



AIRCRAFT MAINTENANCE ENGINEER SKILL TEST STANDARDS
DOCUMENT NUMBER KCAA AME-STS



Foreword


The Kenya Civil Aviation Authority (KCAA) has developed skill test standards for Aircraft Maintenance Engineers licences and ratings and these are published as Skill Test Standards (STS). This STS establishes the standards for the Aircraft maintenance Engineers skill test. KCAA inspectors and examiners shall conduct skill tests in compliance with these standards. Instructors and applicants should find these standards helpful in skill test preparation.

Information considered directive in nature is described in this skill test STS in terms such as "Shall" and "Must", indicating the actions are mandatory. Guidance information is described in terms such as "should" and "may" indicating the actions are desirable or permissive, but not mandatory.

This Skill Test Standard may be downloaded from the KCAA website at <http://www.kcaa.or.ke>. Subsequent changes to the Skill Test Standard will also be available on the KCAA web site.

Comments regarding this publication should be sent to:

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Director Aviation Safety and Security Regulations
Kenya Civil Aviation Authority

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1.0 SECTION I

1.1 PURPOSE

The purpose of this STS is to prescribe the standards that shall be used by KCAA inspectors and examiners when conducting Aircraft Maintenance Engineer skill tests. Instructors are expected to use this document when preparing applicants for skill tests. Applicants should be familiar with this document and refer to these standards during their training.

1.2 GENERAL

The KCAA has developed this skill test standards and shall be used by KCAA examiners when conducting Aircraft Maintenance Engineers' skill tests. Instructors are expected to use this book when preparing applicants for skill tests. Applicants should be familiar with this book and refer to these standards during their training.

1.3 SKILL TEST STANDARD CONCEPT

The Civil Aviation (PEL) Regulations specify the areas in which knowledge and skill must be demonstrated by the applicant before the issuance of a licence or rating. The Civil Aviation (PEL) Regulations provide the flexibility to permit the KCAA to publish Skill Test Standards (STS) containing the AREAS OF OPERATION and specific TASKS in which Aircraft Maintenance Engineer competency shall be evaluated.

"Knowledge" (oral) elements are indicated by use of the words *"Exhibits knowledge of..."*

"Skill" (practical) elements are indicated by the use of the words *"Demonstrates the ability to..."*

The KCAA will revise this STS whenever it is determined that changes are needed in the interest of safety. Adherence to the provisions of the regulations and the STS is mandatory for evaluation of Aircraft Maintenance Engineer applicants.

The STS contains sections. Section One contains the directions and other relevant information for the conduct of the skill test. Section Two contains the areas of operation for each skill test. Within the areas of operation are subject area elements, which contain individual tasks. Some elements are labelled as core competency elements, which means that the entire element must be completed by the applicant.

1.4 SKILL TEST DESCRIPTION

The Aircraft Maintenance Engineer Skill Test Standards include the subject areas of knowledge and skill for the issuance of an Aircraft Maintenance Engineer licence. The subject areas are the topics in which Aircraft Maintenance Engineer applicants must have knowledge and/or demonstrate skill

Information contained in manufacturer and/or KCAA-approved/acceptable data always takes precedence over advisory or textbook referenced data. Written instructions given to applicants for the completion of assigned skill portions of the skill test standard may include service bulletins; airworthiness directives, KCARs Parts; type certificate data sheets or specifications; manufacturer maintenance manuals or other similar approved/acceptable data necessary for accomplishment of objective testing.

Each subject area has an objective. The objective lists the important knowledge and skill elements that must be utilized by the examiner in planning and administering Aircraft Maintenance Engineer tests, and that applicants must be prepared to satisfactorily perform.

1.5 USE OF THE SKILL TEST STANDARDS

The KCAA requires that all skill tests be conducted in accordance with the appropriate STS. When conducting the skill test, the examiner must evaluate the applicant's knowledge and skill in sufficient depth to determine that the objective for each subject area ELEMENT selected is met.

An applicant is not permitted to know before testing begins which selections in each subject area are to be included in his/her test (except the core competency elements, which all applicants are required to perform). Therefore, an applicant should be well prepared in *all* oral and skill areas included in the skill test standard.

1.6. SKILL TEST PREREQUISITES

An applicant for an Aircraft Maintenance Engineer skill test is required to meet the applicable experience requirements in the Civil Aviation (PEL) regulations of an Aircraft Maintenance Engineer license and rating(s) sought.

1.7 EXAMINER RESPONSIBILITY

The examiner who conducts the skill test is responsible for determining that the applicant meets acceptable standards of knowledge and skill in the assigned subject areas within the appropriate skill test standard. Since there is no formal division between the knowledge and skill portions of the skill test, this becomes an ongoing process throughout the test.

The following terms may be reviewed with the applicant prior to, or during, element assignment.

"Inspect" means to examine by sight and/or touch (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.

1.8 PERFORMANCE LEVELS

The following is a detailed description of the meaning of each level.

1.8.1 Level 1

Know basic facts and principles.

Be able to find information and follow directions and written instructions.

Locate methods, procedures, instructions, and reference material.

Interpretation of information not required.

No skill demonstration is required.

Example:

A1b. Exhibits knowledge in use of capacitance in a circuit. (Level 1)

Performance Standard: The applicant will locate information on use of capacitance in a circuit.

1.8.2 Level 2

Know and understand principles, theories, and concepts.

Be able to find and interpret maintenance data and information, and perform basic operations using the appropriate data, tools, and equipment.

A high level of skill is not required.

Example:

A2b. Demonstrates the ability to determine the appropriateness of measurement(s) according to instructions/specifications. (Level 2)

Performance Standard: Using appropriate maintenance data and a multimeter, the applicant will identify items with electric faults.

1.8.3 Level 3

Know, understand, and apply facts, principles, theories, and concepts.

Understand how they relate to the total operation and maintenance of aircraft.

Be able to make independent and accurate airworthiness judgments.

Perform all skill operations to a return-to-service standard using appropriate data, tools, and equipment. Inspections are performed in accordance with acceptable or approved data.

A fairly high skill level is required.

Example:

A2a. Use measuring equipment to measure in a circuit or circuit component(s), at least one of the following: voltage, current, resistance, or continuity. (Level 3).

Performance Standard: Using AVO Meter and the manufacturer's service manual, the applicant will measure the voltage, current, resistance, or continuity, compare the results to the maintenance data, and determine if they are within limits.

1.9 SATISFACTORY PERFORMANCE

The skill test is passed if the applicant demonstrates the prescribed proficiency in the assigned elements (core competency and other selected elements) in each subject area to the required standard. Applicants shall not be expected to memorize all mathematical formulas that may be required in the performance of various elements in this skill test standard. However, where relevant, applicants must be able to locate and apply necessary formulas to obtain correct solutions.

1.10 UNSATISFACTORY PERFORMANCE

If the applicant does not meet the standards of any of the elements performed (knowledge, core competency, or other skill elements), the associated subject area is failed, and thus the skill test is failed. The examiner or the applicant may discontinue testing any time after the failure of a subject area. In any case, the applicant is entitled to credit for only those subject areas satisfactorily completed.

Typical areas of unsatisfactory performance and grounds for disqualification include the following.

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 acceptable or approved maintenance procedures while performing skill (practical) projects.
3. Exceeding tolerances stated in the maintenance instructions.
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.

1.2 SECTION II - SKILL TEST STANDARD- GENERAL

Note; This section is applicable to all Licence Categories

A. Area of Operation -- BASIC ELECTRICITY

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Sources and/or effects of capacitance in a circuit.
- b. Uses of capacitance in a circuit.
- c. Sources and/or effects of inductance in a circuit.
- d. Uses of inductance in a circuit.
- e. Operation of basic AC and/or DC electrical circuits.
- f. Ohm's law.
- g. Kirchhoff's law(s).
- h. Procedures used in the measurement of voltage, current, and/or resistance.
- i. Determining power used in simple circuits.
- j. Troubleshooting, and/or repair or alteration using electrical circuit diagrams.
- k. Common types of defects that may occur in an installed battery system.
- l. Aircraft battery theory/operation.
- m. Servicing aircraft batteries.

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to perform both of the following—

TASKS:

- a. use measuring equipment to measure in a circuit or circuit component(s), at least one of the following: voltage, current, resistance, or continuity. (Level 3)
- b. determine the appropriateness of measurement(s) according to instructions/specifications. (Level 2)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Read and interpret one or more electrical circuit diagrams. (Level 2)
- b. Troubleshoot an electrical circuit. (Level 3)
- c. Calculate voltage, current, and resistance using Ohm's Law. (Level 2)
- d. Inspect a battery and installed battery system. (Level 3)
- e. Accomplish a battery state-of-charge (hydrometer) and/or electrical leak (cell imbalance) test. (Level 3)
- f. Accomplish removal and/or installation of a battery in an aircraft. (Level 3)
- g. Set-up and connect a charger to one or more batteries for constant current and/or constant voltage charging. (Level 3)

B. Area of Operation -- AIRCRAFT DRAWINGS

Objective. To determine that the applicant

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Characteristics and/or uses of any of the various types of drawings/blueprints and/or system schematics.
- b. The meaning of any of the lines and symbols commonly used in aircraft sketches/drawings/blueprints.
- c. Using charts or graphs.
- d. Troubleshooting an aircraft system or component(s) using drawings/blueprints and/or system schematics.
- e. Inspection of an aircraft system or component(s) using drawings/blueprints and/or system schematics.
- f. Repair or alteration of an aircraft system or component(s) using drawings/blueprints and/or schematics.
- g. Use of drawings/blueprints in component fabrication.
- h. Terms used in conjunction with aircraft drawings/blueprints and/or system schematics.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Maintenance and/or inspection using drawings/blueprints and/or system schematics. (Level 3)
- b. Preventive maintenance using drawings/blueprints and/or schematics. (Level 3)
- c. Troubleshooting using drawings/blueprints and/or schematics. (Level 3)
- d. Use a control cable tension chart. (Level 3)
- e. Use a servicing, limitation, or calculation chart or graph. (Level 3)
- f. Draw a sketch of an alteration or repair. (Level 2)
- g. Draw a diagram of an electrical circuit or other system, or portion thereof, and explain the drawing. (Level 2)

C. Area of Operation -- WEIGHT AND BALANCE

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. The purpose(s) of weighing or reweighing.
- b. General preparations for weighing, with emphasis on aircraft preparation and/or weighing area considerations.
- c. The general location of airplane center of gravity (CG) in relation to the center of lift for most fixed main airfoils.
- d. Definitions of any of the following: datum, arm, moment (positive or negative), or moment index.
- e. The meaning and/or application of any terms/nomenclature associated with weight and balance other than those mentioned in element “d” above, including but not limited to any of the following: tare, ballast, and residual fuel/oil.
- f. Procedures for finding any of the following: datum, arm, moment (positive or negative), or moment index.
- g. Purpose and/or application of mean aerodynamic chord (MAC).
- h. Adverse loading considerations.

