



2027

General Mechanic

TEST GUIDE

Essential Prep to
Pass the FAA Knowledge Test

Includes **5 free** online practice tests

2027

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TEST GUIDE

Essential Prep to Pass the FAA Knowledge Test



AVIATION SUPPLIES & ACADEMICS, INC.
KALAMAZOO, MICHIGAN

*General Mechanic Test Guide: Essential Prep to Pass the
FAA Knowledge Test*
2027 Edition

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Visit asa2fly.com/AMG for additional information and resources related to this book.

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About the Contributors

Aviation Supplies & Academics, Inc., (ASA) provides trusted training materials for pilots, flight instructors, aviation mechanics, aircraft dispatchers, and drone operators. As an industry leader in FAA Knowledge Test preparation for more than 85 years, ASA has helped millions of customers earn an FAA certification.

This book was written and edited by a team of experienced aviation professionals, including subject matter experts, instructors, and examiners who understand both the FAA requirements and the real-world applications. Each question, explanation, and reference is thoroughly reviewed to ensure accuracy, clarity, and alignment with current FAA testing standards. Throughout the year, ASA meticulously tracks FAA and industry sources to identify impacts on training and testing and keep you informed of test changes. With ASA, you build knowledge that lasts beyond the test.

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Introduction

Welcome to the Aviation Supplies & Academics, Inc., (ASA) Test Guide Series, based on the original Fast-Track series written by Dale Crane. This series has been helping aviation mechanics prepare for FAA Knowledge Tests with great success for more than 60 years. We are confident that with the proper use of this book you will score very well on your FAA Knowledge Test. Additionally, the ASA Test Guides include typical oral test questions and practical projects to help you prepare for the final step in the Aviation Mechanic certification process.

Begin your studies with an instructor-led or home-study ground school course, which will involve reading a comprehensive textbook for aviation maintenance technicians (AMTs). Once complete, visit the Reader Resources for this Test Guide (asa2fly.com/AMG) and become familiar with the FAA guidance material available for this certification test. Then use this Test Guide to prepare for your test: Read the question, select your choice for the correct answer, and then read the explanation. Use the references that accompany the explanation to identify additional resources for further study. Upon completion of your studies, take practice tests at prepware.com (see inside the front cover for your activation code).

Prior to taking an FAA Airman Knowledge Test, all applicants must establish an FAA Tracking Number (FTN) by creating a profile in the Integrated Airman Certification and Rating Application (IACRA) system at iacra.faa.gov. Then visit psiexams.com/faa-testing-programs/amt/ to register for your test and take FAA-created practice tests to become familiar with the computer testing platform.

The FAA tests are “closed tests” which means the exact database of questions is not available to the public. The question and answer choices in this book are based on our extensive history and experience with the FAA testing process as well as the FAA’s publicly available information. You might see similarly worded questions on your official FAA test and answer stems may be rearranged from the A, B, C order you see in this book. Therefore, be sure to fully understand the intent of each question and corresponding answer while studying, rather than memorizing the letter associated with the correct response. Studying and understanding the information in this book and the associated references will give you the tools to answer question variations with confidence.

If your study leads you to question an answer choice, we recommend you seek the assistance of a local instructor. We welcome your feedback on ASA’s Test Prep and Prepware products. Contact us at:

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The FAA appreciates testing experience feedback. Contact them at:

Federal Aviation Administration, AFS-810

Training & Certification Group, Testing Standards Section
PO Box 25082
Oklahoma City, OK 73125
Email: TestingStandardsComments@faa.gov

Free Test Updates

The FAA modifies tests as needed throughout the year. ASA keeps abreast of changes to the tests and posts free Test Updates on the ASA website. Before taking your test, be certain you have the most current information by visiting the ASA Test Updates webpage: asa2fly.com/testupdate. Additionally, sign up for free email notifications when new Test Updates are available.

Instructions

The general qualifications for an Aviation Mechanic certificate require you to have a combination of experience, knowledge, and skill. If you are pursuing an Aviation Mechanic certificate with Airframe and Powerplant ratings, you should review the appropriate sections of 14 CFR Part 65 for detailed information pertaining to eligibility requirements. Further information may be obtained from faa.gov/mechanics.

The table below lists the number of questions, allotted testing time, and required passing score for each aviation mechanic knowledge test, as well as the Test Code you'll use to register for your test.

Test Code	Test Name	Number of Questions	Min. Age	Allotted Time (hrs)	Passing Score
AMG	Aviation Mechanic—General	60	N/A	2.0	70
AMA	Aviation Mechanic—Airframe	100	N/A	2.0	70
AMP	Aviation Mechanic—Powerplant	100	N/A	2.0	70

Description of the Knowledge Test

All test questions are objective multiple-choice and can be answered by the selection of a single response. Each test question is independent of other questions; therefore, a correct response to one does not depend upon, or influence, the correct response to another. Considerable effort is expended to write each question in a clear, precise manner. Make sure you read the instructions given with the test, as well as the statements in each test item. When taking a test, keep the following points in mind:

1. Answer each question in accordance with the latest regulations and guidance publications.
2. Read each question carefully before looking at the possible answers. You should clearly understand the problem before attempting to solve it.
3. After formulating an answer, determine which choice corresponds with that answer. The answer chosen should completely resolve the problem.
4. From the answers given, it may appear that there is more than one possible answer; however, there is only one answer that is correct and complete. The other answers are either incomplete, erroneous, or represent common misconceptions.
5. If a certain question is difficult for you, mark it for review and proceed to the next question. After you answer the less difficult questions, return to those you marked for review and answer them. The review marking procedure will be explained to you prior to starting the test. Although the computer should alert you to unanswered questions, make sure every question has an answer recorded. This procedure will enable you to use the available time to maximum advantage.
6. When solving a calculation problem, select the answer closest to your solution. The problem has been checked several times by various individuals; therefore, if you have solved it correctly, your answer will be closer to the correct answer than any of the other choices.

Your test will be graded immediately upon completion and your score will display on the computer screen.

Knowledge Test Eligibility Requirements

Before taking the certification knowledge and practical tests, you must meet the eligibility requirements for authorization. Applicants may present one or more of the following acceptable forms of authorization:

- Original FAA Form 8610-2, Airman Certificate and/or Rating Application. The proctor will verify that applicable blocks are marked (in upper left corner of form). Those not applicable will have a line drawn through them (identifying Airframe and/or Powerplant).
- Certificate of graduation or completion from an FAA-certificated Aviation Maintenance Technician School (AMTS).
- Military Certificate of Eligibility.

