Aviation Mechanic

Oral & Practical Exam Guide

Comprehensive preparation for the FAA Aviation Mechanic General, Airframe, and Powerplant Oral & Practical Exams

Fifth Edition

Keith Anderson

Based on original text by Dale Crane



GENERAL | AIRFRAME | POWERPLANT

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AVIATION SUPPLIES & ACADEMICS, INC.
NEWCASTLE, WASHINGTON

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First edition published 1994. Fifth edition published 2024.

See **asa2fly.com/oegamt** for additional information and updates related to this book.

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ASA-OEG-AMT5
ISBN 978-1-64425-362-5

Additional formats available:
eBook EPUB ISBN 978-1-64425-363-2
eBook PDF ISBN 978-1-64425-364-9

Printed in the United States of America
2028 2027 2026 2025 2024 9 8 7 6 5 4 3 2 1

Cover photo: Juice Flair/Shutterstock.com

Library of Congress Cataloging-in-Publication Data:
Names: Anderson, Keith, 1960- author. | Crane, Dale, author.
Title: Aviation mechanic oral & practical exam guide : comprehensive preparation for the FAA aviation mechanic general, airframe, and powerplant oral & practical exams / Keith Anderson, original text by Dale Crane.
Other titles: Oral & practical exam guide : comprehensive preparation for the FAA aviation mechanic general, airframe, and powerplant oral & practical exams
Description: Fifth edition. | Newcastle, Washington : Aviation Supplies & Academics, Inc., 2024. | "ASA-OEG-AMT5".—Title page verso.
Identifiers: LCCN 2023041443 (print) | LCCN 2023041444 (ebook) | ISBN 9781644253625 (trade paperback) | ISBN 9781644253632 (epub) | ISBN 9781644253649 (pdf)
Subjects: LCSH: United States. Federal Aviation Administration—Examinations—Study guides. | Airplanes—Maintenance and repair—Examinations, questions, etc. | Aviation mechanics (Persons)—Certification—United States. | Airplanes—Motors—Maintenance and repair—Examinations, questions, etc. | LCGFT: Examinations.
Classification: LCC TL671.9 .C66468 2024 (print) | LCC TL671.9 (ebook) | DDC 629.134/6—dc23/eng/20231002
LC record available at https://lccn.loc.gov/2023041443
LC ebook record available at https://lccn.loc.gov/2023041444

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Preface

Certification as an aviation mechanic is a major step in your career. You were required to have a certain level of experience to qualify to take your knowledge tests, and having passed all sections, you are now ready for the final step, the oral and practical tests.

The knowledge tests are strictly objective and verify only your knowledge of facts. When taking them, you are interfacing with a computer and there is no personal involvement.

The oral and practical tests are different. In these you work directly with an experienced mechanic on a one-on-one basis. This examiner is able to not only judge your mechanical skills, but to observe the way you think and see the way you solve problems.

It is important that you approach the oral and practical tests with the proper mental attitude. The examiner has one basic thought in mind, that of determining whether or not you have the level of knowledge, skill, and risk management needed for an entry-level aviation mechanic. The examiner will not try to trick you in any way, and he or she wants you to pass almost as much as you do.

If you are asked a question to which you do not know the answer, admit it rather than try to bluff your way through. If you are given a project that you do not understand, discuss it with the examiner. In particular, avoid stumbling through a project that you lack the ability to execute properly. The examiner will discuss the project with you but will show little or no tolerance for your driving ahead with a project you obviously cannot handle.

The oral and practical tests are your last steps toward certification, so study this guide carefully as it is designed to help you prepare for them. We wish you success.

Dale Crane, 2000

Preface to the Fifth Edition

The Oral and Practical Exam process is now guided by the Airman Certification Standards (ACS). The ACS contains many of the same knowledge subjects and skills projects as the previous Practical Test Standards (PTS), but there is less emphasis on the demonstration of skills that have become specialized trades such as welding, wood structures, and fabric covering. The knowledge section of the exam now includes risk management questions for which the student is expected to understand the risks associated with certain tasks and explain the proper ways to mitigate those risks.