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to calculate weight and balance CG and complete aircraft weight and balance documentation. (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Weighing equipment preparation and setup according to manufacturer’s instructions. (Level 3)
- b. Locate procedures for leveling and the leveling points for an aircraft. (Level 2)
- c. Locate weigh points, procedures for determining CG, and determine the weigh point arms for an aircraft. (Level 2)
- d. Identify tare items for a specific aircraft and weighing procedure. (Level 2)
- e. Find the datum for at least two different aircraft. (Level 2)
- f. Determine the weight and location of required ballast after an (actual or hypothetical) equipment change. (Level 2)

D. Area of Operation -- FLUID LINES AND FITTINGS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS

- a. Tubing materials.
- b. Tubing materials application.
- c. Tubing sizes.
- d. Flexible hose material.

- e. Flexible hose materials application.
 - f. Flexible hose sizes.
 - g. Flexible hose identification.
 - h. AN, MS, and/or AC plumbing fittings.
 - i. Rigid line fabrication techniques/practices.
 - j. Rigid line installation techniques/practices.
 - k. Flexible hose fabrication techniques/practices.
 - l. Flexible hose installation techniques/practices.
2. **CORE COMPETENCY ELEMENT:** *Demonstrates the ability to perform at least one of the following—
- TASKS:**
- a. rigid line fabrication to include tube fittings, bending, and tube flaring. (Level 3)
 - b. flexible line fabrication using replaceable fittings on at least one end. (Level 3)
3. **ELEMENT:** Demonstrates the ability to perform at least one of the following— **TASKS:**
- a. Inspect for and identify defects in rigid and/or flexible lines. (Level 3)
 - b. Install and remove a rigid and/or flexible line. (Level 3)
 - c. Identify correct and/or incorrect rigid line installations. (Level 2)
 - d. Identify correct and/or incorrect flexible line installations. (Level 2)
 - e. Form a bead on tubing. (Level 3)
 - f. Select components and assemble a flareless fitting tube connection. (Level 3)
 - g. Repair a damaged rigid line. (Level 3)
 - h. Identify various sizes and types of aircraft fittings. (Level 2)
 - i. Secure a rigid line with clamps. (Level 3)
 - j. Identify fluid and/or air lines that may be installed on an aircraft. (Level 2)

E. Area of Operation -- MATERIALS AND PROCESSES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Any of the metals commonly used in aircraft and their general application.
 - b. Composites and other nonmetallic components and their general application.
 - c. Heat-treated parts precautions, using DD or "icebox" rivets.
 - d. Typical wood materials and fabric coverings.
 - e. Visible characteristics of acceptable and/or unacceptable welds.
 - f. Precision measurement and precision measurement tools.
 - g. Using inspection techniques/methods, including any of the following: visual, metallic ring test, dye/fluorescent penetrant, magnetic particle, and/or eddy current.
 - h. Identification, selection, installation, and/or use of aircraft hardware.
 - i. Safetying of components and/or hardware.
 - j. Finding information about material types for specific application(s).
2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to torque to specification(s), and safety-wire aircraft component(s)/hardware. (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Select and install standard aircraft hardware, to include one or more self-locking nuts. (Level 3)
- b. Select, install, and secure a clevis bolt and associated hardware. (Level 3)
- c. Select and install one or more appropriate screws/bolts, nuts, cotter pins, and washers. (Level 3)
- d. Inspect hardware for defects, proper installation. (Level 3)
- e. Safety a turnbuckle. (Level 3)
- f. Perform a dye or fluorescent penetrant inspection. (Level 3)
- g. Find a (not visible) defect using eddy current or ultrasonic inspection equipment. (Level 2)
- h. Perform, read, and record a precision measurement using a dial indicator, or micrometer, or vernier caliper. (Level 2)
- i. Visually inspect welds and determine acceptability. (Level 3)
- j. Identify rivets by physical characteristics. (Level 2)

F. Area of Operation -- GROUND OPERATION AND SERVICING

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. General procedures for towing aircraft.
- b. Air Traffic Control (ATC) considerations/requirements for towing aircraft on or across active runways.
- c. General procedures for starting, ground operating, and/or taxiing a reciprocating engine powered aircraft.
- d. General procedures for starting, ground operating, and/or taxiing a turbine engine powered aircraft.
- e. The hazards associated with starting, ground operating, and/or taxiing aircraft and procedures for preventing, minimizing or otherwise managing any of them.
- f. Procedures for refueling and/or defueling aircraft.
- g. Oxygen system safety practices/precautions.
- h. Characteristics of aviation gasoline and/or turbine fuels, including basic types and means of identification.
- i. Fuel contamination hazards.
- j. Fuel additives commonly used in the field.
- k. Use of automobile fuel in aircraft engines.
- l. Types/classes of fires, using proper fire extinguishers/methods.

2. N/A

3. ELEMENT; Demonstrates the ability to perform at least one of the following—

TASK:

- a. Service an aircraft with compressed air or nitrogen. (Level 3)
- b. Set-up an aircraft and cockpit controls for engine start. (Level 2)
- c. Start and ground operate an aircraft engine* (taxiing optional), and use or respond to standard hand or light wand signals. (Level 3) *If an operable engine is available.
- d. Determine the engine oil for a specific engine. (Level 2)
- e. Secure an aircraft for outside storage. (Level 3)
- f. Fuel and/or defuel an aircraft (may be simulated). (Level 3)
- g. Sample fuel and inspect for proper fuel and contaminants. (Level 3)
- h. Set-up and connect an aircraft to an external power source. (Level 2)
- i. Connect a tow bar to an aircraft and prepare for towing. (Level 3)
- j. Direct the movement (may be simulated) of aircraft. (Level 3)
- k. Locate and clear a liquid lock (actual or simulated) in an aircraft engine. (Level 3)
- l. Identify the types/classes of fires that local shop and/or flight line fire extinguishers

may be used on. (Level 2)

G. Area of Operation -- CLEANING AND CORROSION CONTROL

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Aircraft preparation for washing, general aircraft cleaning (washing) procedures.
 - b. Post cleaning (washing) procedures.
 - c. Corrosion theory.
 - d. Types/effects of corrosion.
 - e. Conditions that cause corrosion.
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- f. Corrosion prone areas in aircraft.
 - g. Corrosion preventive maintenance procedures.
 - h. Inspection for and identification of corrosion in any of its various forms.
 - i. Corrosion removal and treatment procedures.
 - j. Use of Material Safety Data Sheets (MSDS).
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to inspect for and identify two or more of the various forms of corrosion that affect aircraft. (Level 3)**
 3. ELEMENT: Demonstrates the ability to perform at least one of the following:

TASKS:

 - a. Identify and select materials used to clean interior and/or exterior surfaces according to aircraft manufacturer's instructions. (Level 2)
 - b. Corrosion removal from any of the metals commonly used in aircraft. (Level 3)
 - c. Preventive corrosion treatment on any of the metals commonly used in aircraft. (Level 3)

- d. Identify and select appropriate corrosion preventive methods and materials for a specific aircraft application. (Level 2)

H. Area of Operation -- MATHEMATICS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS

- a. Areas of various geometrical shapes.
- b. Volumes of various geometrical shapes.
- c. Definitions/descriptions of geometrical terms, including but not limited to any of the following: polygon, pi, diameter, radius, and hypotenuse.
- d. Ratio problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- e. Proportion problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- f. Percentage problems, including one or more examples of where or how they may be used in relation to aircraft maintenance or system(s) operation.
- g. Algebraic operations, including one or more examples of where or how they may be used in relation to aircraft maintenance.
- h. Conditions or areas where metric conversion may be necessary.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following, using appropriate formulas—

TASKS

- a. Calculate the area of a polygon and/or circle. (Level 2)
- b. Calculate the volume of a sphere, cube, or cylinder. (Level 2)
- c. Algebraic operations involving addition, subtraction, multiplication, and/or division of positive and negative numbers. (Level 2)
- d. Locate mathematical formulas used to assist in the maintenance, preventive maintenance, or alteration of aircraft. (Level 1)

NOTE: The practical portion of the Mathematics subject area may be tested simultaneously when performing calculation(s) in subject areas Basic Electricity and/or Weight and Balance.

I. Area of Operation -- MAINTENANCE FORMS AND RECORDS

Objective. To determine that the applicant:

1. **ELEMENT:** Exhibits knowledge of at least two of the following—

TASKS

- a. Writing descriptions of work performed and approval for return to service after minor repairs or minor alterations.
 - b. The content, form, and disposition of aircraft maintenance records reflecting approval for return to service after a 100-hour inspection.
 - c. The content, form, and disposition of aircraft maintenance records reflecting disapproval for return to service after a 100-hour inspection.
 - d. the recording content, form, and disposition requirements for certificated aviation mechanics (without an Inspection Authorization) who perform major repairs and/or major alterations.
 - e. The inoperative instruments or equipment provisions of the Civil Aviation (Instrument and Equipment) Regulations.
 - f. The definition/explanation of any of the terms used in relation to aircraft maintenance, such as overhaul(ed), rebuilt, time in service, maintenance, preventive maintenance, inspection, major alteration, major repair, minor alteration, and minor repair.
2. **CORE COMPETENCY ELEMENT:** *Demonstrates the ability to write appropriate entries on FAA Form 337, Major Repair and Major Alteration, indicating performance of a major repair, and make appropriate corresponding aircraft maintenance record entry. (Level 3)

3. **ELEMENT:** Demonstrates the ability to write entries for at least one of the following—

TASKS:

- a. Performance of minor repair or minor alteration. (Level 3)
- b. Performance of preventive maintenance. (Level 3)
- c. Compliance with an airworthiness directive. (Level 3)
- d. Performance of a 100-hour inspection with approval for return to service, including a list of some allowable inoperative instruments or equipment in accordance with the provision of the Civil Aviation (Operation of Aircraft) Regulations. (Level 3)

- e. Performance of a 100-hour inspection with disapproval for return to service because of needed maintenance, or noncompliance with applicable specifications or airworthiness directive(s). (Level 3)
- f. CAA MR&A Form, Major Repair and Major Alteration, for additional equipment installation or an alteration in accordance with a supplemental type certificate (STC) and make appropriate maintenance record entry. (Level 3)
- g. CAA Form Malfunction or Defect Report. (Level 3)

