OFFICER APTITUDE RATING (OAR) FORMULAS 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. A cylinder has radius 3 units and height 7 units. What is its lateral surface area?

A. 28π

B. 14π

C. 42π

D. 36π

2. Under a scaling transformation with factor k = 3, what is the image of the point (2, -4)?

A. (2, -4)

B. (6, -12)

C. (0, 0)

D. (3, -8)

3. In fluid work, which expression is a correct form for the work done by the fluid?

A. Work = force × distance

B. Work = mass × gravity

C. Work = density × height × velocity

D. Work = pressure × piston area × displacement

4. Momentum is defined as which product?

A. M = distance × velocity

B. M = mass ÷ velocity

C. M = velocity × acceleration

D. M = mass × velocity

5. Which equation expresses the time required for a trip, given distance and speed?

A. Time = Distance * Speed

B. Time = Speed / Distance

C. Time = Distance / Speed

D. Time = Distance + Speed

6. In a 3rd class lever, which order correctly lists load, effort, and fulcrum?

A. effort, load, fulcrum

B. fulcrum, load, effort

C. load, effort, fulcrum

D. load, fulcrum, effort

7. In the weighted average example, which expression represents the weighted average?

A. (value1 + value2 + value3) / (w1 + w2 + w3)

B. (value1*w1 + value2*w2 + value3*w3) / (w1 * w2 * w3)

C. (value1*w1 + value2*w2 + value3*w3) / (w1 + w2 + w3)

D. (value1*w1 + value2*w2 - value3*w3) / (w1 + w2 + w3)

8. Which formula gives the area of a circle in terms of the diameter d?

A. A = πd^2

B. A = 2πd

C. A = πd^2 / 4

D. A = πd^2 / 2

9. A notebook contains 60 pages, 25 of which are blank. What is the percent of blank pages?

A. 41.67%

B. 60%

C. 25%

D. 33%

10. Which formula expresses the volume of a regular prism with length l, width w, and height h?

A. s^3

B. πr^2h

C. (4/3)πr^3

D. lwh

Answers

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

Explanations

1. A cylinder has radius 3 units and height 7 units. What is its lateral surface area?

A. 28π

B. 14π

C. 42π

D. 36π

Lateral surface area is found by unwrapping the curved side of the cylinder into a rectangle, so it equals the base circumference times the height. The base circumference is 2πr, and with radius 3 that's 2π(3) = 6π. Multiply by the height 7 to get 6π × 7 = 42π. So the lateral surface area is 42π square units. (This only covers the curved side, not the top and bottom faces; those would add 2πr^2 = 18π for a total surface area of 60π.)

2. Under a scaling transformation with factor k = 3, what is the image of the point (2, -4)?

A. (2, -4)

B. (6, -12)

C. (0, 0)

D. (3, -8)

In a scaling transformation with factor 3 about the origin, each coordinate is multiplied by 3. So the point (2, -4) maps to (3·2, 3·(-4)) = (6, -12). The other options don't come from a uniform scale by 3: staying the same would need a scale factor of 1; (3, -8) would require multiplying x and y by different amounts; and (0, 0) would require the original point to be at the origin or the scale factor to be 0.

3. In fluid work, which expression is a correct form for the work done by the fluid?

A. Work = force × distance

B. Work = mass × gravity

C. Work = density × height × velocity

D. Work = pressure × piston area × displacement

Work in a fluid-piston system comes from the force the fluid pressure exerts over the piston and the distance the piston moves. The fluid pushes with a force F equal to pressure times the piston area, F = P × A. If the piston moves a small distance dx, the infinitesimal work is dW = F dx = P A dx. For a finite movement x at constant pressure, W = P A x. Since the change in volume is ΔV = A x, this is equivalent to W = P ΔV, and in general W = ∫ P dV when pressure varies. So the expression that matches this setup is pressure times piston area times the displacement, because it directly multiplies the pressure (the driving force per unit area) by the area to get force and by the distance the piston travels to get work. The units also work out to joules: Pa × m^2 × m = N/m^2 × m^2 × m = N·m = J. Other options don't describe the work produced by the fluid on the piston in this context: density × height × velocity doesn't yield the correct form or units for work; mass × gravity gives weight, not work; and while work is generally force × distance, that form doesn't express the specific force from fluid pressure on the piston.

4. Momentum is defined as which product?

A. M = distance × velocity

B. M = mass ÷ velocity

C. M = velocity × acceleration

D. M = mass × velocity

Momentum is defined as the product of an object's mass and its velocity, p = m v. This means how much motion an object has depends on both how heavy it is and how fast it's moving. It's a vector, so it points in the same direction as the velocity, and its units are kilograms times meters per second (kg·m/s). For example, a 5 kg object moving at 2 m/s has momentum 10 kg·m/s. The other expressions don't describe momentum: distance times velocity mixes spatial and motion without capturing inertia; mass divided by velocity changes the quantity's units and meaning; velocity times acceleration relates to something else (in certain contexts linked to power, not momentum).