All oral and practical questions and projects are randomly generated from the FAA test generator, and the list of questions and projects are then given to the examiner. Since the examiner does not know which questions and projects will be assigned, both the examiner and the student must be prepared for all possible projects. Applicants should expect to be retested on subjects they missed during the knowledge exam; the subjects associated with the codes on your Airman Knowledge Test Report will be retested during the Oral and Practical Exam.

Keith Anderson

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Certification of Maintenance Airmen

The Federal Aviation Administration has three classifications of maintenance airmen: repairman, authorized inspector, and aviation mechanic. Certification in each category has special requirements and special privileges. This Oral & Practical Exam Guide applies to the tests for Aviation Mechanic certification, but all three classifications are described below.

Repairman

The applicant for a Repairman Certificate must be employed for a specific job requiring his or her special qualifications by a certificated commercial operator or certificated air carrier.

A repairman applicant must have at least 18 months of practical experience in the procedures, practices, inspection methods, materials, tools, machine tools, and equipment generally used in the maintenance duties of the specific job for which he or she is to be employed and certificated. Alternatively, the applicant may complete specialized formal training that is acceptable to the administrator and specifically designed to qualify the applicant for the job for which he or she is to be employed.

A repairman may exercise the privileges of the certificate only in connection with the duties for the certificate holder by whom the repairman was certificated and recommended. There is a special type of repairman certificate issued to the builder of an experimental aircraft which allows the holder to perform condition inspections on the aircraft constructed by him or her.

Authorized Inspector

An applicant for an Inspection Authorization (IA) must:

- Hold a currently effective Aviation Mechanic Certificate with both Airframe and Powerplant Ratings that has been in effect for a total of at least 3 years.
- Have been actively engaged, for at least the 2-year period before the date of application, in maintaining civil certificated aircraft.
- Have a fixed base of operation.
- Have available the equipment, facilities, and inspection data necessary to properly inspect airframes, powerplants, propellers, or any related part or appliance.
- Pass a knowledge test on his or her ability to inspect according to safety standards for returning aircraft to service after major repairs and major alterations, and annual and progressive inspections performed under 14 CFR Part 43.

The holder of an Inspection Authorization may:

- Inspect and approve for return to service an aircraft after a major repair or major alteration if the work has been done in accordance with technical data that has been approved by the administrator.
- Perform an annual inspection, or perform or supervise a progressive inspection.

An Inspection Authorization expires on March 31 of each odd-numbered year and must be renewed for a two-year period at that time.

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Aviation Mechanic

The FAA issues an Aviation Mechanic Certificate with an Airframe Rating, Powerplant Rating, or both ratings to applicants who are properly qualified. Below are descriptions of the experience, knowledge, and practical requirements and suggested study references for all three ratings.

Requirements for Mechanic Certification

14 CFR Part 65, Certification: Airmen Other Than Flight Crewmembers, covers the requirements for mechanic certification, described below.

Basic Requirements

- Must be at least 18 years of age.
- Must be able to read, write, speak, and understand the English language, or in the case of an applicant who does not meet this requirement and who is employed outside of the United States by a U.S. air carrier, have his or her certificate endorsed "Valid only outside the United States."
- Must have passed all of the prescribed tests within a period of 24 months.

Experience Requirements

Must have a graduation certificate or certificate of completion from a certificated aviation maintenance technician school, or documentary evidence, satisfactory to the Administrator, of:

- At least 18 months of practical experience with the procedures, practices, materials, tools, machine tools, and equipment generally used in constructing, maintaining, or altering airframes or powerplants appropriate to the rating sought; or
- At least 30 months of practical experience concurrently performing the duties appropriate to both the airframe and powerplant ratings.

Knowledge Requirements and Knowledge Tests

After meeting the applicable experience requirements, each applicant for an Aviation Mechanic Certificate must pass a knowledge test covering the construction and maintenance of aircraft appropriate to the rating sought, the regulations that pertain to the rating, and the applicable provisions of 14 CFR Part 43 (Maintenance, Preventive Maintenance, Rebuilding, and Alteration) and Part 91 (General Operating and Flight Rules).

The basic principles covering the installation and maintenance of propellers are included in the Powerplant test.

The applicant must pass each section of the knowledge test before applying for the oral and practical tests. There are three knowledge tests, a General test that is required for both ratings, and tests for both the Airframe and Powerplant Ratings. An applicant for the Airframe Rating must pass the General and the Airframe test, and an applicant for the Powerplant Rating must pass the General and Powerplant test. The General test needs to be taken only one time. All test questions are the objective, multiple-choice type with three choices of answers. The minimum passing grade for each test is 70 percent.

