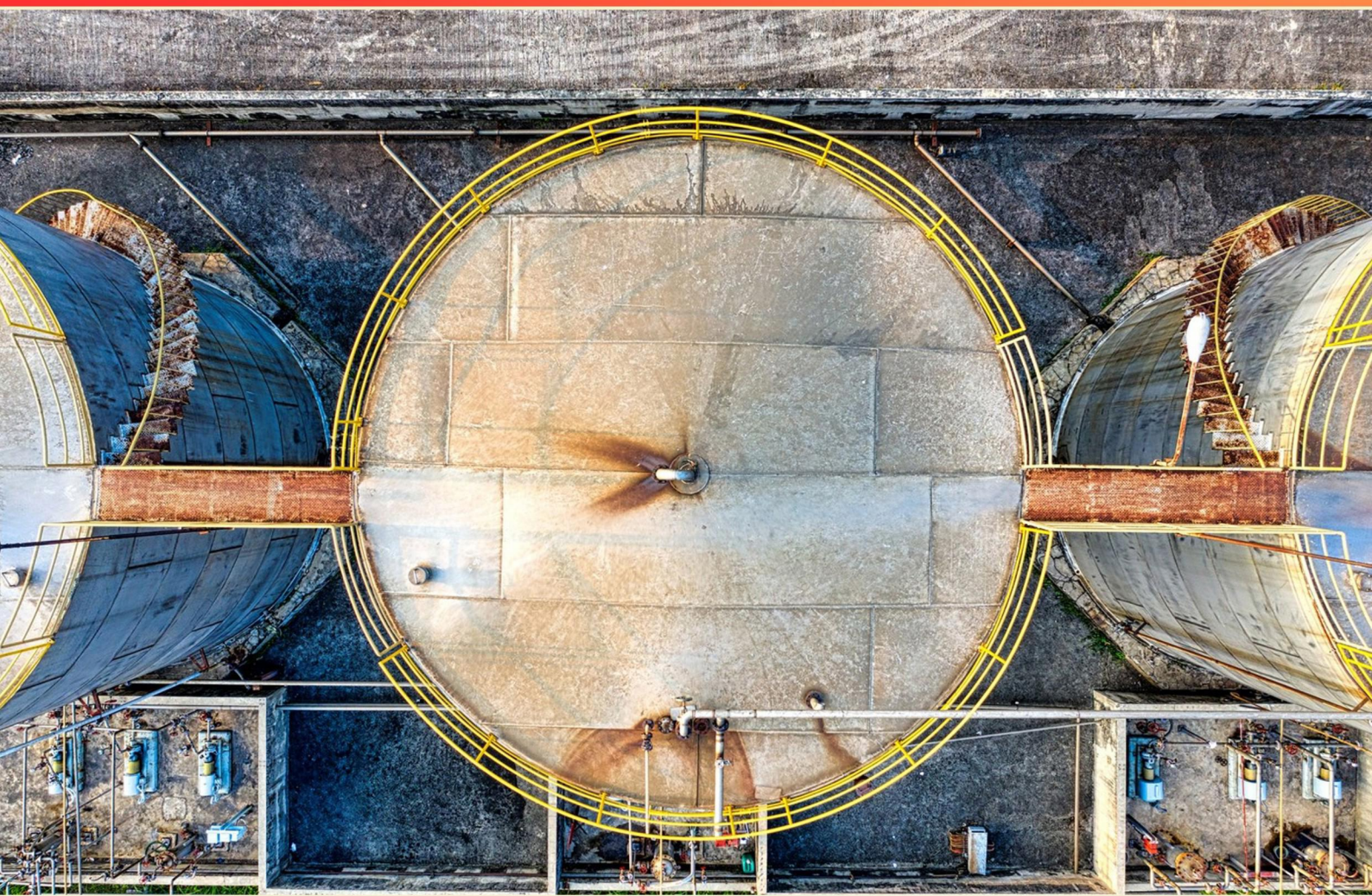


PHYSICAL CHEMICAL OPERATOR SC PRACTICE TEST (SAMPLE)

