ABSA 4TH CLASS POWER ENGINEER CERTIFICATE OF COMPETENCY – PART A PRACTICE TEST (SAMPLE)

STUDY GUIDE

Prepare with structure. Pass with confidence

Table of Contents

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. **What is the speed in rpm of the second gear driven by a 330 mm diameter gear revolving at 200 rpm and driving a 150 mm diameter gear?**

   A. 91

   B. 100

   C. 330

   D. 440

2. **Convert 1000 degrees Fahrenheit to its Celsius equivalent. What is the answer?**

   A. 450

   B. 500

   C. 538

   D. 550

3. **What is y if $y^2 = (5 \times 22)^2$?**

   A. 10.5

   B. 110

   C. 120

   D. 1,200

4. **Calculate the surface area of a sphere with a radius of 3 m.**

   A. 452.2 sq metres

   B. 28.26 sq metres

   C. 37.68 sq metres

   D. 113.0 sq metres

5. **What is the magnitude and direction of the resultant of four concurrent forces of 10 N at 32 degrees east of north, 35 N at 50 degrees east of north, 25 N at 72 degrees east of north, and 85 N at 40 degrees east of south?**

   A. 70 N 56 degrees east of north

   B. 45 N 44 degrees east of north

   C. 196 N 87 degrees east of south

   D. 114 N 77 degrees east of south

6. Which equation correctly expresses the volume of a hemisphere?

A. $V = (4 * \pi * r^3)/3$

B. $V/2 = (4 * \pi * r^3)/3$

C. $V = (2 * \pi * r^3)/3$

D. $V = (4 * \pi * r^{3\ 2})/3$

7. What type of energy change is represented in the first law of thermodynamics?

A. Transformation of kinetic energy into potential energy

B. Conversion of heat energy into mechanical energy

C. Mutual conversion of work and internal energy

D. Change in chemical energy

8. What is 100 square cm equal to in square meters?

A. 1 square m

B. 0.1 square m

C. 0.01 square m

D. 10 square m

9. Which type of energy is typically associated with stored energy in a system?

A. Kinetic

B. Potential

C. Mechanical

D. Thermal

10. Calculate the result of the expression 3/10 x 5/6 x 1/9 x 3/4 and simplify to lowest terms.

A. 1/48

B. 1/60

C. 1/32

D. 1/36

Answers

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

Explanations

1. What is the speed in rpm of the second gear driven by a 330 mm diameter gear revolving at 200 rpm and driving a 150 mm diameter gear?

A. 91

B. 100

C. 330

D. 440

To determine the speed of the second gear, we can use the relationship between the diameters of the gears and their speeds. When two gears are meshed together, the speed and size of the gears follow the principle that the product of the speed (in rpm) and the diameter of the gear remains constant. Given: - The first gear has a diameter of 330 mm and rotates at 200 rpm. - The second gear has a diameter of 150 mm. First, we find the relationship between the speeds of the two gears using the formula: \[\text{Speed}_1 \times \text{Diameter}_1 = \text{Speed}_2 \times \text{Diameter}_2 \] Substituting the known values: \[200 \, \text{rpm} \times 330 \, \text{mm} = \text{Speed}_2 \times 150 \, \text{mm} \] Next, we solve for the speed of the second gear: \[\text{Speed}_2 = \frac{200 \times 330}{150} \] Calculating the values: \[\text{Speed}_2 = \frac{66000}{150} =

2. Convert 1000 degrees Fahrenheit to its Celsius equivalent. What is the answer?

A. 450

B. 500

C. 538

D. 550

To convert degrees Fahrenheit to degrees Celsius, the formula used is: \[C = \frac{5}{9} \times (F - 32) \] In this case, we start with 1000 degrees Fahrenheit. First, we subtract 32 from 1000: \[1000 - 32 = 968 \] Next, we multiply this result by \(\frac{5}{9}\): \[C = \frac{5}{9} \times 968 \approx 537.78 \] When we round this to the nearest whole number, we get approximately 538 degrees Celsius. This aligns with the provided answer, confirming that the Celsius equivalent of 1000 degrees Fahrenheit is indeed around 538 degrees. Understanding this calculation is crucial for anyone preparing for the ABSA 4th Class Power Engineer Certificate of Competency, as it demonstrates the ability to convert temperature readings between two common scales used in engineering and related fields.