Learn more about the FAA's test authorization requirement by reviewing 14 CFR Parts 65 and 147 and the FAA Airman Knowledge Testing Authorization Requirements matrix posted in the reader resources at asa2fly.com/AMG.

Taking the Knowledge Test

The FAA testing provider authorizes hundreds of test center locations that offer a full range of airman knowledge tests. For information on authorized testing centers and to register for the knowledge test, visit psixams.com/faa-testing-programs/amt/.

When you contact a knowledge testing center, be prepared to select a test date and make a payment. You may register for test(s) several weeks in advance online or with a telephone call, and you may cancel in accordance with the testing center's cancellation policy. Regardless of your registration method, you will need an FAA Tracking Number (FTN). This FTN will follow you throughout your aviation career. You will obtain your FTN by creating a profile in the Integrated Airman Certificate and Rating Application (IACRA) system at iacra.faa.gov. This FTN will be printed on your Airman Knowledge Test Report (AKTR).

For more information, contact:

PSI Services LLC

844-704-1487 or examschedule@psionline.com

psixams.com/faa-testing-programs/amt/

On the day of the Airman Knowledge Test the applicant must provide the following information to be collected in order to complete the registration process at the testing center prior to the test proctor administering the Airman Knowledge Test: Name, FAA Tracking Number (FTN), physical address, date of birth, email address, photo identification, phone number, test authorization (credentials of the individual such as an instructor endorsement), and previous number of test attempts. The psixams.com/faa-testing-programs/amt/ website, your instructor, or local FAA office can assist you with what documentation to take to the testing facility. Testing center personnel will not begin the test until your identification is verified. Acceptable forms of authorization are:

- FAA Form 8610-2.
- A graduation certificate or certificate of completion from an affiliated testing center.
- A failed, passing, or expired AKTR.

Retesting Procedure

Retests do not require a 30-day waiting period if the applicant presents a signed statement from an airman holding the certificate and rating sought by the applicant. This statement must certify that the airman has given the applicant additional instruction in each of the subjects failed, and that the airman considers the applicant ready for retesting. A 30-day waiting period is required for retesting if the applicant presents a failed airman knowledge test report, but no authorized instructor endorsement.

Applicants taking retests **after failure** are required to submit the applicable test report indicating failure to the testing center prior to retesting. The original failed test report shall be retained by the proctor and attached to the applicable sign-in/out log. The latest test taken will reflect the official score.

Applicants retesting **in an attempt to achieve a higher passing score** may retake the same test for a better grade after 30 days. The latest test taken will reflect the official score. Applicants are required to submit the **original** applicable test report indicating previous passing score to the testing center prior to testing. Testing center personnel must collect and destroy this report prior to issuing the new test report.

Use of Test Aids and Materials

Airman knowledge tests require applicants to analyze the relationship between variables needed to solve aviation problems, in addition to testing for accuracy of a mathematical calculation. The intent is that all applicants are tested on concepts rather than rote calculation ability. It is permissible to use certain calculating devices when taking airman knowledge tests, provided they are used within the following guidelines. The term "calculating devices" is interchangeable with such items as calculators, computers, or any similar devices designed for aviation-related activities.

1. Guidelines for use of test aids and materials. The applicant may use test aids and materials within the guidelines listed below, if actual test questions or answers are not revealed.
 - a. Applicants may use test aids, such as a calculating device that is directly related to the test. In addition, applicants may use any test materials provided with the test.
 - b. The test proctor may provide a calculating device to applicants and deny them use of their personal calculating

device if the applicant's device does not have a screen that indicates all memory has been erased. The test proctor must be able to determine the calculating device's erasure capability. The use of calculating devices incorporating permanent or continuous type memory circuits without erasure capability is prohibited.

- c. The use of magnetic cards, magnetic tapes, modules, computer chips, or any other device upon which prewritten programs or information related to the test can be stored and retrieved is prohibited. Printouts of data will be surrendered at the completion of the test if the calculating device used incorporates this design feature.
 - d. The use of any booklet or manual containing instructions related to the use of the applicant's calculating device is not permitted.
 - e. Dictionaries are not allowed in the testing area.
 - f. The test proctor makes the final determination relating to test materials and personal possessions that the applicant may take into the testing area.
2. Guidelines for applicant's with learning or reading disabilities. An applicant with a learning or reading disability may request approval from the local Flight Standards Office to take an airman knowledge test using one of the following options listed in preferential order:
- (1) The applicant may request up to 1½ times the standard time allotted to complete the knowledge test.
 - (2) The applicant may use a self-contained electronic device which pronounces and displays typed-in words (e.g., the Franklin Speaking Wordmaster®) to facilitate the testing process. The applicant must provide his or her own device, with approval of the device to be determined by the administrator. Note: The device should consist of an electronic thesaurus that audibly pronounces typed-in words and presents them on a display screen. The device should also have a built-in headphone jack for private listening in order to avoid disturbing others during testing.

Use of Figures on FAA Knowledge Tests

Some sample FAA questions refer to figures or legends immediately following the question number (e.g., "8078. (Refer to Figure 22.)"). These figures and legends are taken from the *Airman Knowledge Testing Supplement* (FAA-CT-8080-4G) and are included at the back of this book for reference.

During your actual test, this supplement is typically provided to you as a separate booklet at the testing center. However, in the computer-based testing system used by the Federal Aviation Administration and administered through providers such as PSI Services, these same figures may be embedded directly into test questions or accessed onscreen via an exhibit button.

As testing continues to evolve, applicants should be prepared to use either a printed supplement or onscreen figures and be comfortable locating and interpreting both formats efficiently.

Cheating or Other Unauthorized Conduct

Computer testing centers are required to follow strict security procedures to avoid test compromise. These procedures are established by the FAA and are covered in FAA Order 8080.6, Conduct of Airman Knowledge Tests. The FAA has directed testing centers to terminate a test at any time a test proctor suspects a cheating incident has occurred. An FAA investigation will then be conducted. If the investigation determines that cheating or other unauthorized conduct has occurred, then any airman certificate or rating that you hold may be revoked, and you will be prohibited for 1 year from applying for or taking any test for a certificate or rating under 14 CFR Part 65.