5. Which equation expresses the time required for a trip, given distance and speed?

A. Time = Distance * Speed

B. Time = Speed / Distance

C. Time = Distance / Speed

D. Time = Distance + Speed

Speed tells how far you go each hour, so time is found by rearranging the relation speed = distance / time into time = distance / speed. This expression directly computes how long a trip takes when you know how far you're going and how fast you'll go. For example, 120 miles at 60 miles per hour takes 120 / 60 = 2 hours. The units line up: miles divided by (miles per hour) leaves hours, which is the measure of time. The other forms don't fit because they mix or invert the quantities improperly: multiplying distance by speed doesn't produce a time, dividing distance by distance isn't time, and adding distance and speed combines unlike quantities.

6. In a 3rd class lever, which order correctly lists load, effort, and fulcrum?

A. effort, load, fulcrum

B. fulcrum, load, effort

C. load, effort, fulcrum

D. load, fulcrum, effort

In a 3rd class lever, the effort is applied between the fulcrum and the load. If you move along the lever from the load side toward the fulcrum, you encounter the load first, then the effort, then the fulcrum. That order—load, effort, fulcrum—reflects the fact that the effort acts between the load and the fulcrum. Because the effort arm is shorter than the load arm, the mechanical advantage is less than one, so more force is needed to move the load, but the load can be moved faster and through a greater distance.

7. In the weighted average example, which expression represents the weighted average?

A. (value1 + value2 + value3) / (w1 + w2 + w3)

B. (value1*w1 + value2*w2 + value3*w3) / (w1 * w2 * w3)

C. (value1*w1 + value2*w2 + value3*w3) / (w1 + w2 + w3)

D. (value1*w1 + value2*w2 - value3*w3) / (w1 + w2 + w3)

*The main idea is that a weighted average accounts for how much each value should count by multiplying each value by its weight, summing those products, and then dividing by the total of the weights. This captures the idea that larger weights push the average more toward their corresponding values. So the correct expression is the sum of each value times its weight, all divided by the sum of the weights: (value1*w1 + value2*w2 + value3*w3) / (w1 + w2 + w3). For intuition, if you have values 3, 5, and 9 with weights 1, 2, and 1, you get (3*1 + 5*2 + 9*1) / (1+2+1) = 22/4 = 5.5, showing how the middle value with a higher weight pulls the average up. The alternative forms don't reflect how weighted averages combine contributions: dividing the sum of values by the total weight ignores the weights on each value; dividing by the product of weights exaggerates or distorts the influence in ways the standard formula doesn't support; and subtracting a term breaks the additive combination of contributions from all values.*

8. Which formula gives the area of a circle in terms of the diameter d?

A. A = πd^2

B. A = 2πd

C. A = πd^2 / 4

D. A = πd^2 / 2

Start from the standard area formula and relate radius to diameter. The area of a circle is A = πr^2, and the radius is half the diameter, so r = d/2. Substituting gives A = π(d/2)^2 = π(d^2/4) = (π d^2)/4. The 1/4 factor comes from squaring the half-diameter to get the radius. Forms like πd^2 omit the squaring relationship between radius and diameter, and 2πd would describe a different quantity (circumference-related) rather than area.

9. A notebook contains 60 pages, 25 of which are blank. What is the percent of blank pages?

A. 41.67%

B. 60%

C. 25%

D. 33%

Percent represents a part of a whole, found by dividing the part by the total and multiplying by 100. Here, the blank pages are 25 out of 60, so you compute 25 ÷ 60 = 0.416666... Multiply by 100 to turn that into a percent: 0.416666... × 100 = 41.666...%, which rounds to 41.67%. So the percent of blank pages is 41.67%. The other options would correspond to different counts of blank pages (for example, 25% would be 15 blank pages, 60% would be 36, and 33% would be 20), which don't match 25 blank pages out of 60.

10. Which formula expresses the volume of a regular prism with length l, width w, and height h?

A. s^3

B. πr^2h

C. (4/3)πr^3

D. lwh

The volume of a rectangular prism is found by multiplying its three linear dimensions because you can think of filling the solid layer by layer. The base is a rectangle with area l × w, and extending that base through the height h fills the 3D space, giving Volume = base area × height = l × w × h. This matches the idea of volume having three measurements combined to give cubic units. The other formulas correspond to different shapes: s^3 is for a cube with side s; π r^2 h is the volume of a cylinder; (4/3) π r^3 is the volume of a sphere.

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://oarformulas.examzify.com

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