STUDY GUIDE



**SAMPLE STUDY GUIDE
WITH LIMITED QUESTIONS**

**VISIT US ONLINE FOR
THE FULL VERSION STUDY GUIDE**

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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. All organics contain which element?
 - A. Carbon
 - B. Hydrogen
 - C. Oxygen
 - D. Nitrogen
2. Pumps and pump parts should be lubricated according to the ____
 - A. Manufacturer's specifications
 - B. Personal preference
 - C. Industry standards
 - D. Daily routine
3. Head pressure in a water column depends on which factor?
 - A. Height of water column
 - B. Volume of water
 - C. Temperature
 - D. Pressure at base
4. DPD is a method of measuring what in water?
 - A. Nessler method
 - B. DPD
 - C. Amperometric
 - D. Iodometric
5. Fuses and ____ are designed to protect equipment.
 - A. Relays
 - B. Circuit breakers
 - C. Transformers
 - D. Capacitors
6. If you tighten the packing gland too much, what is a likely consequence?
 - A. It may cause overheating and excessive wear
 - B. It will seal completely with no leakage
 - C. It will improve efficiency
 - D. It will cause more leaks

- 7. Which of the following is used as a sludge dewatering device?**
- A. Mixing Tank
 - B. Chlorination Column
 - C. Air Stripper
 - D. Belt Press
- 8. The unit of heat required to raise the temperature of one pound of water by one degree Fahrenheit is**
- A. Calorie
 - B. Joule
 - C. Therm
 - D. BTU
- 9. Which practice best reduces wear on pump moving parts?**
- A. Run the pump at maximum speed to heat up
 - B. Operate without lubrication
 - C. Use only oil-lubricated bearings
 - D. Lubricate according to manufacturer specifications
- 10. What term actually refers to the total of the suspended, settleable and dissolved solids?**
- A. Total Solids
 - B. Total Dissolved Solids
 - C. Suspended Solids
 - D. Settleable Solids

Answers

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

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Explanations

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1. All organics contain which element?

- A. Carbon**
- B. Hydrogen
- C. Oxygen
- D. Nitrogen

Organic compounds are defined by containing carbon as the backbone of their structure. Carbon's ability to form four covalent bonds lets it bond to itself and to many other elements, creating a vast variety of stable, complex molecules. Because of this fundamental role, carbon is present in all organic substances, making it the universal element in organics. Hydrogen is very common and often attached to carbon, but there are organics that have no hydrogen at all, such as carbon tetrachloride. Oxygen and nitrogen appear frequently in many organics, yet there are many hydrocarbons that contain only carbon and hydrogen. So while those elements are common, they aren't universal.

2. Pumps and pump parts should be lubricated according to the ____

- A. Manufacturer's specifications**
- B. Personal preference
- C. Industry standards
- D. Daily routine

Lubrication should be done according to the manufacturer's specifications because the pump is designed with specific bearing clearances, seals, and lubricant pathways that require a particular lubricant type, viscosity, amount, and service interval. Using the recommended lubricant ensures the film strength needed to prevent wear and overheating, and protects seals from damage or chemical attack. The maintenance schedule is based on the actual operating conditions—speed, load, temperature, and duty cycle—so deviations can lead to premature failure. Personal preferences, industry standards, or a daily routine lack the exact compatibility with that specific pump's design and operating environment, risking improper lubrication. Following the manufacturer's instructions keeps performance reliable and helps maintain warranty coverage.

3. Head pressure in a water column depends on which factor?

- A. Height of water column**
- B. Volume of water
- C. Temperature
- D. Pressure at base

Head pressure, or hydrostatic pressure, comes from the weight of the water above a point. The pressure at the base of a column is determined by how tall the water column is, not by how much water there is in total. This relationship is captured by $P = \rho g h$, where h is the height of the water column. So as the height increases, the pressure increases in direct proportion (assuming density stays roughly constant). Volume changes the amount of water but not the pressure at a given depth unless it changes the height. Temperature can tweak density slightly, but the height remains the primary factor.

4. DPD is a method of measuring what in water?

- A. Nessler method
- B. DPD**
- C. Amperometric
- D. Iodometric

Chlorine residual in water is measured with the DPD colorimetric method. The reagent *N,N*-diethyl-*p*-phenylenediamine reacts with chlorine species (like Cl_2 , HOCl , and OCl^-) to form a pink compound, and the color intensity is proportional to the chlorine concentration. A colorimeter or color chart converts that shade into a chlorine value, commonly used for both free chlorine and total chlorine analyses. This makes DPD specifically a chlorine-measuring method, unlike Nessler (ammonia), amperometric (general electrochemical sensing), or iodometric (titration-type) methods.