Test Reports

Your test will be graded immediately upon completion and your score will display on the computer screen. You will receive your Airman Knowledge Test Report (AKTR), which will state your score. See sample AKTR on the next page.

Visit [psiexams.com/faa-testing-programs/amt/](https://www.psiexams.com/faa-testing-programs/amt/) to request a duplicate or replacement AKTR due to loss or destruction.

Airman Knowledge Test Reports are valid for 24 calendar months. If the AKTR expires before completion of the practical test, you must retake the knowledge test.

Your AKTR lists the Airman Certification Standard (ACS) code for questions answered incorrectly. The total number of ACS codes shown on the AKTR is not necessarily an indication of the total number of questions answered incorrectly. Study these knowledge areas to improve your understanding of the subject matter. See Cross-Reference B in the back of this book for a listing of ACS codes and their associated questions.

During the oral and practical test, the examiner will re-evaluate the noted areas of deficiency. You will be retested on the subjects identified by the ACS code on the AKTR.

**U.S. DEPARTMENT OF TRANSPORTATION
Federal Aviation Administration
Airman Knowledge Test Report**

NAME: CHARLES TAYLOR

FAA TRACKING NUMBER (FTN): C1234567

EXAM ID: 98765432109876543

EXAM: Aviation Maintenance Technician General (AMG)

EXAM DATE: 08/15/2026

EXAM SITE: ABC12345

SCORE: 88%

GRADE: Pass

TAKE: 1

The Airman Certification Standards (ACS) codes listed below represent incorrectly answered questions. These ACS codes and their associated Areas of Operation/Tasks/Elements may be found in the appropriate ACS document at http://www.faa.gov/training_testing/testing/acs.

A single code may represent more than one incorrect response.

AM.I.A.K9 AM.I.C.K5 AM.I.E.K6 AM.I.E.K11 AM.I.H.K2 AM.I.I.K9 AM.I.K.K4

EXPIRATION DATE: 08/30/2028

DO NOT LOSE THIS REPORT

AUTHORIZED INSTRUCTOR'S STATEMENT: (if applicable)

On _____ (date) I gave the above named applicant _____ hours of additional instruction, covering each subject area shown to be deficient, and consider the applicant competent to pass the knowledge test.

Name _____

Cert. No. _____ (print clearly)

Type of instructor certificate _____

Signature _____

**FRAUDULENT ALTERATION OF THIS FORM BY ANY PERSON IS A BASIS FOR SUSPENSION OR REVOCATION
OF ANY CERTIFICATES OR RATINGS HELD BY THAT PERSON.**

**ISSUED BY: PSI Services LLC
FEDERAL AVIATION ADMINISTRATION**

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Knowledge Test References

The FAA references the following documents to write the FAA Knowledge Test questions. You should be familiar with all of these as part of your classroom studies, which you should complete before starting test preparation:

FAA-H-8083-30	<i>Aviation Maintenance Technician Handbook—General</i> (FAA)
FAA-H-8083-31	<i>Aviation Maintenance Technician Handbook—Airframe</i> (FAA)
FAA-H-8083-32	<i>Aviation Maintenance Technician Handbook—Powerplant</i> (FAA)
FAA-H-8083-3	<i>Airplane Flying Handbook</i> (FAA)
14 CFR Parts 1, 3, 21, 23, 39, 43, 45, 47, 65, 91, 147	
Advisory Circulars (AC) 21-12, 23-21, 23.1309-1, 43.9-1, 43.13-1	

Additional resources helpful for AMT studies:

AM-G	<i>Aviation Mechanic Series: General</i> (ASA)
AM-STRUC	<i>Aviation Mechanic Series: Airframe Structures</i> (ASA)
AM-SYS	<i>Aviation Mechanic Series: Airframe Systems</i> (ASA)
AM-P	<i>Aviation Mechanic Series: Powerplant</i> (ASA)
DAT	<i>Dictionary of Aeronautical Terms</i> (ASA)
AIM	<i>Aeronautical Information Manual</i> (FAA)

Acronyms

For reference, acronyms appearing in this book are defined below.

AC	Advisory Circular	SAE	SAE International, previously the Society of Automotive Engineers
AC	Air Corp (fitting, specification standard)	SHEL	software, hardware, environment, liveware (human factors model)
AC	alternating current	STC	Supplemental Type Certificate
AD	Airworthiness Directive	TCC	thrust control computer
AD	ashless dispersant (oil)	TCDS	Type Certificate Data Sheet
amp	ampere	TCO	thermal cutoff
AN	Army-Navy (specification standard)	TEL	tetraethyl lead
ATA	Air Transport Association (specification standard)	TEMAC	trailing edge of mean aerodynamic chord
BHP	brake horsepower	TIT	turbine inlet temperature
BMEP	brake mean effective pressure	TSO	Technical Standard Order
CG	center of gravity	V	volt
CO	carbon monoxide	W	watt
CO ₂	carbon dioxide		
DC	direct current		
EGT	exhaust gas temperature		
EMF	electromotive force		
FCF	fuel crossfeed		
hp	horsepower		
IA	inspection authorization		
ITT	interstage turbine temperature		
KV	kilovolt (1,000 volts)		
L/D	lift over drag (ratio)		
LEMAC	leading edge of mean aerodynamic chord		
LTS	left tank switch		
MEDA	Maintenance Error Decision Aid		
MEK	methyl ethyl ketone		
METO	maximum except for takeoff (power)		
MS	military specification (standard)		
NAS	National Aerospace Standard (specification)		
OAT	outside air temperature		
OD	outside diameter		
PCO	pressure crossfeed valve open		
PHDAN	physically dangerous materials		
psi	pounds per square inch		
RPM	rotations per minute		
RTS	right tank switch		

ASA Test Guide Layout

Sample FAA questions have been sorted according to subject matter, as defined in the Airman Certification Standards. Some sample FAA questions refer to Figures immediately following the question number, e.g., “8006. (Refer to Figure 1.)” These are FAA Figures from the Airman Knowledge Testing Supplement (FAA-CT-8080-4G) and can be found in Cross-Reference C at the back of this book. The figures will be provided to you as a separate booklet when you take your FAA test.