J. Area of Operation -- BASIC PHYSICS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Any of the simple machines, how they function, and/or how mechanical advantage is applied in one or more specific examples.
- b. Sound resonance, how it can be a hazard to aircraft, and how sound may be used to aid in inspecting aircraft.
- c. The relationship between fluid density and specific gravity.
- d. The characteristic of specific gravity of fluids and how it may be applied to aircraft maintenance.
- e. The general effects of pressure and temperature on gases and liquids and how the qualities of compressibility and/or incompressibility of gases and liquids are generally applied to aircraft systems.
- f. Density altitude and the effects of temperature, and/or pressure, and/or humidity on aircraft and/or engine performance.
- g. Heat, how it is manifested in matter, and how heat transfer is accomplished through conduction, and/or convection, and/or radiation.
- h. Coefficient of linear (thermal) expansion as related to aircraft materials.
- i. Aircraft structures and theory of flight/physics of lift.
- j. The operation of aerodynamic factors in the flight of airplanes and/or helicopters.
- k. The relationship between force, area, and pressure.
- l. The five forces or stresses affecting aircraft structures.
- m. The two forms of energy and how they apply to aircraft and/or aircraft systems.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Identify any parts or systems of an aircraft and/or engine where Bernoulli's principle and/or Newtonian law is applied. (Level 2)
- b. Identify parts or systems of an aircraft where Boyle's, Charles', and/or Pascal's Laws apply. (Level 2)

- c. Calculate force, area, or pressure in a specific application. (Level 3)
- d. Identify one or more methods of heat transfer in aircraft systems and where and how heat damage may occur when performing aircraft maintenance. (Level 2)
- e. Identify any of the following and describe how they function aerodynamically: stall strips, wing fences, vortex generators, flaps, slats, spoilers, ailerons, stabilators, elevators, rudders, or trim tabs. (Level 2)
- f. Determine which of the five forces/stresses are acting on an aircraft or aircraft parts at specific points under given conditions. (Level 2)
- g. Design a simple machine (on paper) that uses one or more methods of mechanical advantage. (Level 2)

K. Area of Operation -- MAINTENANCE PUBLICATIONS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. How a mechanic makes use of Type Certificate Data Sheets (TCDSs) and/or Aircraft Specifications in conducting maintenance or inspections.
- b. Aircraft maintenance manuals and associated publications including any of the following types of publications and how they are used: service bulletin, maintenance manual, overhaul manual, structural repair manual, or instructions for continued airworthiness.
- c. The requirements of performance of maintenance.
- d. Airworthiness Directives (AD), including purpose and/or AD categories and/or ADs issued to other than aircraft.
- e. In what form individuals may receive CAA published AD summaries and/or how they may be obtained.
- f. The AD identification numbering system.
- g. KCAA MAPs including any of the following: significance of the MAP numbering system, one or more examples of MAPs issued to provide information in designated subject areas, and one or more examples of MAPs issued to show a method acceptable to the KCAA complying with the KCARS.
- h. The intent or function of the Aviation Maintenance Alerts.
- i. The Air Transport Association (ATA) Specification 100.

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to perform both of the following—

TASKS:

- a. read, comprehend, and apply information contained in a manufacturer's maintenance manual or illustrated parts manual. (Level 3)

- b. locate and list all applicable ADs for at least one particular make, model, and serial number of an aircraft, engine, propeller, or appliance. (Level 2)
3. ELEMENT: Demonstrates the ability to read, comprehend, and apply the information contained in at least one of the following—

TASKS:

- a. Service bulletin. (Level 3)
- b. Overhaul manual. (Level 3)
- c. Structural repair manual. (Level 3)
- d. Instructions for continued airworthiness. (Level 3)
- e. At least one maintenance related section, or appendix, or portion(s) thereof, of KCARs. (Level 3)
- f. An AD. (Level 3)
- g. Aircraft Specifications or TCDSs to specific maintenance or inspection operations, or portions thereof. (Level 3)

L. Area of Operation -- AVIATION MECHANIC PRIVILEGES AND LIMITATIONS

Objective: To determine that the applicant:

1. ELEMENT: Exhibits knowledge of mechanic privileges and limitations and exercise thereof, including at least two of the following—

TASKS:

- a. Required evidence of eligibility experience satisfactory to the Administrator.
- b. Length of experience required for eligibility.
- c. Practical experience required for eligibility.
- d. The privileges of a mechanic in relation to 100-hour and annual inspections.
- e. Change of address reporting requirements.
- f. Minimum age requirements.
- g. Recent experience requirements to exercise privileges of a certificate.
- h. Who is authorized to perform maintenance/inspection, preventive maintenance, rebuilding, or alteration and/or approve for return to service afterwards.
- i. Causes for revocation or suspension.
- j. Criteria for determining major and minor repair or alteration.

2. N/A

3. ELEMENT: When given a copy of The Civil Aviation (PEL) Regulations, demonstrates the ability to understand mechanic privileges and limitations by finding and interpreting/explaining essential information contained in at least two of the following—

TASKS:

- a. Offenses involving alcohol or drugs. (Level 2)

- b. Written tests: Cheating or other unauthorized conduct. (Level 2)
- c. Applications, certificates, logbooks, reports, and records: falsification, reproduction, or alteration. (Level 2)
- d. Refusal to submit to a drug or alcohol test. (Level 2)
- e. General privileges and limitations. (Level 2)
- f. Recent experience requirements. (Level 2)
- g. Airframe rating; additional privileges and/or Power plant rating; additional privileges. (Level 2)
- h. Display of certificate. (Level 2)

1.3 SECTION III—AIRFRAME STRUCTURES

A. Area of Operation -- WOOD STRUCTURES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Inspection tools for wood structures.
- b. Inspection techniques and practices for wood structures.
- c. Effects of moisture/humidity on wood.
- d. Types and/or general characteristics of wood used in aircraft structures.
- e. Permissible substitutes and/or other materials used in the construction and repair of wood structures.
- f. Acceptable wood defects.
- g. Non-acceptable wood defects.
- h. Wood repair techniques and practices.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Inspect aircraft wood structure or wood sample. (Level 3)
- b. Inspect a wood repair for airworthiness. (Level 3)
- c. Identify and select aircraft quality/acceptable wood. (Level 2)
- d. Determine acceptable repairs or limits for one or more specific defects. (Level 2)
- e. Locate data for allowable substitute wood material. (Level 1)
- f. Determine the allowable species of wood that can be used as a substitute for spruce, and what, if any, dimensional changes are necessary. (Level 2)
- g. Locate wood spar and/or rib structure repair procedures. (Level 1)

B. Area of Operation -- AIRCRAFT COVERING

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:
 - a. Factors used in determining the proper type covering material.
 - b. Types of approved aircraft covering material.
 - c. Seams commonly used.
 - d. Covering textile terms.
 - e. Structure surface preparation.
 - f. Covering methods commonly used.
 - g. Covering means of attachment.
 - h. Areas on aircraft covering most susceptible to deterioration.
 - i. Aircraft covering preservation/restoration.
 - j. Inspection of aircraft covering.
 - k. Covering repair techniques and practices.
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:
 - a. Inspect the repair of a damaged covering for airworthiness. (Level 3)

- b. Test a finished covering sample to determine acceptability of strength. (Level 3)
- c. Determine the minimum fabric strength covering requirements for a specific aircraft. (Level 2)
- d. Determine if a covering sample has appropriate identification markings. (Level 2)
- e. Determine acceptable repairs for a specific defect. (Level 2)
- f. Determine the classification (major or minor) of a specific repair to a fabric covered surface. (Level 2)
- g. Locate the requirements for repair of a specific fabric covering defect. (Level 1)

C. Area of Operation -- AIRCRAFT FINISHES

Objective. To determine that the applicant:

- 1. ELEMENT: Exhibits knowledge of at least two of the following—
TASKS:
 - a. Protection of airframe structures.
 - b. Primer materials.
 - c. Topcoat materials.
 - d. Surface preparation for a desired finishing material.
 - e. Effects of ambient conditions on finishing materials.
 - f. Effects of improper surface preparation on finishing materials.
 - g. Regulatory requirements for registration markings.
 - h. Inspection of aircraft finishes.
 - i. Safety practices/precautions when using finishing materials.
 - j. Fungicidal, butyrate, and/or nitrate dopes.
 - k. Finishing materials application techniques and practices.
 - l. Where necessary, balance considerations after refinishing.
- 2. N/A
- 3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Select appropriate finishing materials for a specific application. (Level 2)
- b. Determine preparation necessary for application of finishing materials to a particular surface. (Level 2)
- c. Prepare a surface for application of finishing materials. (Level 3)
- d. Apply primer and/or topcoat materials. (Level 3)
- e. Inspect one or more finished surfaces. (Level 3)
- f. Locate appropriate data to use for a specific finishing task. (Level 1)
- g. Determine the allowable location and size of registration numbers for a fixed-wing and/or rotorcraft aircraft. (Level 2)

D. Area of Operation -- SHEET METAL AND NON-METALLIC STRUCTURES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:
 - a. Inspection/testing of sheet metal structures.
 - b. Types of sheet metal defects.
 - c. Selection of sheet metal.
 - d. Layout, and/or forming of sheet metal.
 - e. Selection of rivets.
 - f. Rivet layout.
 - g. Rivet installation.
 - h. Inspection/testing of composite structures.
 - i. Types of composite structure defects.
 - j. Composite structure fiber, core, and/or matrix materials.
 - k. Composite materials storage practices and shelf life.

- l. Composite structure repair methods, techniques, and practices.
 - m. Window inspection/types of defects.
 - n. Window material storage and handling.
 - o. Window installation procedures.
 - p. Care and maintenance of windows.
 - q. Window temporary and/or permanent repairs.
 - r. Maintenance safety practices/precautions for sheet metal, and/or composite materials/structures, and/or windows.
2. **CORE COMPETENCY ELEMENT: Demonstrates the ability to install and remove at least two each, of two or more types of rivets. (Level 3)**
3. **ELEMENT: Demonstrates the ability to perform at least one of the following—**

TASK:

- a. Lay out and form sheet metal to given dimensions; include at least one bend. (Level 3)
- b. Determine a rivet lay out pattern. (Level 2)
- c. Visually inspect an unpainted composite surface. (Level 3)
- d. Inspect a composite structure using a non-destructive testing method (in addition to visual). (Level 3)
- e. Select materials and clean a transparent surface. (Level 3)
- f. Inspect a window or windscreen. (Level 3)
- g. Remove one or more minor scratches from a transparent surface. (Level 3)
- h. Determine hole size to use in a sheet metal repair. (Level 2)
- i. Inspect a sheet metal assembly or repair for airworthiness. (Level 3)
- j. Drill and countersink and/or dimple sheet metal. (Level 3)
- k. Identify the fiber-reinforcing materials in at least three laminated composite structure samples. (Level 2)
- l. Locate data for composite structure damage assessment. (Level 1)

E. Area of Operation -- WELDING

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:

- a. Flame welding gasses.
- b. Storage/handling of welding gasses.
- c. Flame welding practices and techniques.
- d. Inert-gas welding practices and techniques.
- e. Purpose and types of shielding gasses.
- f. Characteristics of acceptable welds.
- g. Characteristics of unacceptable welds.
- h. Types of steel tubing welding repairs.
- i. Procedures for weld repairs.
- j. Soldering preparation, types of solder, and/or flux usage.
- k. Welding and/or soldering safety practices/precautions.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Ignite a torch, set one or more specified flame patterns, and accomplish proper torch shutdown. (Level 2)
- b. Solder a joint or connection. (Level 2)
- c. Using aircraft quality materials, weld or braze a joint. (Level 2)
- d. Determine the appropriate method/material(s) to use for a specific welding, soldering, or brazing task. (Level 2)
- e. Determine the appropriate data to use for a specific welding, soldering, or brazing task. (Level 1)

F. Area of Operation -- ASSEMBLY AND RIGGING

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:

- a. Control cable.
 - b. Control cable maintenance.
 - c. Cable connectors.
 - d. Cable guides.
 - e. Control Stops
 - f. Push pull tubes.
 - g. Torque tubes.
 - h. Bell cranks.
 - i. Flutter and flight control balance.
 - j. Rigging of airplane or rotorcraft flight controls.
 - k. Airplane or rotorcraft flight controls and/or stabilizer systems.
 - l. Types of rotorcraft rotor systems.
 - m. rotor vibrations
 - n. Rotor blade tracking.
 - o. Aircraft jacking procedures.
 - p. jacking safety practices/precautions
2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to check and/or set control surface cable tension. (Level 3)
3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Install a control surface. (Level 3)
- b. Check the static balance of a control surface. (Level 3)
- c. Locate the procedures for rigging a helicopter. (Level 1)
- d. Locate helicopter rotor blade tracking procedures. (Level 1)
- e. Identify fixed-wing aircraft rigging adjustment locations. (Level 2)
- f. Locate leveling methods and procedures for a specific aircraft. (Level 1)
- g. Inspect a flight control system for travel and security. (Level 3)
- h. Inspect a primary flight control cable. (Level 3)
- i. Install one or more swaged cable terminals and check with appropriate gage. (Level 3)
- j. Install one or more Nicopress sleeves and check with appropriate gage. (Level 3)
- k. Check and adjust as necessary a push-pull flight control system. (Level 3)
- l. Locate jacking points and leveling locations for a specific aircraft. (Level 2)
- m. Determine the jacking requirements for a particular aircraft. (Level 2)
- n. Jack an aircraft or portion thereof (e.g., as appropriate for tire/wheel change, or gear retraction). (Level 3)

G. Area of Operation --AIRFRAME INSPECTION

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:
 - a. One or more required inspections.
 - b. Maintenance requirements.
 - c. Inspection requirements.
 - d. Requirements for complying with airworthiness directives.
 - e. Compliance with service letters, instructions for continued airworthiness, and/or bulletins.
 - f. Maintenance record requirements.
 - g. Maintenance record requirements .

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to examine an aircraft maintenance record, and determine if inspection and/or maintenance is due. (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:
 - a. Accomplish a required inspection on an airframe portion or component thereof. (Level 3)
 - b. Inspect an aircraft or portion thereof after maintenance or preventive maintenance. (Level 3)
 - c. Determine placarding requirements for a specific aircraft and condition. (Level 2)
 - d. Determine if all required instruments and equipment for specific operating conditions are installed in a particular aircraft. (Level 2)
 - e. Accomplish a conformity inspection on an airframe portion or component thereof and record results. (Level 3)
 - f. Generate a checklist for conducting a 100-hour airframe inspection on a specific aircraft. (Level 2)

1.4 SECTION IV -- AIRFRAME SYSTEMS AND COMPONENTS

A. Area of Operation -- AIRCRAFT LANDING GEAR SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—
TASKS:
 - a. Landing gear strut servicing/lubrication.
 - b. Landing gear steering systems.
 - c. Landing gear retraction/extension systems.
 - d. Landing gear inspection.
 - e. Brake assembly inspection.
 - f. wheel and tire construction
 - g. Tire mounting.
 - h. Wheel and tire inspection.
 - i. Wheel bearing inspection.
 - j. Tire storage, care, and/or servicing.
 - k. Landing gear and/or tire and wheel safety practices/precautions.
2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to perform inspection of an installed brake for serviceability. (Level 3)
3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:
 - a. Determine the proper lubricant(s) for a landing gear. (Level 1)
 - b. Inspect a landing gear or landing gear component(s). (Level 3)
 - c. Service an oleo strut. (Level 3)
 - d. Install a brake lining or brake assembly. (Level 3)
 - e. Clean and inspect wheel bearings. (Level 3)
 - f. Disassemble, clean as necessary, and inspect a wheel. (Level 3)
 - g. Select lubricant, and lubricate wheel bearings. (Level 3)
 - h. Remove and replace/install a wheel and tire assembly on a landing gear. (Level 3)

- i. Inspect a wheel and tire assembly, check tire pressure, and service as necessary. (Level 3)
- j. Service a nose wheel shimmy damper. (Level 3)
- k. Accomplish a landing gear retraction/extension check. (Level 3)
- l. Replace a tire or tube valve core and check for leaks. (Level 3)

B. Area of Operation -- HYDRAULIC AND PNEUMATIC POWER SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Hydraulic and/or pneumatic system, and/or system component(s) function/operation.
 - b. Servicing, function, and/or operation of accumulators.
 - c. Types of hydraulic/pneumatic seals and/or fluid/seal compatibility.
 - d. Hydraulic/pneumatic seal maintenance procedures.
 - e. Types of hydraulic/pneumatic filters and/or filter operation.
 - f. Filter maintenance procedures.
 - g. Pressure regulators and valves.
 - h. Servicing hydraulic and/or pneumatic systems.
 - i. Types/identification and/or characteristics of various hydraulics fluids used in aircraft.
 - j. Hydraulic/pneumatic system safety practices/precautions.
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to select and install a hydraulic seal. (Level 3)**
 3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

 - a. Service a pneumatic or hydraulic system filter. (Level 3)
 - b. Inspect components or portions of a hydraulic or pneumatic system. (Level 3)

- c. Locate fluid servicing instructions and identify/select fluid for a particular aircraft. (Level 2)
- d. Service a hydraulic reservoir. (Level 3)
- e. Troubleshoot a hydraulic or pneumatic system. (Level 3)
- f. Repair a hydraulic or pneumatic system defect. (Level 3)
- g. Remove and install hydraulic or pneumatic system component(s) and check operation. (Level 3)
- h. Service a hydraulic system accumulator. (Level 3)

C. Area of Operation -- CABIN ATMOSPHERE CONTROL SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Exhaust heat exchanger and/or system component(s) function, operation, and/or inspection procedures.
 - b. Combustion heater and/or system component(s) function, operation, and/or inspection procedures.
 - c. Vapor-cycle system and/or system component(s) operation, servicing and/or inspection procedures.
 - d. Air-cycle system and/or system component(s) operation and/or inspection procedures.
 - e. Cabin pressurization and/or system component(s) operation and/or inspection procedures.
 - f. Types of oxygen systems and/or oxygen system component(s) operation.
 - g. Oxygen system maintenance procedures.
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following—
- TASKS:**

- a. Inspect and/or troubleshoot an exhaust heat exchanger cabin heat system or system component(s). (Level 3)
- b. Inspect and/or troubleshoot a combustion air heater system and/or system component(s). (Level 3)
- c. Select proper solution and leak test oxygen system component(s). (Level 3)
- d. Inspect and/or troubleshoot an oxygen system and/or system component(s). (Level 3)
- e. Check the operation of an oxygen system. (Level 3)
- f. Service an oxygen system. (Level 3)
- g. Purge an oxygen system. (Level 3)
- h. Inspect and/or troubleshoot a vapor cycle cooling system and/or system component(s). (Level 3)

- i. Inspect and/or troubleshoot a cabin pressurization system and/or system component(s). (Level 3)
- j. Inspect and/or troubleshoot an air cycle machine system and/or system component(s). (Level 3)
- k. Locate procedures for protecting a vapor-cycle system from contamination during component replacement. (Level 1)
- l. Locate procedures for servicing a vapor-cycle cooling system. (Level 1)
- m. Locate procedures for inspecting a cabin outflow valve. (Level 1)

D. Area of Operation -- AIRCRAFT INSTRUMENT SYSTEMS

Objective. To determine that the applicant:

- 1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:
 - a. Magnetic compass operation.

- b. Magnetic compass swinging procedures.
 - c. Gyroscopic instrument(s) purpose and operation.
 - d. Vacuum/pressure and/or electrically operated instrument system operation.
 - e. Vacuum/pressure and/or electricity operated instrument system maintenance procedures.
 - f. Pitot and/or static instruments purpose and operation.
 - g. Pitot and/or static system operation.
 - h. Requirements for static system checks.
 - i. Aircraft instrument range markings.
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install an aircraft instrument. (Level 3)
- b. Accomplish a magnetic compass swing. (Level 3)
- c. Determine range/limit markings for one or more instruments. (Level 2)
- d. Remove, inspect, and install one or more vacuum or pressure system filters. (Level 3)
- e. Determine the proper setting of a vacuum and/or pressure system for a particular aircraft. (Level 2)
- f. Inspect and/or troubleshoot portions of a vacuum and/or pressure and/or electrically operated instrument power system. (Level 3)
- g. Inspect portions of a pitot-static system. (Level 3)
- h. Find barometric pressure using an altimeter. (Level 2).

