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Outline General Curriculum

Instructional Units, Segments and Estimated Instructional Time

Mathematics

(Meets the requirements of Part 147, Appendix B-H)

1. Extract Roots and Raise Number to a Given Power
Ref: 147-C-H24 - 3.0 hrs Level 3
 - A. Recognize and apply formulas involving the power of a number Level 3
2. Determine Areas and Volumes of various geometrical shapes Ref: 147-C-H25 – 6.0 hrs Level 3
 - A. Apply formulas to determine areas and volumes. Level 3
 - B. Compute wing area. Level 3
 - C. Calculate volume of baggage compartments and fuel tanks. Level 3
 - D. Compute piston displacement. Level 3
3. Solve ratio, proportion, and percentage problems
Ref: 147-C-H26 – 5.0 hrs Level 3
 - A. Convert fractions numbers to decimal equivalent Level 3
 - B. Determine ration and percentage of number Level 3
 - C. Compute compression ration Level 3
4. Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers
Ref: 147-C-H27 – 6.0 hrs Level 3
 - A. Add, subtract, multiply and divide positive and negative numbers. Level 3

Estimated Instructional Time: 20.0 hrs

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II-4	0	08/01/2016	08/01/2016

Aircraft Drawings

(Meets the requirements of Part 147, Appendix B-B)

5. Use aircraft drawings, symbols, and system schematics
Ref: 147-C-B7 - 14.0 hrs Level 2
 - A. Identify lines and symbols Level 2
 - B. Interpret dimensions Level 2
 - C. Interpret electrical system drawings Level 2
 - D. Use installation diagrams and schematics Level 2
6. Draw sketches of repairs and alterations
Ref: 147-C-B8 - 10.0 hrs Level 3
 - A. Make sketches Level 3
7. Use blueprint information
Ref: 147-C-B9 - 11.0 hrs Level 3
 - A. Read and interpret drawings Level 3
 - B. Interpret installation diagrams Level 3
8. Use graphs and charts
Ref: 147-C-B10 - 3.0 hrs Level 3
 - A. Use manufacturer's charts and graphs Level 3

Estimated Instructional Time: 38.0 hrs

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Basic Physics

(Meets the requirements of Part 147, Appendix B-J)

9. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight
Ref: 147-C-J - 8.0 hrs Level 2
- A. Relationship of temperature and heat Level 1
 - B. Relationship between pressure, temperature and volume of air mass Level 1
 - C. Factors effecting air pressure on an airfoil Level 1
 - D. Physical factors effecting engine output power Level 2
 - E. Relationship between pressure, area and force Level 1
 - F. The incline plane, the level and the pulley Level 1
 - G. Origin of sound Level 2
 - H. Centrifugal/centripetal forces Level 2

Estimated Instructional Time: 8.0 hrs

Basic Electricity

(Meets the requirements of Part 147, Appendix B-A)

10. Calculate and measure capacitance and inductance
Ref: 147-C-A1 - 4.0 hrs Level 2
- A. Capacitance, inductance and impedance Level 2
 - B. Measure capacitance in aircraft applications Level 2
11. Calculate and measure electrical power
Ref: 147-C-A2 - 8.0 hrs Level 2
- A. Determine aircraft electrical power requirements Level 2

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12. Measure voltage, current, resistance, and continuity
Ref: 147-C-A3 – 14.0 hrs Level 3
- A. Meaning of electrical quantity prefixes Level 2
 - B. Use DC electrical instruments Level 3
 - C. Connect voltmeters and ammeters Level 3
 - D. Use a volt ohmmeter Level 3
 - E. Detect electrical leakage Level 2
 - F. Measure AC voltage Level 3
13. Determine the relationship of voltage, current, and resistance in electrical circuits
Ref: 147-C-A4 – 26.5 hrs Level 3
- A. Calculate current Level 3
 - B. Calculate voltage drop Level 3
 - C. Determine current carrying capacity of wire Level 3
 - D. Calculate electrical power Level 3
 - E. Measure current flow in a parallel and serial electrical circuit Level 3
 - F. Demonstrate characteristics of magnetism Level 2
 - G. Electromagnetic inductions Level 2
14. Read and interpret aircraft electrical circuit diagrams, including solid-state devices and logic functions
Ref: 147-C-A5 - 16.0 hrs Level 3
- A. Identify commonly used aircraft electrical and electronic symbols Level 3
 - B. Trace circuits with aircraft wiring diagram Level 3
 - C. Electronic symbols and schematics in aircraft use Level 2
 - D. Identify electrical malfunctions by reference to circuit diagrams Level 3

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- E. Basic operating principles and internal circuits of aircraft DC generators and alternators Level 3
 - F. Characteristics and operation principles of aircraft electric motors Level 2
 - G. Basic principles of solid-state devices, logic functions and computers Level 2
15. Inspect and service batteries
Ref: 147-C-A6 - 10.0 hrs Level 3
- A. Principles of battery construction and operation Level 2
 - B. Characteristic of aircraft storage batteries Level 2
 - C. Inspect and recharge aircraft storage batteries Level 3
 - D. Perform removal, installation and compartment maintenance for aircraft batteries. Level 3