Following each sample FAA test question is ASA’s explanation in italics. The last line of the explanation contains an Airman Certification Standards (ACS) code, as well as a reference for further study. Answers to each question are found at the bottom of each page.

EXAMPLE:

The diagram illustrates the layout of a sample FAA question and its explanation. It includes callout boxes pointing to various parts of the text:

- Question number**: Points to the number 8006.
- See the Airman Knowledge Testing Supplement at the back of the book.**: Points to the reference "(Refer to Figure 1.)".
- Question**: Points to the main text of the question: "When different rated capacitors are connected in series in a circuit, the total capacitance is".
- Answer choices**: Points to the list of options: "A— less than the capacitance of the lowest rated capacitor.", "B— greater than the capacitance of the highest rated capacitor.", and "C— equal to the sum of all the capacitances."
- Explanation**: Points to the italicized explanation text: "When capacitors of different values are connected in series, the total capacitance is less than that of the lowest rated capacitor. (AM.I.A.K3) — FAA-H-8083-30".
- FAA ACS code in parentheses, followed by reference for further study.**: Points to the ACS code and reference: "(AM.I.A.K3) — FAA-H-8083-30".
- Correct answer is found at the bottom of the page.**: Points to the answer key at the bottom: "8006 [A]".

Question number

See the Airman Knowledge Testing Supplement at the back of the book.

8006. (Refer to Figure 1.) When different rated capacitors are connected in series in a circuit, the total capacitance is

A— less than the capacitance of the lowest rated capacitor.

B— greater than the capacitance of the highest rated capacitor.

C— equal to the sum of all the capacitances.

When capacitors of different values are connected in series, the total capacitance is less than that of the lowest rated capacitor. (AM.I.A.K3) — FAA-H-8083-30

Question

Answer choices

Explanation

FAA ACS code in parentheses, followed by reference for further study.

Correct answer is found at the bottom of the page.

8006 [A]

General Knowledge Test Study Guide

Fundamentals of Electricity and Electronics

8078. (Refer to Figure 22.) Which illustration is correct concerning bias application and current (positive charge) flow?

- A—1.
- B—2.
- C—3.

In 1, the base of this N-P-N transistor is positive with respect to the emitter (the emitter-base junction is forward biased). Base-emitter current flows and therefore collector emitter current flows as is shown by the current-flow arrow.

In 2, the base and emitter of this N-P-N transistor have the same polarity and no emitter-base current flows. There is no flow between the emitter and the collector.

In 3, the base and emitter of this P-N-P transistor have the same polarity, and no emitter-base current flows. There is no flow between the emitter and the collector. (AM.I.A.K1) — FAA-H-8083-30

8597. What schematic symbol represents a current limiter?

- A—A triangle and a Z-like symbol across a horizontal line.
- B—One triangle pointing to a vertical line.
- C—Two triangles pointing to each other with a line on both sides of the triangles.



Symbol 3 represents a current limiter. Current limiters are used primarily to sectionalize an aircraft circuit or bus.

Symbol 1 represents a Zener diode.

Symbol 2 represents a general-purpose diode.

(AM.I.A.K1) — FAA-H-8083-30

8597-1. What kind of circuit protection device can be reset?

- A—Fuse.
- B—Current limiter.
- C—Circuit breaker.

The circuit breaker is commonly used in place of a fuse and is designed to break the circuit and stop the current flow when the current exceeds a predetermined value. Unlike the fuse, the circuit breaker can be reset; whereas the fuse or current limiter must be replaced. (AM.I.A.K1) — FAA-H-8083-30

8004-1. What factors strengthen a coil inductor?

- A—Limiting and separating the coils.
- B—Adding and separating the coils.
- C—Adding coils close together.

As more loops are added close together, the strength of the magnetic field increases. Many loops close together will result in a strong electromagnet. (AM.I.A.K2) — FAA-H-8083-30

8052. Through which material will magnetic lines of force pass the most readily?

- A—Copper.
- B—Iron.
- C—Aluminum.

The permeability of a material is a measure of the ease with which lines of magnetic force can pass through it. Iron has the highest permeability of all the metals listed in this question. (AM.I.A.K2) — FAA-H-8083-30

8001. The working voltage of a capacitor in an AC circuit should be

- A—equal to the highest applied voltage.
- B—at least 20 percent greater than the highest applied voltage.
- C—at least 50 percent greater than the highest applied voltage.

The working voltage of a capacitor is the highest voltage that can be steadily applied to it without the danger of the dielectric breaking down. The working voltage depends upon the material used as the dielectric and on its thickness. A capacitor used in an AC circuit should have a working voltage at least 50 percent greater than the highest voltage that will be applied to it. (AM.I.A.K3) — FAA-H-8083-30

Answers

8078 [A]

8597 [C]

8597-1 [C]

8004-1 [C]

8052 [B]

8001 [C]

- 8006.** (Refer to Figure 1.) When different rated capacitors are connected in series in a circuit, the total capacitance is
- A—less than the capacitance of the lowest rated capacitor.
 - B—greater than the capacitance of the highest rated capacitor.
 - C—equal to the sum of all the capacitances.

When capacitors of different values are connected in series, the total capacitance is less than that of the lowest rated capacitor. (AM.I.A.K3) — FAA-H-8083-30

- 8006-1.** Capacitors are sometimes used in DC circuits to
- A—counteract inductive reactance at specific locations.
 - B—smooth out slight pulsations in current/voltage.
 - C—assist in stepping voltage and current up and/or down.

Capacitors store electrical charges and are sometimes used in DC circuits to smooth out slight pulsations in current or voltage. Capacitors accept electrons when there is an excess and release them back into the circuit when the values decrease. (AM.I.A.K3) — FAA-H-8083-30

- 8008.** The amount of electricity a capacitor can store is directly proportional to the
- A—distance between the plates and inversely proportional to the plate area.
 - B—plate area and is not affected by the distance between the plates.
 - C—plate area and inversely proportional to the distance between the plates.

Three factors affect the amount of electricity a capacitor can store:

1. *The area of the plates. The larger the plate area, the greater the capacity.*
2. *The thickness of the dielectric (the distance between the plates). The closer the plates are together, the stronger the electrical field will be and the greater the capacity.*
3. *The material from which the dielectric is made (its dielectric constant). The higher the dielectric constant, the greater the capacity.*

(AM.I.A.K3) — FAA-H-8083-30

- 8009.** (Refer to Figure 2.) What is the total capacitance of a certain circuit containing three capacitors with capacitances of .02 microfarad, .05 microfarad, and .10 microfarad, respectively?

