heat transfer coefficient, a measure of how easily heat is transferred per unit area for a given temperature difference across the boundary between two media. It combines all thermal resistances in series—conduction through solids, convection on both sides, and any radiation—so the heat transfer rate is $Q = U A \Delta T_{lm}$. Its units are $W/(m^2 \cdot K)$, and a larger U means heat moves more readily under the same area and temperature driving force. This is distinct from the heat transfer rate itself (Q), the temperature difference (ΔT_{lm}), or the surface area (A).

3. Gas binding in a pump system is most commonly caused by which of the following?

- A. Cavitation
- B. Inadequate venting or entrained gases in the liquid**
- C. Excessive prime
- D. High ambient temperature

Gas binding occurs when pockets of gas on the suction side prevent the pump from being fully filled with liquid, so the impeller tries to move air rather than liquid and cannot develop the necessary suction to lift the fluid. The most common cause is inadequate venting or entrained gases in the liquid. If the suction line isn't properly vented, dissolved gases come out of solution as the liquid is drawn into the pump, forming air pockets that break the liquid column and cause loss of prime. Cavitation is a related phenomenon but it's driven by local pressure dropping below the liquid's vapor pressure and forms vapor bubbles inside the pump itself, not by gas trapped in the suction line. The other options aren't typical root causes: high ambient temperature or excessive prime don't directly create the suction-side gas pockets that cause binding.

4. Which heat exchanger type is bent into a U shape with the inlet and outlet on the same end and a divider plate separating inlet from outlet?

A. U-Tube

B. Straight Tube

C. Shell and Tube Type Heat Exchanger

D. Multi-Pass HXR

The defining feature here is a heat exchanger where the tubes are formed into a U, so the tube ends come back to the same side of the exchanger. That U-bend makes the inlet and outlet for the tube side appear on the same end, which is the key clue. A divider plate that separates the inlet flow from the outlet flow on the shell side further reinforces this configuration by keeping the two streams from mixing as they pass through the shell. This combination—U-shaped tubes plus ports on one end—doesn't describe straight-tube exchangers, which have tubes that run straight, nor does it describe the general shell-and-tube family where the tube geometry isn't necessarily a U. It also isn't about flow pattern in the tubes (like multiple passes) but about the actual tube geometry and how the ends are arranged. So the design that matches all these details is the U-tube heat exchanger.

5. The description given describes which concept: energy added as heat to a working fluid, its passage through a turbine, and electricity generation in a nuclear plant?

A. Thermodynamic Cycle

B. Heat Transfer

C. Power Plant Operation

D. Nuclear Reactor

This describes a thermodynamic cycle. Heat is added to a working fluid, the high-energy fluid expands through a turbine to produce work, and that energy eventually becomes electricity in the plant. In a nuclear power plant, the reactor provides the heat that drives this loop, but the essential idea is the cycle: heat input, energy conversion through the turbine, and electrical generation, with the fluid circulating back to repeat the process. This distinguishes it from just heat transfer (energy moving between bodies), from a generic "power plant operation" (too broad), or from the reactor itself (the heat source, not the cycle).

6. What term refers to the minimum fluid energy at the pump inlet specified by the manufacturer?

- A. Required Net Positive Suction Head**
- B. Available Net Positive Suction Head**
- C. Static Head**
- D. NPSH Margin**

Understanding cavitation risk in a pump starts with how much suction energy the pump needs. The manufacturer specifies a minimum suction energy required at the inlet for a given flow to prevent cavitation. This threshold is called the Required Net Positive Suction Head (NPSHr). It represents the energy level the fluid must have at the pump inlet to keep the fluid from flashing to vapor inside the pump, and it depends on the pump design and operating point. This is different from available suction head, NPSHa, which is how much suction energy the system can actually supply. It's also different from static head, which is just the elevation-based energy term, not the pump's cavitation requirement. NPSH margin refers to the difference between NPSHa and NPSHr, indicating how much safety cushion exists. So the term that matches the description is the Required Net Positive Suction Head.

7. What type of heat exchanger does cooling/heating fluid REMAIN in gaseous or liquid phase?

- A. Single Phase**
- B. Two-Phase**
- C. Condensing**
- D. Evaporating**

Single-phase heat transfer means the working fluid stays in one phase (either all liquid or all gas) as it moves through the exchanger. Since no phase change occurs, there's no latent heat involved—the heat transfer is sensible, driven by the fluid's specific heat and temperature change. The fluid remains gaseous or liquid along the entire length, which is why this fits the single-phase category. In contrast, condensing and evaporating involve phase change (vapor to liquid or liquid to vapor), and two-phase flow means both liquid and vapor are present simultaneously.

8. What type of heat exchangers have no physical contact between the two fluids and are separated by a metallic tube wall boundary?

- A. Indirect Contact**
- B. Direct Contact**
- C. Crossflow**
- D. Parallel Flow**

Indirect contact heat exchangers keep the two fluids completely separate with a solid wall between them, usually a metal tube. Heat is transferred by conduction through that wall and convection on each side, so there is no mixing of the fluids. This is the defining feature here. Direct contact would involve the fluids touching and possibly exchanging components, which is not the case. Crossflow and parallel flow describe how the streams move relative to each other, not whether there's a separating barrier. So the best answer is the indirect contact type.

9. Parallel pumps are useful when varying flows are required because you can use which options?

A. A, B, or A&B

B. C And D

C. Only A

D. Only B

Parallel pumps let you tailor flow by which pumps are running. When pumps operate in parallel, the head they face is shared, and the total flow is the sum of the individual flows. This means you can achieve different flow rates by using just one pump for low flow, the other pump for a different low flow, or both pumps together for higher flow. This flexible capability is exactly what the option describing using one pump, the other, or both expresses, making it the best choice.

10. What is the freezing point of water in Kelvin?

A. 273.15

B. 0

C. 373.15

D. 671.67

Freezing point is tied to the Celsius value, where water freezes at 0°C under standard pressure. The Kelvin scale shifts Celsius by 273.15, with 0 K being absolute zero. So the freezing point in Kelvin is $0 + 273.15 = 273.15$ K. That matches the standard freezing point. The other numbers don't fit: 0 K is absolute zero, 373.15 K is the boiling point at 1 atm, and 671.67 K isn't a standard reference for water's phase change at typical conditions.

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://epriheattransferfluidflow.examzify.com>

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

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