E. Area of Operation -- COMMUNICATION AND NAVIGATION SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Emergency locator transmitter (ELT) maintenance requirements.
 - b. ELT record keeping requirements.
 - c. Checking/inspecting coaxial cable.
 - d. Coaxial cable installation and/or routing requirements.
 - e. Communication and/or navigation systems commonly used.
 - f. Proper installation of a com/nav radio in an existing radio rack.
 - g. Means of identification of commonly used communication and/or navigation antennas.
 - h. Autopilot system basic components and/or sensing elements.
 - i. Static discharger function and operation.
 - j. Static discharger maintenance procedures.
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Identify and inspect com/nav cable and connectors. (Level 3)
- b. Inspect an ELT and/or ELT installation. (Level 3)
- c. Determine ELT battery serviceability/status. (Level 2)
- d. Inspect one or more antenna installations. (Level 3)
- e. Inspect a coaxial cable installation. (Level 3)
- f. Inspect a com/nav radio installation. (Level 3)
- g. Inspect a shock mount base. (Level 3)
- h. Locate and identify various antennas installed on a particular aircraft. (Level 2)
- i. Inspect one or more static dischargers for security, resistance. (Level 3)

F. Area of Operation -- AIRCRAFT FUEL SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—
TASKS:

- a. Fuel system strainer servicing.
 - b. Construction characteristics of one or more types of fuel tanks.
 - c. Fuel tank maintenance procedures.
 - d. Fuel line routing/installation requirements.
 - e. Hazards associated with fuel system maintenance.
 - f. Types, characteristics, and/or operation of fuel systems and/or components thereof.
 - g. Characteristics, and/or operation of fuel jettison systems and/or components thereof.
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to service a fuel system strainer. (Level 3)**
3. **ELEMENT: Demonstrates the ability to perform at least one of the following—**
TASKS:
- a. Install a fuel quantity transmitter and/or accomplish an operational check. (Level 3)
 - b. Install a fuel valve and/or accomplish an operational check. (Level 3)
 - c. Install a fuel pump and/or accomplish an operational check. (Level 3)
 - d. Troubleshoot a fuel system. (Level 3)
 - e. Determine the airworthiness of a specified size fuel system leak/seep. (Level 2)
 - f. Inspect a fuel system and/or fuel system component(s). (Level 3)
 - g. Check the operation of one or more fuel system components. (Level 3)
 - h. Inspect a metal fuel tank. (Level 3)
 - i. Inspect a bladder fuel tank. (Level 3)
 - j. Locate fuel system operating instructions. (Level 1)
 - k. Locate fuel system inspection procedures. (Level 1)

G. Area of Operation -- AIRCRAFT ELECTRICAL SYSTEMS

Objective. To determine that the applicant:

1. **ELEMENT: Exhibits knowledge of at least two of the following— TASKS:**

- a. Factors to consider when selecting wire size for an aircraft circuit.
 - b. Routing and/or installation of electric wire or wire bundles.
 - c. Wire splicing.
 - d. Use of derating factors in switch selection.
 - e. Requirements for circuit protection devices.
 - f. Voltage regulator—purpose and operating characteristics.
 - g. Lighting and/or lighting system components.
 - h. Electric motor operation and/or motor components.
 - i. Constant speed drive (CSD) and/or integrated drive generator (IDG) systems and/or system components.
 - j. Airframe electrical system components.
 - k. Wiring defects and/or inspection.
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to troubleshoot an electrical system or portion thereof, using appropriate tools and/or test equipment. (Level 3)**
3. **ELEMENT: Demonstrates the ability to perform at least one of the following—**
TASKS:
- a. Select a circuit switch or circuit protection device for a specific aircraft and application. (Level 2)
 - b. Install a circuit switch or circuit protection device. (Level 3)
 - c. Select materials and tools and accomplish a wire splice. (Level 3)
 - d. Adjust one or more voltage regulators. (Level 3)
 - e. Select and install one or more wires and pins and/or sockets in a connector. (Level 3)
 - f. Select materials and fabricate a bonding wire. (Level 3)
 - g. Install a bonding wire and accomplish a resistance check. (Level 3)
 - h. Check the operation of one or more airframe electrical system circuits and/or system components. (Level 3)
 - i. Inspect and check a landing light. (Level 3)
 - j. Inspect and check anti-collision and position lights. (Level 3)

- k. Inspect generator brushes and determine serviceability. (Level 3)

H. Area of Operation -- POSITION AND WARNING SYSTEM

Objective. To determine that the applicant:

- 1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Anti-skid system basic components.
- b. Anti-skid system operating characteristics.
- c. Takeoff warning system basic components.
- d. Takeoff warning system function and operation.
- e. Control-surface trim indicating system basic components and/or operating characteristics.
- f. Landing gear position indicators.
- g. Flap position indicators.
- h. Landing gear warning system basic components and/or operating characteristics.
- i. Checking and/or repairing a landing gear warning system.
- j. Types of stall warning/lift detector systems and/or operating characteristics.
- k. Common annunciator system indications.
- l. Mach warning system indicator(s) and/or operating characteristics.

- 2. N/A

- 3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Inspect and/or adjust a landing gear position switch. (Level 3)
- b. Accomplish an operational check of a landing gear position indicating and/or warning system. (Level 3)
- c. Inspect and/or adjust a flap position indicating system. (Level 3)
- d. Check the operation of a flap position indicating and/or warning system. (Level 3)

- e. Troubleshoot a landing gear warning system. (Level 3)
- f. Check the operation of an annunciator system. (Level 3)
- g. Check the operation of an anti-skid warning system. (Level 3)
- h. Identify landing gear position/warning system components. (Level 2)
- i. Locate troubleshooting procedures for an anti-skid system. (Level 1)
- j. Locate troubleshooting procedures for a landing gear warning system. (Level 1)

I. Area of Operation -- ICE AND RAIN CONTROL SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:

- a. Aircraft icing causes/effects.
- b. Ice detection systems.
- c. Anti-ice and/or deice areas.
- d. Anti-ice and/or deice methods commonly used.
- e. Checking and/or troubleshooting a pitot-static anti-ice system.
- f. Anti-icing and/or de-icing system components/operation.
- g. Anti-icing and/or de-icing system maintenance.
- h. Types of rain removal systems and/or operating characteristics.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Troubleshoot a pitot anti-ice system. (Level 3)
- b. Check the operation of a pitot-static anti-ice system. (Level 3)
- c. Inspect a deicer boot. (Level 3)
- d. Check deicer boot operation. (Level 3)
- e. Inspect windshield wiper blade(s) and check blade tension. (Level 3)

- f. Adjust a windshield wiper blade tension to specification. (Level 3)
- g. Inspect an electrically-heated windshield. (Level 3)
- h. Check an electrically-heated windshield operation. (Level 3)
- i. Troubleshoot a pneumatic deicer boot system. (Level 3)
- j. Service or repair on a pneumatic deicer boot. (Level 3)

J. Area of Operation -- FIRE PROTECTION SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—
TASKS:
 - a. Fire and/or smoke detection system(s) or system components.
 - b. Fire extinguishing system(s) and/or system components.
 - c. Fire and/or smoke detection system operating characteristics.
 - d. Fire extinguishing system operating characteristics.
 - e. Determining proper container pressure for an installed fire extinguisher system.
 - f. Maintenance procedures for fire detection and/or extinguishing system(s) and/or system component(s).
 - g. Inspecting and/or checking a fire detection/overheat system.
 - h. Inspecting and/or checking a smoke and/or toxic gas detection system.
 - i. Troubleshooting a fire detection and/or extinguishing system.
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Inspect a fire extinguisher container and determine if the pressure is within limits. (Level 3)
- b. Determine the hydrostatic test date of a fire extinguisher container. (Level 2)
- c. Troubleshoot a fire detection system. (Level 3)
- d. Install/replace one or more smoke and/or fire detection and/or extinguishing system components. (Level 3)
- e. Inspect a smoke and/or fire detection and/or extinguishing system, or system component(s). (Level 3)
- f. Locate inspection procedures for carbon monoxide detectors. (Level 1)
- g. Locate procedures for checking a smoke detection system. (Level 1)

1.5 SECTION V- ENGINE THEORY AND MAINTENANCE

A. Area of Operation – PISTON/RECIPROCATING ENGINES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Reciprocating engine theory of operation.
- b. Basic radial engine design, components, and/or operation.
- c. Firing order of a reciprocating engine.
- d. Probable cause and removal of a hydraulic lock.
- e. Valve adjustment on a radial engine.
- f. Purpose of master and/or articulating rods.
- g. Checks necessary to verify proper operation of a reciprocating engine.
- h. Induction system leak indications.
- i. Reciprocating engine maintenance procedures.

- j. Procedures for inspecting various engine components during an overhaul.
- k. Correct installation of piston rings and results of incorrectly installed or worn rings.
- l. Purpose/function/operation of various reciprocating engine components, including, but not limited to, any of the following: crankshaft dynamic dampers, multiple springs for valves, piston rings, and reduction gearing.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Measure the valve clearance on a reciprocating aircraft engine when the lifters are deflated. (Level 2)
- b. Accomplish a compression test, and note all findings. (Level 3)
- c. Inspect engine control cables and/ or push-pull tubes for proper rigging. (Level 3)
- d. Inspect ring gap, install piston rings on a piston, and install an aircraft engine cylinder. (Level 3)
- e. Dimensionally inspect an aircraft engine component. (Level 3)
- f. Replace/install one or more aircraft engine components. (Level 3)

B. Area of Operation -- TURBINE ENGINES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Turbine engine theory of operation.
- b. Checks necessary to verify proper operation.
- c. Turbine engine troubleshooting procedures.
- d. Procedures required after the installation of a turbine engine.
- e. Causes for turbine engine performance loss.
- f. Purpose/function/operation of various turbine engine components.

g. Turbine engine maintenance procedures.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following:

TASKS:

- a. Repair a turbine engine compressor blade by blending. (Level 3)
- b. Remove and/or install a turbine engine component. (Level 3)
- c. Determine cycle life remaining between overhaul of a turbine engine life limited component. (Level 2)
- d. Check rigging of a turbine engine inlet guide vane system. (Level 3)
- e. Measure compressor or turbine blade clearance. (Level 3)
- f. Troubleshoot a turbine engine. (Level 3)
- g. Locate and identify turbine engine components. (Level 2)
- h. Inspect turbine engine components. (Level 3)

NOTE: AUXILIARY POWER UNITS may be tested at the same time as AREA B. No further testing of auxiliary power units is required.

C. ENGINE INSPECTION

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. The use of a type certificate data sheet (TCDS) to identify engine accessories.
- b. Requirements for the installation or modification in accordance with a supplemental type certificate (STC).

- c. Procedures for accomplishing a 100-hour inspection in accordance with the manufacturer's instruction.
 - d. Compliance with airworthiness directives.
 - e. Changes to an inspection program due to a change or modification required by airworthiness directive or service bulletin.
 - f. Determination of life limited parts.
 - g. Inspection required after a potentially damaging event, including but not limited to any of the following: sudden stoppage, over speed, or over temperature.
2. **CORE COMPETENCY ELEMENT: Demonstrates the ability to perform inspection of a reciprocating and/or turbine engine installation in accordance with the manufacturer's instructions. (Level 3)**
3. **ELEMENT: Demonstrates the ability to perform at least one of the following—**
- a. **TASKS:**
 - a. Inspect a turbine engine using a bore scope. (Level 3)
 - b. Determine proper crankshaft flange run-out. (Level 3)
 - c. Inspect an engine in accordance with applicable airworthiness directive. (Level 2)
 - d. Inspect a turbine engine compressor section. (Level 3)
 - e. Inspect a crankcase for cracks. (Level 3)
 - f. Inspect a crankshaft oil seal for leaks. (Level 3)
 - g. Engine conformity inspection. (Level 3)
 - h. Engine airworthiness inspection. (Level 3)

1.6 SECTION VI—ENGINES SYSTEMS AND COMPONENTS

A. ENGINE INSTRUMENT SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- g. Troubleshoot a fuel flow and/or low fuel pressure indicating system.
- h. The operation of a fuel flow indicating system and where it is connected to the engine.
- i. The operation of a temperature indicating system.
- j. The operation of a pressure indicating system.
- k. The operation of an RPM indicating system.
- l. Required checks to verify proper operation of a temperature indicating system.
 - m. Required checks to verify proper operation of a pressure indicating system.
 - n. Required checks to verify proper operation of an RPM indicating system.
 - o. The operation of a manifold pressure gage and where it actually connects to an engine.