- A—.170 μ F.
- B—0.125 pF.
- C—.0125 μ F.

When a 0.02-microfarad, a 0.05-microfarad, and a 0.10-microfarad capacitor are connected in series, the total capacitance is 0.0125 microfarad.

$$C_T = \frac{1}{\frac{1}{C_1} + \frac{1}{C_2} + \frac{1}{C_3}}$$

$$= \frac{1}{\frac{1}{.02} + \frac{1}{.05} + \frac{1}{.1}}$$

$$= 0.0125 \mu F$$

(AM.I.A.K3) — FAA-H-8083-30

- 8009-1.** What is the total capacitance of a circuit containing three capacitors in parallel with capacitances of .02 microfarad, .05 microfarad, and .10 microfarad, respectively?

- A—.170 μ F.
- B—0.125 μ F.
- C—.0125 μ F.

Use the formula $C_T = C_1 + C_2 + C_3$. When capacitors are connected together in parallel, the plate area of all the capacitors add together and the total capacitance is the sum of the individual capacitances.

$$.02 + .05 + .10 = .170 \mu F$$

(AM.I.A.K3) — FAA-H-8083-30

- 8014.** What is the total capacitance of a certain circuit containing three capacitors with capacitances of .25 microfarad, .03 microfarad, and .12 microfarad, respectively?

(Note: $C_T = C_1 + C_2 + C_3$)

- A—.4 μ F.
- B—.04 pF.
- C—.04 μ F.

When three capacitors are connected in parallel, their total capacitance is the sum of the individual capacitances.

$$C_T = C_1 + C_2 + C_3$$

$$= 0.25 + 0.03 = 0.12$$

$$= 0.4 \mu F$$

(AM.I.A.K3) — FAA-H-8083-30

Answers

8006 [A]

8006-1 [B]

8008 [C]

8009 [C]

8009-1 [A]

8014 [A]

8029-2. What does the letter Q symbolize when measuring electrical charge?

- A—Farad.
- B—Electron.
- C—Coulomb.

The general formula for capacitance in terms of charge and voltage is $C = Q/E$, where:

- C = Capacitance measured in farads*
- E = Applied voltage measured in volts*
- Q = Charge measured in coulombs*

(AM.I.A.K3) — FAA-H-8083-30

8005. An increase in which of the following factors will cause an increase in the inductive reactance of a circuit?

- A—Inductance and frequency.
- B—Resistance and voltage.
- C—Resistance and capacitive reactance.

The inductive reactance (X_L) in an AC circuit is increased when either the frequency of the alternating current or the inductance of the circuit is increased.

Resistance, voltage, or capacitive reactance have no effect on the inductive reactance of a circuit. The formula for inductive reactance is:

$$X_L = 2\pi fL$$

(AM.I.A.K4) — FAA-H-8083-30

8011. When different rated capacitors are connected in parallel in a circuit, the total capacitance is

(Note: $C_T = C_1 + C_2 + C_3 \dots$)

- A—less than the capacitance of the lowest rated capacitor.
- B—equal to the capacitance of the highest rated capacitor.
- C—equal to the sum of all the capacitances.

When capacitors are connected in parallel, the effective area of the plates combine, and the total capacitance is the sum of the individual capacitances. (AM.I.A.K4) — FAA-H-8083-30

8012. When inductors are connected in series in a circuit, the total inductance (where the magnetic fields of each inductor do not affect the others) is

(Note: $L_T = L_1 + L_2 + L_3 \dots$)

- A—less than the inductance of the lowest rated inductor.
- B—equal to the inductance of the highest rated inductor.
- C—equal to the sum of the individual inductances.

When several inductors are connected together in such a way that there is no inductive coupling, the total inductance is the sum of the individual inductances. (AM.I.A.K4) — FAA-H-8083-30

8013. (Refer to Figure 3.) When more than two inductors of different inductances are connected in parallel in a circuit, the total inductance is

- A—less than the inductance of the lowest rated inductor.
- B—equal to the inductance of the highest rated inductor.
- C—equal to the sum of the individual inductances.

When two or more inductors having different inductances are connected in parallel, the total inductance is less than the inductance of the lowest rated inductor. (AM.I.A.K4) — FAA-H-8083-30

8041. Transfer of electric energy from one circuit to another without the aid of electrical connections

- A—is called induction.
- B—is called capacitance.
- C—can cause excessive arcing and heat, and as a result is practical for use only with low voltages/amperages.

The continually changing current in an AC circuit causes a changing magnetic field to cut across conductors in an adjacent circuit. When the changing field cuts across a conductor, it induces a voltage in it. Induction allows electrical energy to be transferred from one circuit to another without the aid of electrical connections. (AM.I.A.K4) — FAA-H-8083-30

8002. The term that describes the combined resistive forces in an AC circuit is

- A—resistance.
- B—reactance.
- C—impedance.

Impedance (Z) is the vector sum of the resistance and the total reactance in a circuit. It is expressed in ohms, and found using the formula:

$$Z = \sqrt{R^2 + X^2}$$

There are three types of resistive forces in an AC circuit: inductive reactance, which causes the current to lag the voltage; capacitive reactance, which causes the current to lead the voltage; and resistance, which allows the current and voltage to remain in phase.

Inductive and capacitive reactance are 180° out of phase and cancel each other. (AM.I.A.K5) — FAA-H-8083-30

Answers

8029-2 [C]
8002 [C]

8005 [A]

8011 [C]

8012 [C]

8013 [A]

8041 [A]

8002-1. What is the opposition to the flow of AC produced by an electromagnetic field (EMF) with generated back voltage called?

- A—Inductive reactance.
- B—Capacitive reactance.
- C—Mutual inductance.

Alternating current is in a constant state of change; EMF causes continuously induced voltage opposition to the current in the circuit. This opposition is called inductive reactance (X_L), and is measured in ohms just as resistance is measured. Inductance is the property of a circuit to oppose any change in current and is measured in henries. Inductive reactance is a measure of how much the counter-EMF in the circuit will oppose current variations. (AM.I.A.K5) — FAA-H-8083-30

8004. The opposition offered by a coil to the flow of alternating current (ignoring resistance) is called

- A—impedance.
- B—reluctance.
- C—inductive reactance.