The General test consists of 60 multiple-choice questions selected by computer from more than 600 questions in the Aviation Mechanic—General test question bank. You are allowed 2 hours to take this test. The Airframe and Powerplant tests each consist of 100 multiple-choice questions taken from the more than 1,000-question Aviation Mechanic—Airframe and

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the more than 1,000-question Aviation Mechanic—Powerplant test question banks. You are allowed 2 hours for each of these tests.

If the score on your Airman Knowledge Test Report is 70 or above, the report is valid for 24 calendar months. You may elect to retake the test in anticipation of a better score, after 30 days from the date your test was taken. The score of the latest test you take will become the official test score. If you fail a knowledge test, you may apply for retesting before 30 days if you present the failed test report and an endorsement from an authorized Aviation Mechanic Certificate holder. This endorsement must certify that additional instruction has been given and that you have been found competent to pass the test (the endorsement is not necessary if you wait 30 days).

Skill Requirements

Each applicant for an Aviation Mechanic Certificate or Rating must pass an oral and a practical test on the rating sought by demonstrating the assigned objectives for the relevant subject areas contained in the *Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards* (FAA-S-ACS-1). The oral and practical portion of the tests assesses the applicant's application of the knowledge, risk management, and skill in these subject areas. These testing procedures are covered in detail beginning on page x.

An applicant for a Powerplant Rating must show his or her ability to make satisfactory minor repairs to and minor alterations of propellers.

The examiner will download an oral and practical examination that is generated at random for each applicant. Each candidate should be familiar with all the knowledge, risk management, and skill requirements contained within the appropriate airman certification standards.

How to Use This Guide

The ASA Test Guides for General, Airframe, and Powerplant Mechanic have been specially prepared to help you get ready to take your FAA knowledge tests. The same material is covered in your oral and practical tests, so it is important to review all of the questions and answers in the knowledge test portion of these Guides in preparation for your O&P.

The questions in this *Aviation Mechanic Oral & Practical Exam Guide* are typical of those you will likely be asked. The Skills section in each subject area includes the practical projects that are typical of those the designated mechanic examiner (DME) will be apt to use to check your level of skill. The *actual* questions and projects will be chosen at random by the FAA test generator, to include retesting knowledge proven deficient on the Knowledge Exams, and will be given to your DME to be used during the evaluation.

Your examiner is a knowledgeable mechanic who can evaluate your capabilities, so don't try to "snow" the examiner with words when you don't know the answer, and don't attempt any project that you are not competent to handle. It is far better to admit your lack of knowledge or skill than to blunder into a project and show that you lack the judgment to properly evaluate your capabilities.

All questions and skill elements in this guide are followed by the corresponding ACS code (e.g., AM.I.A.K1) that they align with to aid you in preparing for the tests. See a more detailed explanation of ACS element codes under the "Test Standards" section on page x.

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Reference Codes Used in this Guide

Included in each section of this guide are references to other ASA resources, FAA handbooks, FAA Advisory Circulars (ACs), Federal Aviation Regulations, and other study materials that apply specifically to that section or subject covered. These resources as well as additional documents that are valuable in preparing you for your oral and practical exam are listed below.