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to perform inspection of engine electrical and/or mechanical instrument systems to include at least one of the following (Level 3)—

TASKS:

- a. Temperature.
- b. Pressure.
- c. RPM.
- d. Rate of flow.

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Verify proper operation and marking of an indicating system. (Level 2)
- b. Replace a temperature sending unit. (Level 3)
- c. Remove, inspect, and install fuel flow transmitter. (Level 3)
- d. Troubleshoot an oil pressure indicating system. (Level 3)

- e. Locate and inspect fuel flow components on an engine. (Level 2)
- f. Replace an exhaust gas temperature (EGT) indication probe. (Level 3)
- g. Troubleshoot a manifold pressure gage that is slow to indicate the correct reading. (Level 2)

B. ENGINE FIRE PROTECTION SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Checks to verify proper operation of an engine fire detection and/or extinguishing system.
- b. Troubleshoots an engine fire detection and/or extinguishing system.
- c. Inspection requirements for an engine fire extinguisher squib and safety practices/precautions.
- d. Components and/or operation of an engine fire detection and/or extinguishing system.
- e. Engine fire detection and/or extinguishing system maintenance procedures.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following:

TASKS:

- a. Check an engine fire detection and/or extinguishing system for proper operation. (Level 2)
- b. Accomplish weight and pressure inspection of an engine fire bottle, and verify hydrostatic inspection date. (Level 2)
- c. Repair an engine fire detector heat sensing loop malfunction. (Level 3)
- d. Check operation of firewall shut-off valve after a fire handle is pulled. (Level 2)
- e. Troubleshoot an engine fire detection or extinguishing system. (Level 2)
- f. Inspect an engine fire detection or extinguishing system. (Level 2)

C. ENGINE ELECTRICAL SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Generator rating and performance data location.
- b. Operation of a turbine engine starter-generator.
- c. The procedure for locating the correct electrical cable/wire size needed to fabricate a replacement cable/wire.
- d. Installation practices for wires running close to exhaust stacks or heating ducts.
- e. Operation of engine electrical system components.
- f. Types of and/or components of D.C. motors.
- g. Inspection and/or replacement of starter-generator brushes.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:

- a. Flash a generator field. (Level 3)
- b. Install an engine driven generator or alternator. (Level 3)
- c. Use of an engine electrical wiring schematic. (Level 2)
- d. Accomplish the installation of a tach generator. (Level 3)
- e. Fabricate an electrical system cable. (Level 3)
- f. Repair a damaged engine electrical system wire. (Level 3)
- g. Replace and check a current limiter. (Level 3)
- h. Check/service/adjust one or more engine electrical system components. (Level 3)
- i. Troubleshoot an engine electrical system component. (Level 3)

D. LUBRICATION SYSTEMS

Objective. To determine that the applicant:

ELEMENT: Exhibits knowledge of at least two of the following— TASKS:

- a. Differences between straight mineral oil, ashless-dispersant oil, and synthetic oil.

- b. Types of oil used for different climates.
- c. Functions of an engine oil.
- d. Identification and selection of proper lubricants.
- e. Servicing of the lubrication system.
- f. The reasons for changing engine lubricating oil at specified intervals.
- g. The purpose and operation of an oil/air separator.
- h. Reasons for excessive oil consumption without evidence of oil leaks in a reciprocating and/or turbine aircraft engine.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Inspect an engine lubrication system to ensure continued operation. (Level 3)
- b. Inspect oil lines and filter/screen for leaks. (Level 3)
- c. Replace a defective oil cooler or oil cooler component. (Level 3)
- d. Replace a gasket or seal in the oil system, and accomplish a leak check. (Level 3)
 - e. adjust oil pressure. (Level 3)
- f. Change engine oil, inspect screen(s) and/or filter, and leak check the engine. (Level 3)
- g. Pre-oil an engine. (Level 2)

E. IGNITION AND STARTING SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Troubleshooting a reciprocating and/or turbine engine ignition system.
- b. Replacement of an exciter box and safety concerns if the box is damaged.
- c. Troubleshooting a starter system.
- d. Checking a starter system for proper operation.

- e. The operation of a pneumatic starting system.
- f. Reasons for the starter dropout function of a starter generator or pneumatic starter.
- g. The purpose of a shear section in a starter output shaft.
- h. Purpose of checking a p-lead for proper ground.
- i. Inspection and servicing of an igniter and/or spark plug.
- j. Magneto systems, components, and operation.
- k. Function/operation of a magneto switch and p-lead circuit.
- l. High and low tension ignition systems.

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to perform at least one of the following (Level 3)—

TASKS:

- a. check engine timing.
- b. check a magneto switch for proper operation.
- c. inspect a turbine engine ignition system for proper installation.
- d. inspect a starter/generator for proper installation.
- e. inspect magneto points.

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- B Install a magneto, and set timing on an aircraft engine. (Level 3)
- C Repair an engine ignition and/or starter system. (Level 3)
- D Remove, inspect, and install turbine engine igniter plugs, and perform a functional check of the igniter system. (Level 3)

- E Inspect generator or starter-generator brushes. (Level 3)
- F Install brushes in a starter or starter-generator. (Level 3)
- G Install breaker points in a magneto and internally time the magneto. (Level 3) H repair an engine direct drive electric starter. (Level 3)
- I Inspect and test an ignition harness with a high tension lead tester. (Level 3)
- J Inspect and/or service and install aircraft spark plugs. (Level 3)
- K Bench test an ignition system component. (Level 2)

F. FUEL METERING SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Troubleshooting an engine that indicates high exhaust gas temperature (EGT) for a particular engine pressure ratio (EPR).
- b. Purpose of an acceleration check after a trim check.
- c. Reasons an engine would require a trim check.
- d. Purpose of the part power stop on some engines when accomplishing engine trim procedure.
- e. Procedure required to adjust (trim) a fuel control unit (FCU).
- f. possible reasons for fuel running out of a carburetor throttle body;
- g. Indications that would result if the mixture is improperly adjusted.
- h. Procedure for checking idle mixture on a reciprocating engine.
- i. Possible causes for poor engine acceleration, engine backfiring or missing when the throttle is advanced.
- j. Types and operation of various fuel metering systems.
- k. Fuel metering system components.

2. N/A

3. ELEMENT; Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install the accelerating pump in a float-type carburetor. (Level 3)
- b. Check and adjust the float level of a float-type carburetor. (Level 3)
- c. Check the needle and seat in a float-type carburetor for proper operation. (Level 2)
- d. Check a fuel injection nozzle for proper spray pattern, and install a fuel injector nozzle. (Level 2)
- e. Check and adjust idle mixture. (Level 3)
- f. Install a turbine engine fuel nozzle. (Level 3)
- g. Locate and identify various fuel metering system components. (Level 2)
- h. Service a carburetor fuel screen. (Level 3)

G. ENGINE FUEL SYSTEMS

Objective. To determine that the applicant:

1. **ELEMENT:** Exhibits knowledge of at least two of the following—

TASK:

- a. Inspection requirements for an engine fuel system.
- b. Checks of fuel systems to verify proper operation.
- c. Troubleshooting an engine fuel system.
- d. Procedure for inspection of an engine driven fuel pump for leaks and security.
- e. Function and/or operation of one or more types of fuel pumps.
- f. Function and/or operation of one or more types of fuel valves.
- g. Function and/or operation of engine fuel filters.

2. **CORE COMPETENCY ELEMENT:** Demonstrates the ability to perform at least one of the following (Level 3)—

TASKS:

- a. Check a fuel selector valve for proper operation.

- b. Inspect an engine fuel filter assembly for leaks.
- c. Inspect a repair to an engine fuel system.

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Check a fuel boost pump for proper operation. (Level 3)
- b. Repair fuel selector valve. (Level 3)
- c. Inspect a main fuel filter assembly for leaks. (Level 3)
- d. Check the operation of a remotely located fuel valve. (Level 3)
- e. Locate and identify a turbine engine fuel heater. (Level 2)
- f. Service an engine fuel strainer. (Level 3)
- g. Inspect an engine driven fuel pump for leaks and security, and perform an engine fuel pressure check. (Level 3)
- h. Repair an engine fuel system or system component. (Level 3)
- i. Troubleshoot a fuel pressure system. (Level 3)

H. INDUCTION AND ENGINE AIRFLOW SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Inspection procedures for engine ice control systems and/or carburetor air intake and induction manifolds.
- b. Operation of an alternate air valve, both automatic and manual heat systems.
- c. Troubleshooting ice control systems.
- d. Explain how a carburetor heat system operates and the procedure to verify proper operation.
- e. Effect on an aircraft engine if the carburetor heat control is improperly adjusted.
- f. Causes and effects of induction system ice.
- g. Function and operation of one or more types of supercharging systems and components.

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to perform inspection of engine induction or airflow system to include at least one of the following (Level 3)—

TASKS:

- a. engine ice control system.
- b. induction manifolds.

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Repair a defective condition in a carburetor heat box. (Level 3)
- b. Check proper operation of an engine anti-ice system. (Level 3)
- c. Rig a carburetor heat box. (Level 3)
- d. Inspect an induction system. (Level 3)
- e. Replace an induction system manifold gasket and/or induction tube. (Level 3)
- f. Service an induction system air filter. (Level 3)
- g. Trouble shoot an engine malfunction resulting from a defective induction or supercharging system. (Level 3)

I. ENGINE COOLING SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Required inspection on an engine cooling system.
- b. Operation of cowl flaps, and how cooling is accomplished.
- c. How turbine engine cooling is accomplished.
- d. Cooling of engine bearings and other parts on turbine engines.
- e. The importance of proper engine baffle and seal installation.
- f. The operation of a heat exchanger.
- g. The function and operation of an augmentor cooling system.

h. Rotorcraft engine cooling systems.

2. N/A

3. ELEMENT: Demonstrate the ability to perform at least one of the following—

TASKS:

- a. Inspect an engine cooling system. (Level 3)
- b. Check cowl flap operation and inspect rigging. (Level 3)
- c. Repair one or more cylinder cooling fins. (Level 3)
- d. Repair an engine pressure baffle plate. (Level 3)
- e. Inspect a heat exchanger. (Level 3)
- f. Troubleshoot an engine cooling system. (Level 3)
- g. Locate and identify rotorcraft cooling system components. (Level 2)

J.ENGINE EXHAUST AND REVERSER SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Exhaust leak indications and/or methods of detection.
- b. Thrust reverser system operation and components.
- c. Differences between a cascade and a mechanical blockage door thrust reverser.
- d. Hazards of exhaust system failure.
- e. Effects of using improper materials to mark on exhaust system components.
- f. Function and operation of various exhaust system components.