When alternating current flows in a coil of wire, the changing lines of flux cutting across the turns of wire in the coil induce a voltage in it. The polarity of this voltage (the counter EMF) is opposite to the polarity of the voltage that caused it. The counter EMF decreases the total voltage across the coil, and this decreases the current flowing through it. This opposition to the flow of alternating current is called inductive reactance (X_L) and is measured in ohms. It opposes the flow of current, but it does not cause heat nor use any power. (AM.I.A.K5) — FAA-H-8083-30

8007. In an AC circuit, the effective voltage is

- A—equal to the maximum instantaneous voltage.
- B—greater than the maximum instantaneous voltage.
- C—less than the maximum instantaneous voltage.

The effective voltage of sine wave alternating current is 0.707 time its peak voltage. The effective voltage, also called the root mean square (rms) voltage, is the voltage measured by most of the AC voltmeters. Peak voltage is measured with a special peak voltmeter or an oscilloscope. (AM.I.A.K5) — FAA-H-8083-30

8010. Unless otherwise specified, any values given for current or voltage in an AC circuit are assumed to be

- A—instantaneous values.
- B—effective values.
- C—maximum values.

Almost all measuring instruments used for electrical system servicing measure the effective rms values of alternating current. Unless peak values, peak-to-peak values, or average values are specifically called out, effective rms values are assumed. (AM.I.A.K5) — FAA-H-8083-30

8024. (Refer to Figure 5.) What is the impedance of an AC-series circuit consisting of an inductor with a reactance of 10 ohms, a capacitor with a reactance of 4 ohms, and a resistor with a resistance of 8 ohms?

- A—22 ohms.
- B—5.29 ohms.
- C—10 ohms.

The total reactance in this circuit is the difference between the inductive reactance and the capacitive reactance. Total reactance is $10 - 4 = 6$ ohms. The impedance is the square root of the resistance squared plus the reactance squared. This is the square root of 64 plus 36, or the square root of 100. The circuit impedance is 10 ohms. (AM.I.A.K5) — FAA-H-8083-30

8039. When referencing resistance in a parallel DC circuit, which of the following statements is true?

- A—The current is equal in all portions of the circuit.
- B—The total current is equal to the sum of the currents through the individual branches of the circuit.
- C—The current in amperes can be found by dividing the source voltage in volts by the sum of the resistors in ohms.

According to Kirchhoff's current law, the current flowing in a parallel circuit is equal to the sum of the currents flowing through each of the individual branches of the circuit. (AM.I.A.K7b) — FAA-H-8083-30

8009-2. Convert farads to microfarads by

- A—multiplying farads by 10 to the power of 6
- B—multiplying picofarads by 10 to the power of 6
- C—multiplying microfarads by 10 to the power of 6

One farad is equal to 10^6 microfarads. Example: 2 farads is equal to 2×10^6 (2,000,000) microfarads. (AM.I.A.K8) — FAA-H-8083-30

8009-3. Convert farads to picofarads by

- A—multiplying farads by 10 to the power of 12
- B—multiplying microfarads by 10 to the power of -12
- C—multiplying picofarads by 10 to the power of 12

One farad is equal to 10^{12} picofarads. Example: 2 farads is equal to 2×10^{12} (2,000,000,000,000) picofarads. (AM.I.A.K8) — FAA-H-8083-30

Answers

8002-1 [A]
8009-2 [A]

8004 [C]
8009-3 [A]

8007 [C]

8010 [B]

8024 [C]

8039 [B]

General Oral & Practical Study Guide

The Oral and Practical Tests

Each applicant for a Mechanic Certificate must successfully pass a written test, an oral test, and a practical test to comply with the general eligibility requirements to obtain a mechanic certificate or rating (see 14 CFR §65.53). The O&P tests are typically conducted by an FAA Designated Mechanic Examiner (DME); however, in some circumstances, an FAA inspector may conduct an oral and/or practical test. 14 CFR §65.11 provides that application for a certificate and/or rating must be made on a form and in a manner prescribed by the administrator. As part of the application process, the applicant must contact a DME to schedule the O&P tests. A list of DMEs is available faa.gov or from a local Flight Standards District Office.

Prior to the tests, the evaluator conducts a pretest interview with the applicant. This pretest interview provides the evaluator and applicant with information needed for the test, such as the date, time, and location of the test. It also establishes a testing schedule and allows the evaluator to see any codes associated with the written test report and identify any deficient areas that should be included on the oral test. FAA designees may charge a reasonable fee for their services and this fee should be discussed and agreed upon prior to taking the scheduled test.

The applicant should bring the following documentation to the pretest interview and the O&P test:

- Two identically-prepared FAA Forms 8610-2, Airman Certificate and/or Rating Application, with original signatures;
- Unless early testing under 14 CFR §65.80, written test results indicating a passing grade, applicable to the appropriate rating(s) sought; and
- A current government-issued photo identification with a signature from the issuing official, such as a passport, U.S. Military ID, driver's license, etc.

Additionally, the applicant should bring the following eligibility documentation:

If testing on the basis of this eligibility:	The applicant should bring this documentation:
Graduation from an FAA certificated 14 CFR Part 147 AMTS	An authenticated document from an AMTS indicating the applicant's date of graduation and curriculum completed, applicable to the certificate or rating sought
Civil or Military Practical experience as provided by 14 CFR §65.77	A signature in Block V of FAA Form 8610-2 authorizing the applicant to test
Practical experience through the JSAMTCC program	A military certificate of eligibility, applicable to the certificate or rating sought
Satisfactory progress at an FAA certificate 14 CFR Part 147 AMTS pursuant to 14 CFR §65.80	A signature in Section II of FAA Form 8610-2 from a school official and FAA inspector authorizing the applicant to test

Oral-related Questions

As per the structure of the mechanic ACS, there will be three oral tests—one for General, one for Airframe, and one for Powerplant. The number of questions that must be asked in the oral test will vary by applicant, depending on the results of the applicant's written test:

- Under the ACS, 14 CFR §65.17 is met at a 70% standard applied to the entire oral test (General, Airframe, Powerplant) as a whole, and not by subject area.
- Each oral test will have a minimum of 4 questions in each section (i.e., a minimum of 4 General questions, 4 Airframe questions, and 4 Powerplant questions), randomly generated by the Mechanic Test Generator, even if an applicant has scored a 100% on their AKTR.
- An applicant that passed the written test with a 70% could get the maximum number of questions on the oral test (i.e., 22 General questions, 34 Airframe questions, 34 Powerplant questions).
- For every ACS code missed on the Airman Knowledge Written Test Report (AKTR) the applicant will have an additional oral question added to on their oral test to validate their knowledge of the material presented.