14 CFR	*Title 14 of the Code of Federal Regulations* (Applicable parts are available in ASA's FAR-AMT)
AC 25-11	*Electronic Flight Displays*
AC 25.1455-1	*Waste Water/Potable Water Drain System Certification Testing*
AC 39-7	*Airworthiness Directives*
AC 43-4	*Corrosion Control for Aircraft*
AC 43-9	*Maintenance Records*
AC 43.13-1	*Acceptable Methods, Techniques, and Practices—Aircraft Inspection and Repair*
AC 43.13-2	*Acceptable Methods, Techniques, and Practices—Aircraft Alterations*
AC 43-215	*Standardized Procedures for Performing Aircraft Magnetic Compass Calibration*
AC 45-2	*Identification and Registration Marking*
AC 60-11	*Test Aids and Materials that May be Used by Airman Knowledge Testing Applicants*
AC 60-28	*FAA English Language Standard for an FAA Certificate Issued Under 14 CFR Parts 61, 63, 65, and 107*
AC 65-2	*Airframe and Powerplant Mechanic's Certification Guide*
AC 120-39	*Hazards of Waste Water Ice Accumulation Separating from Aircraft in Flight*
AC 120-72	*Maintenance Human Factors Training*
AC 150/5210-20	*Ground Vehicle Operations to include Taxiing or Towing an Aircraft on Airports*
ASA-MHB	*Aviation Mechanic Handbook* (ASA)
DOT/FAA/AM-11/10	*Fatigue Risk Management in Aviation Maintenance: Current Best Practices and Potential Future Countermeasures*
FAA-H-8083-1	*Aircraft Weight and Balance Handbook*
FAA-H-8083-2	*Risk Management Handbook*
FAA-H-8083-25	*Pilot's Handbook of Aeronautical Knowledge*
FAA-H-8083-30	*Aviation Maintenance Technician Handbook—General*
FAA-H-8083-31	*Aviation Maintenance Technician Handbook—Airframe*
FAA-H-8083-32	*Aviation Maintenance Technician Handbook—Powerplant*
FAA-S-ACS-1	*Aviation Mechanic General, Airframe, and Powerplant Airman Certification Standards*
POH/AFM	*Pilot's Operating Handbook/FAA-Approved Airplane Flight Manual*

Be sure to use the latest versions of these references when reviewing for the test. Most of these documents are available on the FAA's website (www.faa.gov). Additionally, some of these resources (FAA handbooks, ACS, and Code of Federal Regulations) are reprinted by ASA (asa2fly.com) and are available from aviation retailers worldwide.

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The Oral and Practical Tests

Prerequisites

All applicants must have met the prescribed experience requirements as stated in 14 CFR §65.77. In addition, all applicants must provide:

1. Proof of having unexpired passing credit for the Aviation Mechanic General (AMG) knowledge test by presenting an Airman Knowledge Test Report (except when properly authorized under the provisions of 14 CFR §65.80 to take the practical tests before the airman knowledge tests).
2. Identification with a photograph and signature.

Test Standards

The examiner will download an oral and practical examination that is generated for each applicant that reflects the knowledge, risk management, and skill elements for each relevant subject area as detailed in the Airman Certification Standards (ACS).

The ACS consists of three *Sections*: General, Airframe, and Powerplant. *Subjects* are the areas in which aviation mechanic applicants must have knowledge and demonstrate skill. The *Objective* of each subject states what the applicant should know, consider, and do, as appropriate.

The knowledge, skill, and risk management *Elements* are the items that should be performed or answered according to standards acceptable to the FAA.

References identify the publication(s) that describe the task. *(Information contained in manufacturer and/or FAA-approved data always takes precedence over textbook referenced data.)*

Element codes in the ACS are divided into four components. For example,

AM.I.A.K1:

AM = ACS (Aviation Mechanic)

I = Section (General)

A = Subject (Fundamentals of Electricity and Electronics)

K1 = Knowledge Element (Electron theory [conventional flow vs. electron flow.])

Knowledge test questions are linked to the ACS codes. The Airman Knowledge Test Report (AKTR) lists an ACS code that correlates to a specific subject element for a given section and subject. This will allow remedial instruction and re-testing to be specific and based on explicit learning criteria. The FAA encourages applicants and instructors to use the ACS when preparing for tests.

The following terms apply to each element:

- *Inspect* means to examine (with or without inspection enhancing tools/equipment).
- *Check* means to verify proper operation.
- *Troubleshoot* means to analyze and identify malfunctions.
- *Service* means to perform functions that assure continued operation.
- *Repair* means to correct a defective condition and repair of an airframe or powerplant system including component replacement and adjustment.
- *Overhaul* means to disassemble, clean, inspect, repair as necessary, and reassemble.

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The applicant should be well prepared in *all* knowledge, skill, and risk management elements included in the standards.

Satisfactory performance to meet the requirements for certification is based on the applicant's ability to:

1. Show basic knowledge.
2. Demonstrate basic mechanic skills.
3. Perform the skill elements within the standards of the reference materials.