5. Fuses and ___ are designed to protect equipment.

- A. Relays
- B. Circuit breakers**
- C. Transformers
- D. Capacitors

Fuses and circuit breakers are protective devices that interrupt current to prevent damage from overloads or faults. A fuse works by melting its metal link when current is too high, breaking the circuit. A circuit breaker performs the same protection but can be reset after tripping, so it's reusable. Relays control other parts of a circuit, transformers change voltage levels, and capacitors store energy or smooth power—not primarily as protective interruptors. So the missing term is circuit breakers.

6. If you tighten the packing gland too much, what is a likely consequence?

- A. It may cause overheating and excessive wear**
- B. It will seal completely with no leakage
- C. It will improve efficiency
- D. It will cause more leaks

Tightening a packing gland too much raises the friction between the packing material and the rotating shaft. That extra friction turns into heat, which speeds up wear of the packing and can damage the shaft or bearings. The heat and wear shorten packing life and can eventually cause leaks, even though you started with the intention of stopping leakage. So the most likely consequence is overheating and excessive wear. (Note that while a snug seal is desirable, over-tightening often worsens sealing over time due to damaged packing.)

7. Which of the following is used as a sludge dewatering device?

- A. Mixing Tank
- B. Chlorination Column
- C. Air Stripper
- D. Belt Press**

Sludge dewatering focuses on removing water from thickened sludge to reduce its volume and make handling easier. A belt press accomplishes this with moving belts and rollers that mechanically compress the sludge, squeezing out water and producing a relatively dry filter cake. This combination of pressure and filtration is specifically designed for dewatering, which is why the belt press is the appropriate device. Mixing tanks are meant for blending or homogenizing streams, chlorination columns are used for disinfection, and air strippers remove volatile compounds from liquids. These processes serve different purposes, so they don't achieve the dewatering goal the belt press is built for.

8. The unit of heat required to raise the temperature of one pound of water by one degree Fahrenheit is

- A. Calorie
- B. Joule
- C. Therm
- D. BTU**

Heat added to water to produce a temperature rise is described by the specific heat. For water, the amount of energy needed to raise the temperature of 1 pound by 1 degree Fahrenheit is defined as one BTU, so this unit directly matches the scenario described. The BTU is the traditional energy unit used in English engineering systems, with 1 BTU $\approx$ 1055 joules. Other options describe different scales or substances—calories relate to 1 gram of water by 1 degree Celsius, joules are the SI unit of energy, and a therm is a much larger energy unit (about 100,000 BTU). Thus the appropriate unit for this measurement is the BTU.

9. Which practice best reduces wear on pump moving parts?

- A. Run the pump at maximum speed to heat up
- B. Operate without lubrication
- C. Use only oil-lubricated bearings
- D. Lubricate according to manufacturer specifications**

Lubrication reduces wear by forming a protective film between moving parts, which minimizes metal-to-metal contact, lowers friction, and helps carry away heat and debris. Following the manufacturer's lubrication specifications ensures the right lubricant type and viscosity, correct quantity, and proper maintenance intervals for the pump's bearings and clearances under its operating conditions. This keeps the lubricating film intact during start-ups, load changes, and temperature shifts, which is when wear accelerates if the film is insufficient. Raising speed to heat the pump increases temperature, which can break down lubricant, change viscosity, and cause uneven expansion—all of which raise wear instead of preventing it. Running without lubrication removes the protective film entirely, leading to rapid surface damage and possible seizure. Simply using oil-lubricated bearings isn't enough if the overall lubrication plan isn't matched to the pump's design and specified intervals; the best practice is to follow the manufacturer's lubrication guidance to maintain optimal film strength and component life.

10. What term actually refers to the total of the suspended, settleable and dissolved solids?

A. Total Solids

B. Total Dissolved Solids

C. Suspended Solids

D. Settleable Solids

In water analysis, solids are grouped into dissolved solids and suspended solids. The total solids (TS) is the sum of these two main categories: $TS = \text{Total Dissolved Solids (TDS)} + \text{Total Suspended Solids (TSS)}$. Settleable solids are a subset of suspended solids, so they're already included in the suspended portion. Therefore, the total of the suspended, settleable, and dissolved solids is simply the total solids. The other terms describe only part of the solids: dissolved solids (no suspended portion), suspended solids (no dissolved portion), or settleable solids (a subset of suspended).

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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://physicalchemiopsc.examzify.com>

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

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