3. What is y if $y^2 = (5 \times 22)^2$?

A. 10.5

B. 110

C. 120

D. 1,200

To find the value of \(y \) in the equation \(y^2 = (5 \times 22)^2 \), begin by simplifying the expression on the right side. First, calculate \(5 \times 22 \): \[5 \times 22 = 110 \] Now, substitute this value back into the original equation: \[y^2 = 110^2 \] Next, calculate \(110^2 \): \[110^2 = 12100 \] At this point, we have: \[y^2 = 12100 \] To find \(y \), take the square root of both sides: \[y = \sqrt{12100} \] Calculating the square root: \[y = 110 \] Therefore, the correct value for \(y \) is 110. This solution demonstrates the method of simplifying square equations by first breaking down the multiplication before applying the square, ensuring the calculations are straightforward and accurate.

4. Calculate the surface area of a sphere with a radius of 3 m.

A. 452.2 sq metres

B. 28.26 sq metres

C. 37.68 sq metres

D. 113.0 sq metres

To determine the surface area of a sphere, the formula used is $4\pi r^2$, where r is the radius of the sphere. In this case, the radius is given as 3 meters. First, calculate the radius squared: $r^2 = 3\ m * 3\ m = 9\ m^2$. Now, substitute this value into the surface area formula: Surface Area = $4\pi(9\ m^2) = 36\pi\ m^2$. Using the approximate value of π (3.14) for the calculation: Surface Area ≈ $36 * 3.14\ m^2 = 113.04\ m^2$. Rounding this gives approximately 113.0 m^2. This calculation confirms that the surface area of a sphere with a radius of 3 meters is approximately 113.0 square meters, making it the correct choice. The values in the other options do not align with this calculation, showing they do not accurately reflect the formula for calculating the surface area of a sphere.

5. What is the magnitude and direction of the resultant of four concurrent forces of 10 N at 32 degrees east of north, 35 N at 50 degrees east of north, 25 N at 72 degrees east of north, and 85 N at 40 degrees east of south?

A. 70 N 56 degrees east of north

B. 45 N 44 degrees east of north

C. 196 N 87 degrees east of south

D. 114 N 77 degrees east of south

*To determine the magnitude and direction of the resultant of the four concurrent forces, it's essential to break down each force into its components (i.e., x and y components) and then sum these components. 1. **Force breakdown:** - The first force of 10 N at 32 degrees east of north can be expressed as: - $F_{1x} = 10 \sin(32^\circ)$ - $F_{1y} = 10 \cos(32^\circ)$ - The second force of 35 N at 50 degrees east of north: - $F_{2x} = 35 \sin(50^\circ)$ - $F_{2y} = 35 \cos(50^\circ)$ - The third force of 25 N at 72 degrees east of north: - $F_{3x} = 25 \sin(72^\circ)$ - $F_{3y} = 25 \cos(72^\circ)$ - The fourth force of 85 N at 40 degrees east of south (which is equivalent to 180 degrees - 40 degrees*

6. Which equation correctly expresses the volume of a hemisphere?

A. $V = (4 * \pi * r^3)/3$

B. $V/2 = (4 * \pi * r^3)/3$

C. $V = (2 * \pi * r^3)/3$

D. $V = (4 * \pi * r^{3\ 2})/3$

The volume of a hemisphere is derived from the formula for the volume of a complete sphere, which is given by $V = \frac{4}{3} \pi r^3$. Since a hemisphere is exactly half of a sphere, the correct expression for the volume of a hemisphere must represent half of the sphere's volume. To find the volume of a hemisphere, you take the volume of the sphere and divide it by 2: $$V_{hemisphere} = \frac{1}{2} \left(\frac{4}{3} \pi r^3 \right) = \frac{2}{3} \pi r^3$$ This simplifies to the expression $V = \frac{2 \pi r^3}{3}$, which corresponds to the equation provided. Therefore, this equation accurately describes the volume of a hemisphere based on the relationship to the sphere. Other choices do not correctly represent the volume of a hemisphere. The first choice gives the volume of a full sphere, while the second one incorrectly suggests that simply dividing the sphere's volume by two should be expressed differently. The fourth option also misrepresents the dimensions involved, adding confusion with an incorrect exponent. Thus,