- Several missed AKTR questions may fall under the same ACS code. In this case, only one additional oral question will be added to the test, as the questions are based on ACS codes missed and NOT number of questions missed.
- Each applicant may be asked a different number of oral questions on their tests, depending on how many ACS codes were missed on their AKTRs, even if they scored the same grade (percentage) on their respective AKTRs.

The oral portion of the test is a standalone test. It must be kept separate from the practical portion of the test. Under §65.17, the minimum passing grade for each test is 70%. The 70% standard is applied to the entire oral test (i.e., either the General, Airframe, or Powerplant test) as a whole, and not by subject area. This does mean that an applicant can miss all the questions in a subject such as electricity and still pass the test. If an applicant fails the oral General test (as a whole), they will have to retest for General, which means they will have to retake the entire General oral test. During the oral testing the applicant is NOT allowed to use reference material. All questions that are on the DME's planning sheet must be asked. The DME does NOT get to pick and choose which questions to ask.

Practical-related Questions

As per the structure of the mechanic ACS, there will be three practical tests—one for General, one for Airframe, and one for Powerplant. The number of practical projects that must be tested is 9 for General, 11 for Airframe, and 11 for Powerplant.

During the practical portion of the test each project is standalone; projects cannot be combined during testing. At a safe and appropriate time during the applicant's performance of the project, the DME must ask 2 practical questions that are relevant to the project, as provided by the Mechanic Test Generator (MTG, the tool DMEs use to generate the O&P for each applicant).

Under §65.17, the minimum passing grade for each test is 70%. The 70% standard is applied to the entire practical test (i.e., either the General, Airframe, or Powerplant test) as a whole, and not by project. Each project, however, is graded using a pass/fail standard. Therefore, the applicant may fail projects and still pass the test. For example, in General there are 9 projects, so the applicant must pass 7 of the 9 projects to pass. If the applicant fails 3 projects, that is less than 70%, and the practical General test is failed. If an applicant completes the project satisfactorily but answers a practical question incorrectly, then the entire project is failed. If the applicant answers the practical questions correctly but fails to complete the project satisfactorily, then the entire project is considered failed.

When an applicant retests the failed practical portion of the test, they will only be retested on the failed projects, as well as any projects that were not tested in their previous test. The applicant will not have to retest on projects previously passed.

The applicant is given an assigned aircraft and appropriate reference material (assigned and provided by the DME) and is assigned the task. At a safe and appropriate time, the DME will ask the applicant the two practical questions associated with this project. If the applicant misses any part of this project, the project is failed.

Sample Oral Test

- AM.I.A.K1 QUESTION: What is considered the basic building block of all matter?
ANSWER: The atom is considered the basic building block of all matter.
REFERENCE: FAA-H-8083-30
- AM.I.B.K1 QUESTION: When is a full section view used on an aircraft drawing?
ANSWER: It is used when the interior construction or hidden features of an object cannot be shown clearly by exterior views.
REFERENCE: FAA-H-8083-30
- AM.I.C.K2 QUESTION: The weight and balance system commonly employed among aircraft consists of three equally important elements. What are they?
ANSWER: They are the weighing of the aircraft, the maintaining of the weight and balance records, and the proper loading of the aircraft.
REFERENCE: FAA-H-8083-30

- AM.I.D.K1 QUESTION: In the early days of aviation, what tubing material was used extensively in aviation fluid applications?
ANSWER: Copper was used.
REFERENCE: FAA-H-8083-30
- AM.I.E.K9 QUESTION: What property is essential for metals used in making wire and tubing?
ANSWER: The property is ductility.
REFERENCE: FAA-H-8083-30
- AM.I.F.R7 QUESTION: Why should no one ever approach a single-rotor helicopter from the rear?
ANSWER: The tail rotor is invisible when operating.
REFERENCE: FAA-H-8083-30
- AM.I.G.K20 QUESTION: If, due to the configuration of an aircraft, it is impossible for a person to mark an aircraft in accordance with 14 CFR Part 45.21 and 45.23 through 45.33, what must be done?
ANSWER: The owner/operator may apply to the FAA for a different marking procedure.
REFERENCE: 14 CFR §45.22(d)
- AM.I.H.K4 QUESTION: Define the term “aspect ratio”.
ANSWER: Aspect ratio is the ratio of the length (or span) of an airfoil to its width (or chord).
REFERENCE: FAA-H-8083-30
- AM.I.I.K5 QUESTION: What is FAA Form 8100-2?
ANSWER: FAA Form 8100-2 is a Standard Airworthiness Certificate.
REFERENCE: FAA-H-8083-30
- AM.I.J.K3 QUESTION: Two gears with teeth on their outer edges act like what class of lever?
ANSWER: They act like a first class lever.
REFERENCE: FAA-H-8083-30
- AM.I.K.K4 QUESTION: Irregular and haphazard inspections invariably result in what?
ANSWER: The result is a gradual and certain deterioration of an aircraft.
REFERENCE: FAA-H-8083-30
- AM.I.L.K3 QUESTION: A review of accident related data indicates that approximately 75–80 percent of all aviation accidents are the result of human error. Of those accidents what percent are maintenance related?
ANSWER: Of those accidents, about 12 percent are maintenance related.
REFERENCE: FAA-H-8083-30

Sample Practical Test

Project—Weight and Balance

DESCRIPTION: Compute forward and aft loaded CG limit.

GIVEN: Manufacturer’s publications, weight and balance records, and project information on assigned aircraft.

PERFORMANCE STANDARD: The applicant will use the provided information to compute the forward and aft loaded CG limit.

ACS CODE: AM.I.C.S6

REFERENCE: FAA-H-8083-30, manufacturer’s publications, weight and balance records, and project information on assigned aircraft.

QUESTION: What is the total moment of the assigned aircraft?

ANSWER: The total moment will be calculated with information provided in the project.