The practical test is passed if, in the judgment of the examiner, the applicant demonstrates the prescribed level of proficiency on the assigned elements in each subject area. Each practical examination item must be performed, at a minimum, to the performance level in the airman certification standards.

If, in the judgment of the examiner, the applicant does not meet the standards of any subject element performed, the associated subject is failed and therefore, the practical test is failed.

Typical areas of unsatisfactory performance and grounds for disqualification are:

1. Any action or lack of action by the applicant that requires corrective intervention by the examiner for reasons of safety.
2. Failure to follow recommended maintenance practices and/or reference material while performing projects.
3. Exceeding tolerances stated in the reference material.
4. Failure to recognize improper procedures.
5. The inability to perform to a return-to-service standard, where applicable.
6. Inadequate knowledge in any of the subject areas.

When an applicant fails a test, the examiner will record the applicant's unsatisfactory performance and elements not completed in terms of subjects appropriate to the practical test conducted.

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The General Oral and Practical Tests

There are 12 subject areas that are tested on the General Oral and Practical Exams.

For each subject area, this guide provides typical oral questions and succinct answers for the knowledge and risk management elements and presents the skills that applicants must understand and demonstrate.

I. General

A. Fundamentals of Electricity and Electronics
B. Aircraft Drawings
C. Weight and Balance
D. Fluid Lines and Fittings
E. Aircraft Materials, Hardware, and Processes
F. Ground Operations and Servicing
G. Cleaning and Corrosion Control
H. Mathematics
I. Regulations, Maintenance Forms, Records, and Publications
J. Physics for Aviation
K. Inspection Concepts and Techniques
L. Human Factors

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A. Fundamentals of Electricity and Electronics

References: AC 43.13-1; FAA-H-8083-30

Knowledge

1. **What is the difference between the conventional current flow theory and electron flow?** (AM.I.A.K1)
   Conventional current flow theory is a visualization of current as flowing from positive to negative. In actual practice, electrons in a circuit flow from negative to positive (electron theory).

2. **How can you find the polarity of an electromagnet?** (AM.I.A.K2)
   Hold the electromagnet in your left hand with your fingers encircling the coil in the direction electrons flow (from negative to positive). Your thumb will point to the north pole of the electromagnet.

3. **What constitutes a capacitor?** (AM.I.A.K3)
   Two conductors separated by an insulator.

4. **What is the purpose of a capacitor?** (AM.I.A.K3)
   It stores electrical energy in electrostatic fields.

5. **What is the basic unit of capacitance?** (AM.I.A.K3)
   The farad.

6. **Why should electrolytic capacitors not be used in an AC circuit?** (AM.I.A.K3)
   They are polarized. An electrolytic capacitor will pass current of one polarity, but will block current of the opposite polarity.

7. **What is meant by inductance?** (AM.I.A.K4)
   The ability to store electrical energy in electromagnetic fields.

8. **What is the basic unit of inductance?** (AM.I.A.K4)
   The henry.

9. **Given the inductance and the frequency of the AC in a circuit, how do you compute the inductive reactance caused by the coil?** (AM.I.A.K4)
   $X_L = 2\pi fL$

   Where: X_L = inductive reactance in ohms
   f = frequency in cycles per second
   π = 3.1416
   L = inductance

   For example, in an AC series circuit in which the inductance is 146 mH (millihenry) and the voltage is 110 volts at a frequency of 60 cps, the inductive reactance is determined by the following method:
   $X_L = 2\pi \times f \times L$
   $X_L = 6.28 \times 60 \times 0.146$
   $X_L = 55$ ohm

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10. **Does a capacitor in an AC circuit cause the current to lead or lag the voltage?** (AM.I.A.K5)
    It causes the current to lead the voltage.

11. **Does an inductor in an AC circuit cause the current to lead or lag the voltage?** (AM.I.A.K5)
    It causes the current to lag behind the voltage.

12. **What is the basic unit of power in a DC circuit?** (AM.I.A.K6)
    The watt.

13. **What happens to the current in a DC circuit if the voltage is increased but the resistance remains the same?** (AM.I.A.K6)
    It increases.

14. **What are five sources of electrical energy?** (AM.I.A.K7)
    Magnetism, chemical energy, light, heat, and pressure.

15. **Which law of electricity is the most important for an aircraft mechanic to know?** (AM.I.A.K7)
    Ohm's law.