2 CORE COMPETENCY ELEMENT: Demonstrates the ability to perform inspection of engine exhaust system and/or turbocharger system. (Level 3)

3 ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Determine if components of an exhaust system are serviceable. (Level 2)
- b. Show the procedures to accomplish a pressurization check of an exhaust system. (Level 2)
- c. Repair one or more exhaust system components. (Level 3)
- d. Check engine exhaust system for proper operation. (Level 3)
- e. Replace one or more exhaust gaskets. (Level 3)
- f. Install an engine exhaust system. (Level 3)
- g. Check a turbocharger and waste gate system for proper operation. (Level 3)
- h. Troubleshoot and/or repair a turbine engine thrust reverser system and/or system component(s). (Level 3)

K. PROPELLERS

Objective. To determine that the applicant:

1. **ELEMENT:** Exhibits knowledge of at least two of the following—

TASKS:

- a. Propeller theory of operation.
 - b. Checks necessary to verify proper operation of propeller systems.
 - c. Procedures for proper application of propeller lubricants.
 - d. Installation or removal of a propeller.
 - e. Measurement of blade angle with a propeller protractor.
 - f. Repairs classified as major repairs on an aluminum propeller.
 - g. Reference data for reducing the diameter of a type certificated propeller.
 - h. Operation of propeller system component(s).
 - i. Propeller governor components and operation.
 - j. Theory and operation of various types of constant speed propellers.
 - k. Function and operation of propeller synchronizing systems.
 - l. Function and operation of propeller ice control systems.
2. **CORE COMPETENCY ELEMENT:** Demonstrates the ability to perform both of the following—

TASKS:

- a. inspection of a propeller installation, and make a minor repair on an aluminum propeller. (Level 3)
- b. determine what minor propeller alterations are acceptable using the appropriate type certificate data sheet. (Level 2)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Service a constant speed propeller with lubricant. (Level 2)
- b. Use a propeller protractor to determine correct blade angle. (Level 3)
- c. Leak check a constant speed propeller installation. (Level 3)
- d. Install a fixed pitch propeller and check the tip tracking. (Level 3)
- e. Inspect a spinner/ bulkhead for defects and proper alignment and installation. (Level 3)
- f. Dye-penetrant inspection to determine the amount of propeller damage. (Level 2)
- g. Inspect and/or adjust a propeller governor. (Level 3)
- h. Inspect a wood propeller. (Level 3)
- i. Troubleshoot a propeller system. (Level 3)

L. TURBINE POWERED AUXILIARY POWER UNITS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following:

TASKS:

- a. Inspection to ensure proper operation of turbine driven auxiliary power unit.
- b. Replacement procedure for an igniter plug.
- c. Servicing an auxiliary power unit.
- d. Troubleshooting an auxiliary power unit.
- e. Function and operation of auxiliary power unit(s).

NOTE: Subject area T, AUXILIARY POWER UNITS, may be tested at the same time as AREA B, TURBINE ENGINES. No further testing of auxiliary power units is required.

1.7 SECTION VII— ELECTRICAL SYSTEMS AND EQUIPMENTS.

A. Area of Operation – AIRCRAFT BATTERIES

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Lead-acid battery
- b. Ni-Cad battery
- c. Methods of charging batteries in aircraft.
- d. Battery Capacity testing,
- e. Battery Storage
- f. Battery temperature sensors
- g. Battery ventilation.

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Battery replacement on the aircraft (Level 3)
- b. Battery voltage check in-situ (Level 3)
- c. Verify battery charging in an aircraft. (Level 2)
- d. Inspect the battery terminals. (Level 2)

B. Area of Operation – AIRCRAFT ELECTRICAL POWER GENERATION AND DISTRIBUTION

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Routing and/or installation of electric wire or wire bundles.
- b. Wire splicing.
- c. Voltage regulator—purpose and operating characteristics.
- d. Load sharing.
- e. Paralleling
- f. Constant and variable frequency.
- g. Constant speed drive units.
- h. Load shedding.
- i. Generator control unit
- j. Differential protection.
- k. Voltage, frequency and excitation control
- l. Requirements for circuit protection devices
- m. Wiring defects and/or inspection.

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to troubleshoot an electrical system or portion thereof, using appropriate tools and/or test equipment. (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Inspect the cooling systems of an IDG (Level 2)
- b. Install and remove GCU or TRU or AC Generator; (Level 3)
- c. Using a fault and test panel trouble shoot battery overheat warning. (Level 3)
- d. Determine the cause of generator not coming on line. (Level 2)

- e. Carry out the functional check of a static inverter (Level 3)
- f. Powering the right electrical bus from the left generator. (Level 2)
- g. Remove and install a CSD/IDG unit in a given aircraft (Level 3)
- h. Powering of an aircraft from a ground power unit ((Level 3)
- i. Powering of an aircraft from an auxiliary power unit ((Level 3)
- j. Inspect an installed electrical cable (Level 3)
- k. Install a bonding wire and accomplish a resistance check. (Level 3)
- l. Select materials and tools and accomplish a wire splice. (Level 3)
- m. Install a circuit switch or circuit protection device. (Level 2)

C. Area of Operation – AIRCRAFT LIGHTING SYSTEM.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:

- a. Landing lights system.
- b. Navigation lights system
- c. Emergency lighting system
- d. Cockpit lighting
- e. Cabin lighting
- f. Service lights

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Perform functional check of the external lighting system from the flight deck. (Level 2)
- b. Determine the serviceability of the floor proximity lighting system. (Level 2)
- c. Carry out the removal and installation of florescent tube in cabin overhead lighting (Level 2)
- d. Perform the functional check of the emergency power pack. (Level 2)
- e. Replacement of the top anti-collision beacon (large aircraft). (Level 3)
- f. Locate the strobe light flash unit in a large aircraft. (Level 2)

1.8 SECTION VIII— AIRCRAFT INSTRUMENTS.

A. Area of Operation – MEASURING INSTRUMENTS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. pressure measurement
- b. temperature measurement
- c. rotational speed measurement
- d. Position measurement
- e. Quantity measurement
- f. Flow measurement
- e. vibration measurement

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to remove and install at least two each ,of the following ;flow transmitter , engine thermocouple and tacho generator (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASK:

- a. removal and installation of pressure altimeter(Level 2)
- b. Carry out pitot/static leak check (Level 3) .
- c. Visually inspect the pitot heads and the static ports face. (Level 2)
- d. carry water drain in a pitot/static pipelines and flexible hoses (level 3)
- e. locate and identify a thermocouple junction box (Level 2)
- f. balancing of the fuel quantity in the tanks (Level 3)
- g. determine the fuel quantity using drip sticks (level 2)
- h. flap position indication and adjustment level (level 3)
- i. Cabin temperature sensing and indication (Level 2)
- k. locate and identify a vibration sensor. (Level 1)

B. Area of Operation – AIR DATA AND FLIGHT PATH COMPUTATION

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Air data computer sensors and inputs
- b. Signal processing (mechanical, electrical and electronics).
- c. Signal outputs and displays.
- d. Identification of pitot/static codes and inspection of the of pitot/static flexible hoses
- e. Standby air data instruments

- f. Altitude hold and alerts
- g. Radio inputs to the air data system.
- h. Reduced vertical separation minima.
- i. Control panels on air data and flight path computation.
- j. Interface systems of the air data and flight path systems
- k. Flight path modes

2. CORE COMPETENCY ELEMENT: Demonstrates the ability to remove and install air data computer on large aircraft or both pneumatic altimeter and airspeed indicator (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Functional check flight director heading mode (Level 2)
- b. Locate the data to be used for pneumatic altimeter accuracy check (level 1)
- c. Select the runway course for a given airport during takeoff mode (level 2)
- d. Carry out the visual inspection of a VOR antennae (level 1)
- e. Locate and identify all the components of vertical separation minima (level 2)
- f. Identify the components of standby air data instruments (level 2)
- g. Barometric setting for air data system (level 2)

C. Area of Operation – GYROSCOPES AND SERVOMECHANISMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Electrical gyroscopic instruments purpose and operation.
- b. Vacuum gyroscopic instruments purpose and operation
- c. Laser gyros purpose and operation
- d. Direction sensing
- e. Vertical sensing
- f. Rate sensing
- g. Accelerometers
- h. gimbal rings
- i. remote gyros

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to carry out the functional check of a directional gyro/vertical gyro (level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Determine the erection time of given gyro (level 2)
- b. Identify and locate the power source of the artificial horizon (level 2)
- c. Identify and show basic accelerometer outputs (level 2)
- d. Identify and locate the gyro that inputs to the turn and slip indicator (Level 2)
- e. Single source display on captains and first officers attitude indication (Level 2)
- f. Find barometric pressure using an altimeter. (Level 2)
- g. Determine range/limit markings for one or more instruments. (Level 2)

D. Area of Operation – FLIGHT DATA RECORDER AND COCKPIT VOICE RECORDER

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Requirements
- b. Sensors
- c. inputs
- d. Interface with aircraft systems
- e. Signal processing
- f. Entry panels
- g. Data recording methods
- h. Retrieval and verification
- i. Readout

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to remove and install FDR and/or CVR (Level 3)

4. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Flight data recorder functional checks (Level 2)
- b. Data retroviral of the QAR (Level 3)
- c. Operational check of the ULB (Level 2)
- d. Functional check the CVR (Level 2)
- e. Locate and identify the failure monitor of both the FDR and CVR (Level 3)

1.9 SECTION IX –AUTOMATIC PILOT AEROPLANES.

A. Area of Operation – THEORY OF FLIGHT

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Forces on the aircraft
 - b. Stability.
 - c. Primary and secondary control surfaces.
 - d. Forces during turns.
 - e. Functions of trim tabs,
 - f. High speed buffet and stall conditions
 - g. Co-ordinated turns, aileron/rudder cross feed
 - h. Versine generation and application
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to perform operational and functional checks of longitudinal and lateral axes (Level 3)**
 3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Functional check of aileron servo (level 2)
- b. Inspection of the safety mechanism of the horizontal stabilizer (level 2)
- c. Versine generation functional check.(Level 2)
- d. Simulation of stall on ground (Level 2)

B. Area of Operation – YAW DAMPER, PITCH TRIM SYSTEMS AND MACH TRIM.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Dutch Roll phenomenon
 - b. Yaw sensing
 - c. Yaw signal processing
 - d. Synchronization
 - e. Cockpit indication.
 - f. Aileron/rudder control interaction in turns
 - g. Interlocks with autopilot systems.
 - h. Longitudinal axis stability.
 - i. High speed tuck.
 - j. Mach trim actuators computation.
2. **CORE COMPETENCY ELEMENT: *Demonstrates the ability to locate and identify at least two autopilot interlocks (Level 3)**
 3. ELEMENT: Demonstrates the ability to perform at least one of the following— **TASKS:**