REFERENCE: FAA-H-8083-30

ACS CODE: AM.I.C.K4

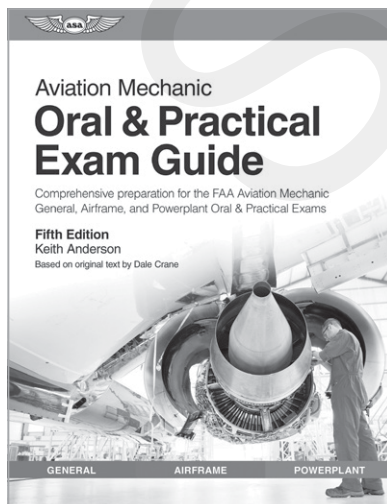
QUESTION: What is the total arm of the assigned aircraft?

ANSWER: The total arm will be calculated with information provided in the project.

REFERENCE: FAA-H-8083-30

ACS CODE: AM.I.C.K5

For more oral and practical projects and sample questions covering General, Airframe, and Powerplant:



Aviation Mechanic Oral & Practical Exam Guide

This comprehensive guide will prepare you for the General, Airframe, and Powerplant tests with additional information on the certification process, typical projects and required skill levels, practical knowledge requirements in a question and answer format, and reference materials for further study.

Available at **asa2fly.com** and at your local aviation retailer (product code ASA-OEG-AMT).

Fundamentals of Electricity and Electronics

Study Materials

AM-G, FAA-H-8083-30, AC 43.13-1

Typical Oral Questions

1. What is the basic unit of voltage?
The volt.
2. What is the basic unit of current?
The amp.
3. What is the basic unit of resistance?
The ohm.
4. Which law of electricity is the most important for an aircraft mechanic to know?
Ohm's law.
5. What are the three elements in Ohm's law?
Voltage, current, and resistance (volts, amps, and ohms).
6. What are five sources of electrical energy?
Magnetism, chemical energy, light, heat and pressure.
7. What four things affect the resistance of an electrical conductor?
The material, the cross-sectional area, the length and the temperature.
8. How can you tell the resistance of a composition resistor?
By a series of colored bands around one end of the resistor.
9. What three things must all electrical circuits contain?
A source of electrical energy, a load to use the energy, and conductors to join the source and the load.
10. What is the purpose of a capacitor?
To store electrical energy in electrostatic fields.
11. What is the basic unit of capacitance?
The farad.
12. Why should electrolytic capacitors not be used in an AC circuit?
They are polarized. An electrolytic capacitor will pass current of one polarity, but will block current of the opposite polarity.
13. What is meant by inductance?
The ability to store electrical energy in electromagnetic fields.
14. What is the basic unit of inductance?
The henry.
15. What is meant by impedance?
The total opposition to the flow of alternating current. It is the vector sum of resistance, capacitive reactance and inductive reactance.
16. How can you find the polarity of an electromagnet?
Hold the electromagnet in your left hand with your fingers encircling the coil in the direction the electrons flow. Your thumb will point to the north end of the electromagnet.
17. In what units is impedance measured?
In ohms.
18. What is the basic unit of electrical power in a DC circuit?
The watt.
19. What is meant by a kilowatt?
1,000 watts.
20. What happens to the current in a DC circuit if the voltage is increased but the resistance remains the same?
The current increases.
21. What are three types of DC circuits, with regard to the placement of the various circuit components?
Series, parallel and series-parallel.
22. How many cells are there in a 24-volt lead-acid battery?
12.
23. What is the specific gravity of the electrolyte in a fully charged lead-acid battery?
Between 1.275 and 1.300.

24. What is the range of temperatures of the electrolyte in a lead-acid battery that does not require that you apply a correction when measuring its specific gravity?
Between 70 degrees and 90 degrees Fahrenheit.
25. What instrument is used to measure the specific gravity of the electrolyte in a lead-acid battery?
A hydrometer.
26. How is a lead-acid battery compartment treated to protect it from corrosion?
Paint it with an asphaltic (tar base) paint or with polyurethane enamel.
27. What is used to neutralize spilled electrolyte from a lead-acid battery?
A solution of bicarbonate of soda and water.
28. How high should the electrolyte level be in a properly serviced lead-acid battery?
Only up to the level of the indicator in the cell.
29. What precautions should be taken in a maintenance shop where both lead-acid and nickel-cadmium batteries are serviced?
The two types of batteries should be kept separate, and the tools used on one type should not be used on the other.
30. Why is a hydrometer not used to measure the state of charge of a nickel-cadmium battery?
The electrolyte of a nickel-cadmium battery does not enter into the chemical changes that occur when the battery is charged or discharged. Its specific gravity does not change appreciably.
31. What is used to neutralize spilled electrolyte from a nickel-cadmium battery?
A solution of boric acid and water.
32. What is meant by electromagnetic induction?
The transfer of electrical energy from one conductor to another that is not electrically connected
33. How many ohms are in a megohm?
One million (1,000,000).
34. What part of an amp is a milliamp?
One thousandth (0.001).

Typical Practical Projects

1. Compute the voltage and current in an electrical circuit specified by the examiner.
2. Find the total resistance of a combination of resistors that are connected in series.
3. Find the total resistance of a combination of resistors that are connected in parallel.
4. Find the power used by an electric motor when the voltage and the current are known.
5. Identify for the examiner electrical symbols used in an aircraft service manual.
6. Measure the voltage drop across each of the components in a series circuit specified by the examiner.
7. Check an electrical circuit for opens or shorts, using an ohmmeter.
8. Measure the current in an electrical circuit, using a multimeter.
9. Measure the resistance of several components, using an ohmmeter.
10. Use an electrical schematic diagram to locate the source of a malfunction described by the examiner.
11. Measure the state of charge of a lead-acid battery.
12. Correctly connect a lead-acid battery to a constant-current battery charger.
13. Correctly remove electrolyte that has been spilled from a lead-acid battery, and protect the surface around the battery from corrosion.
14. Select the proper size terminal and correctly swage it to an electrical wire.
15. Given a group of composition resistors, identify the resistance and tolerance of each one by the color code.
16. Demonstrate to the examiner the correct way to remove and install an aircraft lead-acid battery.
17. Demonstrate to the examiner the correct way to check a solid-state diode to determine whether or not it is good, or if it is open or shorted.

2027 General Mechanic TEST GUIDE

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