16. **What are the elements of Ohm's law?**
    Voltage E, current I, and resistance R (volts, amps, and ohms).

17. **What is the name of the law that describes the relationship in an electrical circuit of voltage, current, and resistance?** (AM.I.A.K7a)
    Ohm's law.

18. **What is the basic equation of Ohm's law?** (AM.I.A.K7a)
    $E = I \times R$

19. **What is Kirchhoff's voltage law?** (AM.I.A.K7b)
    Kirchhoff's voltage law states that the algebraic sum of all voltages around a closed path or loop is zero. Another way of saying it is that the sum of all the voltage drops equals the total source voltage.

20. **What is the formula for determining power?** (AM.I.A.K7c)
    General power formula: $P = I \times E$
    Where: P = Power, I = Current, E = Volts

21. **What is Faraday's law?** (AM.I.A.K7d)
    Faraday's law, or the law of electromagnetic induction, states that the induced EMF or electromagnetic force in a closed loop of wire is proportional to the rate of change of the magnetic flux through a coil of wire.

22. **What is Lenz's law?** (AM.I.A.K7e)
    Lenz's law states that the EMF induced in an electric circuit always acts in such a direction that the current it drives around a closed circuit produces a magnetic field, which opposes the change in magnetic flux.

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23. **What is the right-hand motor rule?** (AM.I.A.K7f)
When the index finger of the right hand is pointed in the direction of the magnetic field and the second finger in the direction of current flow, the thumb indicates the direction the current carrying wire moves.

24. **What is meant by a kilowatt?** (AM.I.A.K8)
1,000 watts.

25. **What is meant by a megawatt?** (AM.I.A.K8)
1,000,000 watts.

26. **What instrument is used to measure current flow?** (AM.I.A.K8)
An ammeter.

27. **What is a megohm?** (AM.I.A.K8)
One million (1,000,000) ohms.

28. **What instrument is used to measure electrical resistance?** (AM.I.A.K8)
An ohmmeter.

29. **When measuring resistance of a component with an ohmmeter, should the circuit be energized?** (AM.I.A.K8)
No, there should be no power on the circuit.

30. **What instrument is used to measure continuity in an electrical circuit?** (AM.I.A.K8)
An ohmmeter.

31. **In what units is battery capacity expressed?** (AM.I.A.K8)
In ampere-hours.

32. **What instrument is used to measure the specific gravity of the electrolyte in a lead-acid battery?** (AM.I.A.K8)
A hydrometer.

33. **What is voltage?** (AM.I.A.K9)
Electrical pressure.

34. **What is the basic unit of voltage?** (AM.I.A.K9)
The volt.

35. **What instrument is used to measure voltage?** (AM.I.A.K9)
A voltmeter.

36. **To measure voltage, is a voltmeter placed in series or in parallel with the source of voltage?** (AM.I.A.K9)
In parallel.

37. **What is the voltage across each resistor connected in parallel across a 12-volt battery?** (AM.I.A.K9)
12 volts.

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38. **What is the open-circuit voltage of a lead-acid cell?** (AM.I.A.K9)
    2.1 volts.

39. **How is output voltage regulated in an AC alternator?** (AM.I.A.K9a)
    Voltage regulation is accomplished by varying the strength of the AC exciter fields (field voltage).

40. **What is electrical current?** (AM.I.A.K10)
    The flow of electrons in a circuit.

41. **What is the basic unit of current flow?** (AM.I.A.K10)
    The ampere (amp).

42. **What part of an amp is a milliamp?** (AM.I.A.K10)
    One thousandth (0.001) of an amp.

43. **What two things happen when current flows through a conductor?** (AM.I.A.K10)
    Heat is generated and a magnetic field surrounds the conductor.

44. **To measure current through a component, is an ammeter placed in parallel or in series with the component?** (AM.I.A.K10)
    In series.

45. **What formula is used to find current when voltage and resistance are known?** (AM.I.A.K10)
    Current = Voltage divided by Resistance.
    $I = \frac{E}{R}$

46. **What is meant by resistance in an electrical circuit?** (AM.I.A.K11)
    The opposition to the flow of electrons.

47. **What is the basic unit of electrical resistance?** (AM.I.A.K11)
    The ohm.