- a. Operational check of the yaw damper system (Level 3)
- b. Removal and installation of a Mach trim actuator (Level 3)
- c. Locate and identify yaw damper coupler.(Level 2)
- d. Trouble shoot a reported dutch roll effect in a given aircraft (Level 3)
- e. Inspect the a yaw damper PCU and its associated components (Level 3)
- f. Locate and identify Mach trim sensor inputs (level 2)
- g. Functional check of pitch trim system (Level 2)

C. Area of Operation –DIGITAL FLIGHT SYSTEM AND SIGNAL PROCESSING.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following— TASKS:
 - a. Flight management systems
 - b. Rate system – errors and control
 - c. Displacement system – errors and control.
 - d. Heading and course error inputs
 - e. Radio beam deviation inputs
 - f. Attitude inputs
 - g. CADC/autopilot interface – e.g. q or %adaptation
 - h. Sideslip sensors and monitors
 - i. Typical channel signal flow path
2. N/A
3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:
 - a. FMC Data loading (Level 3)
 - b. Input desired sector flight data (level 2)
 - c. Locate, identify and discuss autopilot mode selectors (Level 3)
 - d. Locate and identify the FMS interfacing subsystems and components (level 3)
 - e. Check and verify the validity of the FMS data (Level 3)
 - f. Locate and explain the source signals that control the flare manoeuvre during autoland (Level 3)

D. Area of Operation – COMMAND AND DEMAND SIGNALS.

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Power control units – line replaceable units
- b. Solenoid and transfer valves
- c. Position sensors
- d. Servomotors - construction, interconnection with control runs
- e. Clutches – torque settings
- f. Tachogenerators –feedback and damping
- g. Position feedback – indication
- h. Runway conditions – disconnection
- i. Pilot override – disconnection
- j. Torque limiting

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install an autopilot LRU (Level 3)
- b. Locate and identify the position sensors of the three primary flight control surfaces (Level 3)
- c. Determine the clutch torque setting of a given aircraft.(Level 2)
- d. Remove, inspect, and install one or more servo motor or tachogenerator (Level 3)
- e. the various autopilot override methods when engaged (Level 2)
- f. demonstrate all methods used to disengage and disconnect an autopilot.(Level 3)
- g. demonstrate the proper preflight and ground check of an autopilots system
- h. Inspect the control column force transducer.(Level 2)

10.0 SECTION X-AUTOMATIC PILOT ROTORCRAFT.

A. Area of Operation – THEORY OF FLIGHT.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Rotor disc: forces, lift, drag, centrifugal force, weight, phase lag
- b. Articulated/semi-rigid/rigid rotors, flapping/ dragging/feathering
- c. Vertical and translational flight

- d. Main and anti-torque rotors, control inputs, cyclic, collective, rudder pedals
- e. Directional control
- f. Autorotation
- g. Forward speed effects
- h. Trim Systems-Manual/Automatic
- i. Stability Augmentation Systems

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following-

TASKS:

- a. Remove and install an autopilot LRU (Level 2)
- b. Demonstrate how automatic path steering (CPL) is achieved (2)
- c. Auto trim
- d. Identify and locate the Go Around (GA) controls (2)
- e. Remove and install a flight control computer (2)
- f. Locate and identify all the controls rods (Level 3)
- g. Locate and identify the component used in a pitch and roll flight control axis (Level 2)
- h. Locate and identify autopilot switches on the cyclic and collective (Level 2)
- i. Locate and identify the position sensors of the three primary flight control surfaces (Level 3)
- j. demonstrate all methods used to disengage and disconnect an autopilot.(Level 3)
- k. demonstrate the proper preflight and ground check of an autopilots system (Level 2)
- l. Inspect a control motion transducer.(Level 2)

B. Area of Operation —SIGNAL PROCESSING.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Rate system – errors and control
- b. Displacement system – errors and control.
- c. Heading and course error inputs
- d. Radio beam deviation inputs
- e. Attitude inputs
- f. CADC/autopilot interface – e.g. q or % adaptation
- g. Sideslip sensors and monitors
- h. Typical channel signal flow path

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following— TASKS:

- a. FMC Data loading (Level 3)
- b. Input desired sector flight data (level 2)
- c. locate , identify and discuss autopilot mode selectors (Level 3)
- d. Locate and identify the FMS interfacing subsystems and components (level 3)
- e. Check and verify the validity of the FMS data (Level 3)
- f. Locate and explain the source signals that control the flare manoeuvre during auto land (Level 3)

C. Area of Operation — COMMAND AND DEMAND SIGNALS.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Power control units – line replaceable units
- b. Solenoid and transfer valves
- c. Position sensors
- d. Servomotors - construction, interconnection with control runs
- e. Clutches – torque settings
- f. Tach generators –feedback and damping
- g. Position feedback – indication
- h. Runway conditions – disconnection
- i. Pilot override – disconnection
- j. Torque limiting

2. N/A

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install an autopilot LRU (Level 3)
- b. Locate and identify the position sensors of the three primary flight control surfaces (Level 3)
- c. Determine the clutch torque setting of a given aircraft.(Level 2)
- d. Remove, inspect, and install one or more servo motor or tachogenerator (Level 3)
- e. the various autopilot override methods when engaged (Level 2)
- f. demonstrate all methods used to disengage and disconnect an autopilot.(Level 3)
- g. demonstrate the proper preflight and ground check of an autopilots system
- h. Inspect the control column force transducer.(Level 2)

11.0 SECTION XI — COMPASS COMPENSATION AND ADJUSTMENTS.

A. Area of Operation – BASE SURVEY AND COMPASS SWING.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Base survey techniques
- b. Compass swinging areas
- c. Aircraft magnetism
- d. Terrestrial magnetism – variation
- e. Methods and procedures for swinging compasses
- f. Flux valve operation
- g. Deviation: calculations and effects on a compass.
- h. Compensation and adjustment procedures
- i. Various compass types.

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to carry out a compass swing on a given aircraft. (Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install compass integral light. (level 3)
- b. Detailed inspection of a compass before installation. (Level 3)
- c. Damping test (level 2)
- d. Pivot test (level 2)
- e. Carry out a base survey (level 3)
- f. Remove and install flux valve
- g. Give a compass reading with a reference to a compass correction card (level 2)
- h. Locate and identify the different types of compasses in a given aircraft (level 2)
- i. Storage of master compass (level 2)
- j. Locate and identify the components of a remote compass(level 3)
- k. Locate and identify the point at which the index error is adjusted (level 2)

12.0 SECTION XII— RADIO

A. Area of Operation – COMMUNICATION SYSTEMS.

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Emergency locator transmitter (ELT) maintenance requirements.
- b. Checking/inspecting coaxial cable.
- c. Coaxial cable installation and/or routing requirements.
- d. Communication systems commonly used.
- e. Proper installation of a com radio in an existing radio rack.
- f. Identification of commonly used communication antennas and feeders.
- g. Static discharger function and operation.
- h. Static discharger maintenance procedures.
- i. Aircraft intercom system.
- j. Passenger address system
- k. Entertainment systems
- l. Cockpit voice recorder.

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to establish carry out a radio survey and complete the required documentation.(Level 3)

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Identify and inspect com cable and connectors. (Level 3)
- b. Inspect an ELT and/or ELT installation. (Level 3)
- c. function check a fixed ELT (Level 2)
- d. Inspect one or more communication antenna installations. (Level 3)
- e. Inspect a coaxial cable installation. (Level 2)
- f. Inspect a VHF/HF com radio installation. (Level 3)
- g. Inspect a radio comm rack shock mount base. (Level 3)
- h. Inspect one or more static dischargers for security, resistance. (Level 3)
- i. identify the different means of addressing passengers in a given aircraft.(Level 2)
- j. Function check a passenger address system (where applicable) (Level 3)
- k. Locate and identify various antennas installed on a particular aircraft. (Level 2)
- l. Functional check a CVR (Level 2)
- m. Function check one of the different intercom system in a given aircraft (Level 3)
- n. Function check a VHF/HF comm radio (level 3)

B. Area of Operation -- NAVIGATION SYSTEMS

Objective. To determine that the applicant:

1. ELEMENT: Exhibits knowledge of at least two of the following—

TASKS:

- a. Airborne installations
- b. Ground station signals.
- c. Control
- d. Monitors
- e. Indicators
- f. Loading
- g. AFCS and instrument interface
- h. Ground installations
- i. Receivers
- j. Loop and sense aerials and feeders.
- k. Bearing errors and correction devices
- l. Loop swings
- m. EADI; EHSI; symbol generators
- n. RNA interface with other systems

- o. Microwave Landing Systems (TRSB)
- p. EGPWS

2. **CORE COMPETENCY ELEMENT:** *Demonstrates the ability to use VOR airborne installation to establish a flight path using a given frequency. (Level 3)

3. **ELEMENT:** Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Function check a VOR system. (Level 3)
- b. Inspect a airborne NAV radio installation (level 3)
- c. Carry the necessary checks on an installed cable harness. (Level 3)
- d. Function check an ILS system. (Level 3)
- e. Locate and Identify the three marker beacon indicators. (level 2)
- f. Function check an ADF system. (Level 3)
- g. Locate and identify various antennas installed on a particular aircraft. (Level 2)
- h. Remove and install one or more NAV Receiver (level 2)
- i. Identify all the NAV indications on the EHSI
- j. Locate and identify systems interfaced to NAV equipments (level 3)
- k. Function check an EGPWS system and identify the different voice call outs. (Level 2)

C. Area of Operation – RADAR SYSTEMS.

Objective. To determine that the applicant:

1. **ELEMENT:** Exhibits knowledge of at least two of the following—

TASKS:

- a. Radar transmitter/receivers
- b. Pulse Modulation
- c. Peak/average power
- d. Pulse rise time and repetition frequency
- e. Noise
- f. Weather radar
- g. Displays
- h. Scanners and Waveguides
- i. Radio/Radar Altimeters

- j. Pulse and FM/CW systems
- k. DME
- l. ATC transponders
- m. TCAS

2. CORE COMPETENCY ELEMENT: *Demonstrates the ability to carry out functional check on a Weather Radar (Level 3).

3. ELEMENT: Demonstrates the ability to perform at least one of the following—

TASKS:

- a. Remove and install a weather radar transceiver (Level 2)
- b. Locate and identify a wave guide (Level 2)
- c. Remove and install a scanner (Level 3)
- d. Function check a Radio/Radar Altimeter (Level 3)
- e. Function check a DME receiver (Level 2)
- f. Locate and identify systems interfaced to DME system (level 3)
- g. Function check the ATC transponder system.(level 2)
- h. Locate and identify systems interfaced to ATC transponder system (level 3)
- i. Locate and identify various antennas of the secondary radar system (Level 2)
- j. Function check the TCAS system (level 2)
- k. Inspect the TCAS antennas (level 2)
- l. Locate and identify the TCAS symbols on the respective displays (level 2)
- m. Locate and identify systems interfaced to TCAS system (level 3)
- n. Interpretation of TCAS fault codes (level 3)