7. What type of energy change is represented in the first law of thermodynamics?

A. Transformation of kinetic energy into potential energy

B. Conversion of heat energy into mechanical energy

C. Mutual conversion of work and internal energy

D. Change in chemical energy

The first law of thermodynamics, also known as the law of energy conservation, states that energy cannot be created or destroyed, only transformed from one form to another. This is best represented by the mutual conversion of work and internal energy, which means that the energy added to a system in the form of heat can change the internal energy of the system, and this internal energy can also be converted into work. This principle illustrates that any increase or decrease in the internal energy of a system can be attributed to the net heat added to the system and the work done by or on the system. The emphasis here is on the interrelationship between work and internal energy, confirming that energy is conserved within a closed system. The other options focus on more specific forms of energy conversion. While converting heat energy into mechanical energy is a fundamental application of the first law, it is a narrower view of the broader relationship established in the first law. Similarly, the transformation of kinetic energy into potential energy represents specific scenarios that do not encompass the entire scope of the first law. Changes in chemical energy refer specifically to reactions that involve energy changes but do not illustrate the comprehensive relationship defined by the first law concerning internal energy and work.

8. What is 100 square cm equal to in square meters?

A. 1 square m

B. 0.1 square m

C. 0.01 square m

D. 10 square m

To convert square centimeters to square meters, it's important to understand the relationship between the two units. One meter equals 100 centimeters. Therefore, to convert square meters to square centimeters, you square the conversion factor: 1 square meter = (100 cm) x (100 cm) = 10,000 square centimeters. Thus, 1 square centimeter is equal to 1/10,000 of a square meter. To find out how many square meters are in 100 square centimeters, you can perform the following calculation: 100 square centimeters × (1 square meter / 10,000 square centimeters) = 0.01 square meters. This means that 100 square centimeters equals 0.01 square meters, making it clear why this is the correct answer. Understanding these conversions is crucial in various applications within engineering, such as calculating areas for safety measures or equipment specifications.

9. Which type of energy is typically associated with stored energy in a system?

A. Kinetic

B. Potential

C. Mechanical

D. Thermal

Potential energy is the type of energy that is associated with the stored energy in a system. It represents the energy held by an object due to its position relative to other objects, its internal stresses, or its electric charge. For example, a rock perched at the top of a hill has potential energy because of its elevated position, which could be converted to kinetic energy (energy of motion) if the rock were to fall. In various systems, potential energy can take many forms such as gravitational potential energy, elastic potential energy in springs, and chemical potential energy in molecular bonds. This stored energy is crucial for understanding not only how systems function but also how energy is converted from one form to another during various processes. Kinetic energy, on the other hand, refers to the energy of motion and is not stored energy. Mechanical energy encompasses both kinetic and potential energy within a mechanical system, while thermal energy relates to the temperature and motion of particles within a system, rather than being a form of stored energy like potential energy.

10. Calculate the result of the expression 3/10 x 5/6 x 1/9 x 3/4 and simplify to lowest terms.

A. 1/48

B. 1/60

C. 1/32

D. 1/36

*To calculate the expression $\frac{3}{10} \times \frac{5}{6} \times \frac{1}{9} \times \frac{3}{4}$ and simplify it to its lowest terms, follow these steps: First, multiply the numerators together and the denominators together: Numerators: $3 \times 5 \times 1 \times 3 = 45$ Denominators: $10 \times 6 \times 9 \times 4 = 2160$ Now, combine these into a single fraction: $\frac{45}{2160}$ Next, simplify this fraction by finding the greatest common divisor (GCD) of 45 and 2160. The prime factors of 45 are $3^2 \times 5$ and the prime factors of 2160 (which can be calculated by dividing by prime numbers) yield $2^4 \times 3^3 \times 5$. The GCD in this case is 15 (the highest power of common primes), as both the numerator and denominator share the factors of 3^1 *

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://absa4thclasspepta.examzify.com

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