48. **What four things affect the resistance of an electrical conductor?** (AM.I.A.K11)
    The material, the cross-sectional area, the length, and the temperature.

49. **How can you tell the resistance of a composition resistor?** (AM.I.A.K11)
    By a series of colored bands around one end of the resistor.

50. **What formula is used to find resistance when voltage and current are known?** (AM.I.A.K11)
    Resistance = Voltage divided by Current
    $R = \frac{E}{I}$

51. **What is meant by impedance?** (AM.I.A.K11a)
    The total opposition to the flow of alternating current. It is the vector sum of resistance, capacitive reactance, and inductive reactance.

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52. In what units is impedance measured? (AM.I.A.K11a)

In ohms.

53. How is resistance calculated in a series circuit? (AM.I.A.K11b)

For resistors in a series configuration, the total resistance of the circuit is equal to the sum of the individual resistors.

54. How is resistance calculated in a parallel circuit? (AM.I.A.K11c)

The formula for the total parallel resistance is as follows:

$$\frac{1}{R_T} = \frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots \frac{1}{R_N}$$

If the reciprocal of both sides is taken, then the general formula for the total parallel resistance is:

$$R_T = \frac{1}{\frac{1}{R_1} + \frac{1}{R_2} + \frac{1}{R_3} + \ldots \frac{1}{R_N}}$$

55. What is the total resistance of three 12-ohm resistors connected in series? (AM.I.A.K11d)

36 ohms.

56. What is the total resistance of three 12-ohm resistors connected in parallel? (AM.I.A.K11d)

4 ohms.

57. What is the formula for power in a DC circuit? (AM.I.A.K12)

Power = Voltage times current ($P = E \times I$)

58. What is the relationship between mechanical and electrical power? (AM.I.A.K12)

1 horsepower = 746 watts

59. What is meant by true power in an AC circuit? (AM.I.A.K12)

The product of the circuit voltage and the current that is in phase with this voltage.

60. In what units is true power expressed? (AM.I.A.K12)

In watts.

61. What is meant by apparent power in an AC circuit? (AM.I.A.K12)

The product of the circuit voltage and the circuit current, without reference to phase angle.

62. In what units is apparent power expressed? (AM.I.A.K12)

In volt-amps.

63. What is meant by reactive power in an AC circuit? (AM.I.A.K12)

The power consumed in the inductive and capacitive reactances in an AC circuit. Reactive power is also called wattless power.

64. In what units is reactive power expressed? (AM.I.A.K12)

In volt-amps reactive (VAR), or kilovolt-amps reactive (KVAR).

SAMPLE

Risk Management

1. **When a volt/ohm multimeter is set to measure current, what precautions should be taken?** (AM.I.A.R1)

   Never place the multimeter leads across a voltage drop, as this can damage the meter.

2. **What precautions should be taken in the maintenance shop where both lead-acid and nickel-cadmium batteries are serviced?** (AM.I.A.R2)

   The two types of batteries should be kept separate, and the tools used on one type should not be used on the other.

3. **What precaution should be taken when working on a high voltage strobe light circuit?** (AM.I.A.R3)

   Disconnect the power from the strobe power supply and let it stand for 5–10 minutes to allow the capacitors to bleed off.

4. **What are some precautions that should be taken when working around an aircraft battery installed in an aircraft?** (AM.I.A.R4)

   a. When disconnecting a battery, always disconnect the negative terminal first.
   b. When installing a battery, always connect the negative terminal last.
   c. When the battery is installed, care should be taken to never allow tools or equipment to short the positive terminal to ground.

Skills

1. **Using a capacitor tester and capacitor furnished by the examiner, determine the capacity of a capacitor and whether or not it is serviceable.** (AM.I.A.S1)

2. **Find the capacitive reactance in an AC circuit for the values of capacitance and frequency specified by the examiner.** (AM.I.A.S1)

3. **Find the inductive reactance in an AC circuit for the values of inductance and frequency specified by the examiner.** (AM.I.A.S1)

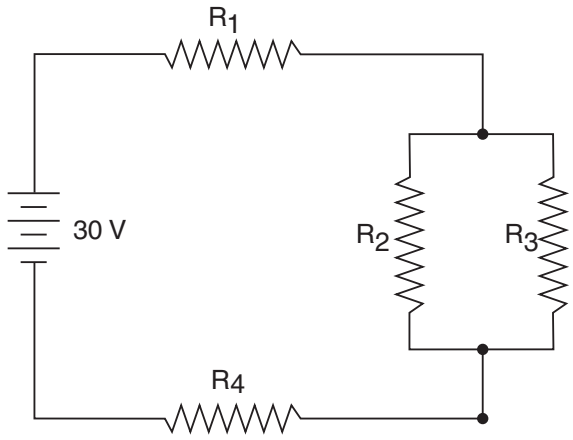
4. **Install wires into an electrical connector assigned by the examiner and test for continuity.** (AM.I.A.S1)

5. **Compute the amps of current drawn by a 1,000-watt landing light in a 24-volt DC electrical system.** (AM.I.A.S2)

6. **Find the total number of watts dissipated by two lamps wired in parallel in a 12-volt circuit, if one lamp requires 3 amps and the other 1.5 amp.** (AM.I.A.S2)

SAMPLE

7. **Find the current through each resistor, the voltage drop across each resistor, and the power dissipated by each resistor in this circuit. Resistor values will be provided by the examiner.** (AM.I.A.S2)



E_1 =	I_1 =	P_1 =
E_2 =	I_2 =	P_2 =
E_3 =	I_3 =	P_3 =
E_4 =	I_4 =	P_4 =

8. **Using a multimeter and an energized electrical circuit, measure the voltage drop across a color-coded resistor. Compute the current flow through it and the amount of power dissipated in it.** (AM.I.A.S2)

9. **Measure the DC current through a component specified by the examiner.** (AM.I.A.S3)

10. **Measure the resistance of a component specified by the examiner and determine whether or not it is within the limits specified in an appropriate service manual.** (AM.I.A.S4)

11. **Using an ohmmeter, determine if a supplied switch is operating correctly.** (AM.I.A.S5)

12. **Using a multimeter, demonstrate to the examiner how to determine if a fuse is blown, or if a circuit breaker is working correctly.** (AM.I.A.S6)

13. **Using an electrical schematic circuit diagram furnished by the examiner, trace the flow of current from a battery through a series of switches and relays to a component.** (AM.I.A.S7)

14. **Using a logic diagram of an electronic circuit, explain to the examiner the function of AND, OR, NOT, and NOR gates.** (AM.I.A.S7)

15. **Demonstrate to the examiner the way to trace a procedure using a logic flow chart.** (AM.I.A.S7)

SAMPLE

16. **Use a voltmeter to troubleshoot a supplied circuit.** (AM.I.A.S8)

17. **Explain to the examiner the various symbols used on an electrical system schematic diagram.** (AM.I.A.S9)

18. **Explain to the examiner how to test a circuit for short-circuit and open-circuit conditions.** (AM.I.A.S10)

19. **Measure the voltage drop across a resistor in an energized DC circuit specified by the examiner.** (AM.I.A.S11)

20. **Demonstrate to the examiner the correct way to check an electrical circuit for continuity.** (AM.I.A.S12)

21. **Visually inspect a battery and battery compartment for defects and provide a list of discrepancies.** (AM.I.A.S13)

22. **Check the battery for cell imbalance.** (AM.I.A.S13)

23. **Check electrolyte level and service as necessary.** (AM.I.A.S14)

24. **Check the state-of-charge of a lead-acid battery using a hydrometer. Apply the appropriate correction for temperature.** (AM.I.A.S14)

25. **Properly remove a lead-acid battery from an aircraft. Describe the proper way to clean the outside of the battery and reinstall it, correctly connecting the battery cables.** (AM.I.A.S14)

26. **Properly connect two batteries on a charger for a constant-voltage charge.** (AM.I.A.S14)

27. **Properly connect two batteries on a charger for a constant-current charge.** (AM.I.A.S14)

28. **Remove a nickel-cadmium battery from an aircraft. Describe to the examiner the correct way to clean the battery and battery compartment.** (AM.I.A.S14)

29. **Perform a deep-cycling discharge and recharge of the battery on a constant-current battery charger.** (AM.I.A.S14)

30. **Properly reinstall the battery in the aircraft and connect the battery cables.** (AM.I.A.S14)

SAMPLE

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ISBN 978-1-64425-362-5

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