Estimated Instructional Time: 78.5 hrs

Fluid Lines and Fittings

(Meets the requirements of Part 147, Appendix B-D)

16. Fabricate and install rigid and flexible fluid lines and fittings
Ref: 147-C-D13 - 25.0 hrs Level 3
- A. Bend aluminum and stainless steel tubing Level 3
 - B. Perform beading of tubing Level 3
 - C. Fabricate flares on tubing Level 3
 - D. Fabricate and install flexible hoses Level 3
 - E. Recognize defects in metal tubing Level 3
 - F. Install a section of tubing Level 3

Estimated Instructional Time: 25.0 hrs

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Material and Processes

(Meets the requirements of Part 147, Appendix B-E)

17. Identify and select appropriate nondestructive testing methods
Ref: 147-C-E14 - 7.0 hrs Level 1
- A. Aircraft uses for non-destructive testing Level 1
18. Perform dye penetrant, eddy current, ultrasonic and magnetic particle inspections
Ref: 147-C-E15 - 12.5 hrs Level 2
- A. Perform dye penetrant inspection Level 2
- B. Perform magnetic particle inspection Level 2
- C. Perform inspections of welded assemblies Level 2
- D. Perform tests to distinguish between heat treatable and weldable aluminum alloys Level 2
19. Familiarize students with basic heat-treating processes
Ref: 147-C-E16 - 6.0 hrs Level 1
- A. Effects of heat treatment Level 1
- B. Identify aluminum alloy code designation of heat-treatability Level 1
20. Identify and select aircraft hardware, composites, and materials
Ref: 147-C-E17 - 38.0 hrs Level 3
- A. Identify and install aircraft bolts Level 3
- B. Identify aluminum alloys Level 3
- C. Identify steel alloys Level 3
- D. Recognition of economic and engineering criteria in selection of aircraft materials Level 1
- E. Identify rivets by physical characteristics Level 3
- F. Identify material used in aircraft firewalls and exhaust shrouds Level 2

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G. Determine suitability of materials for aircraft repairs	Level 2
H. Identify aircraft control cables	Level 3
21. Inspect and check welds Ref: 147-C-E18 - 5.0 hrs	Level 3
A. Inspect and evaluate welds	Level 3
22. Perform precision measurements Ref: 147-C-E19 - 12.0 hrs	Level 3
A. Inspect aircraft components for wear	Level 3
Estimated Instructional Time:	80.5 hrs

Cleaning and Corrosion

(Meets the requirements of Part 147, Appendix B-G)

23. Identify and select cleaning Materials and perform aircraft cleaning Ref: 147-C-G22 - 12.0 hrs	Level 3
A. Identify caustic cleaners	Level 3
B. Identify cleaning agents for aircraft engine parts	Level 3
C. Clean aircraft and aircraft components	Level 3
24. Inspect for aircraft corrosion plus identify, remove and treat aircraft corrosion Ref: 147-C-G23 - 26.0 hrs	Level 3
A. Clean exterior of aircraft	Level 3
B. Identify corrosion	Level 3
C. Remove corrosion	Level 3
D. Apply protective coatings	Level 3
E. Clean rubber products	Level 3
Estimated Instructional Time:	38.0 hrs

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Ground Operations and Servicing

(Meets the requirements of Part 147, Appendix B-F)

25. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards
Ref: 147-C-F20 - 22.0 hrs Level 2
- A. Use fueling equipment Level 2
 - B. Start and operate aircraft engines Level 2
 - C. React to fire in inductions system Level 2
 - D. Connect and operate an external hydraulic power source Level 2
 - E. Direct the movement of aircraft Level 2
 - F. Prepare and aircraft for outside storage Level 2
26. Identify and select fuels
Ref: 147-C-F21 - 4.0 hrs Level 2
- A. Identify aircraft fuels Level 2
- Estimated Instructional Time: 26.0 hrs

Maintenance Publications

(Meets the requirements of Part 147, Appendix B-K)

27. Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, ATA codes, air carrier background elements, minimum equipment lists, configuration deviation lists, data sheets, manuals, publications, and related Federal Aviation Regulations, AD, and advisory material
Ref: 147-C-FK31 - 13.0 hrs Level 3
- A. Locate reference data Level 3
 - B. Use information from the aircraft specifications Level 3
 - C. Use information from the manufacturer's manuals to verify control surface travel Level 3

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D. Identify and relate regulations governing airworthiness certificates	Level 3
E. Select and use technical standards orders	Level 3
F. Use manufacturer's manuals and other publications	Level 3
G. Select and use supplementary type certificates and airworthiness directives	Level 3
28. Read technical data Ref: 147-C-FK32 - 6.0 hrs	Level 3
A. Read, understand and relate technical information	Level 3
Estimated Instructional Time:	19.0 hrs

Mechanic Privileges and Limitations

(Meets the requirements of Part 147, Appendix B-L)

29. Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter Ref: 147-C-L33 - 5.0 hrs	Level 3
A. Interpret FAR 65	Level 3
B. Classify aircraft repairs	Level 3
C. Interpret regulations governing repairs and alterations	Level 3
D. Interpret repair station regulations	Level 3
E. Recognize legal and ethical responsibilities	Level 3
Estimated Instructional Time:	5.0 hrs

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Maintenance Forms and Records

(Meets the requirements of Part 147, Appendix B-I)

30. Write descriptions of work performed, including aircraft discrepancies and corrective actions, using typical aircraft maintenance records
Ref: 147-C-I28 - 5.0 hrs Level 3
- A. Inspect an aircraft and prepare a conditions report Level 3
 - B. Write a description of major/minor repairs and routine maintenance Level 3
31. Complete required maintenance forms, records, and inspection reports
Ref: 147-C-I29 - 8.0 hrs Level 3
- A. Make maintenance record entries Level 3
 - B. Use inspection guides Level 3
 - C. Evaluate aircraft records for compliance with Federal Air Regulations Level 3
- Estimated Instructional Time: 13.0 hrs

Weight and Balance

(Meets the requirements of Part 147, Appendix B-C)

32. Weigh aircraft
Ref: 147-C-C11 - 13.0 hrs Level 2
- A. Locate, interpret and apply weight and balance information Level 2
33. Perform complete weight-and-balance check and record data
Ref: 147-C-C12 - 23.0 hrs Level 3
- A. Solve weight and balance problems Level 3
 - B. Compute forward and aft loaded center of gravity Level 3

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C. Compute effect of equipment changes and loading schedules Level 3

D. Compute weight and balance on a helicopter Level 3

E. Examine weight and balance records Level 2

Estimated Instructional Time: 36.0 hrs

Human Factors/Maintenance Resource Management

(Meets the requirements of Part 147, Appendix B)

34. Conduct a short computer-assisted instruction course in basic MRM principles followed by integrated applications
Ref: 147-C-M35 - 8.0 hrs Level 1

A. Examine elements of human factors, the Pear model, and Human errors Level 1

Estimated Instructional Time: 8.0 hrs

Additional Practice and/or Examinations 5.0 hrs

Grand Total General Curriculum 400.0 hrs

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General Curriculum Detail

Mathematics

(Meets the requirements of Part 147, Appendix B-H)

1. Extract Roots and Raise Number to a Given Power
(EIT = 3 hrs, T = 3 hrs, L/S = 0 hrs) Level 3

- A. Recognize and apply formulas involving the power
of a number Level 3

Student Performance Goal

Given:

Ten mathematical formulas that involve numbers raised to powers
($AREA = \pi R^2$, etc.) and an appropriate mathematics text or
information sheet.

Performance:

The student will recognize formulas that contain exponents.
Using the reference information as a guide, he will solve five
problems requiring the application of the formulas.

Standard:

The student will apply the correct formula. Solution of problems
will demonstrate arithmetic accuracy to a two-place decimal.

2. Determine Areas and Volumes of various geometrical
shapes (EIT = 6 hrs, T = 4 hrs, L/S = 2 hrs) Level 3

- A. Apply formulas to determine areas and volumes. Level 3

Student Performance Goal

Given:

Formulas and information sheets containing dimensioned
drawings of rectangles, squares, triangles, trapezoids, circles,
cylinders, cones, cubes, etc.

Performance:

The student will apply the correct formula and determine the
area and/or volume of ten different geometrical shapes,

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Standard:

The formula selected will be the correct formula. The arithmetic solution of the problem will be accurate to a two-place decimal.

B. Compute wing area.

Level 3

Student Performance Goal

Given:

An information sheet illustrating the shapes and dimensions of two aircraft wings and the formulas for determining the area of various geometrical shapes.

Performance:

The student will apply the correct formula and compute the total wing area.

Standard:

The student will select and apply the correct formulas. Computation of total wing area will be accurate to the nearest square foot.

C. Calculate volume of baggage compartments and fuel tanks.

Level 3

Student Performance Goal

Given:

Formulas for determining the volume of various geometrical shapes and an information sheet containing dimensioned drawings for an aircraft baggage compartment and fuel tank.

Standard:

The student will select and apply the formulas without error. Computation of volumes will be accurate to the nearest cubic foot and/or U.S. gallon.

D. Compute piston displacement.

Level 3

Given:

The formula for computing the volume of cylinders and information specifying the bore, stroke and number of cylinders on a typical aircraft engine.

Performance:

The student will compute the piston displacement of the engine.

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Standard:

The computed displacement of the engine will be accurate to one cubic inch.

- 3. Solve ratio, proportion, and percentage problems (EIT = 5 hrs, T = 3 hrs, L/S = 2 hrs) Level 3
- A. Convert fractions numbers to decimal equivalent Level 3

Student Performance Goal

Given:

An information sheet, illustrating a scale of each 1/32 inch graduation, from 1/32 inch to one inch.

Performance:

The student will, without reference to charts or other aids, arithmetically convert 10 fraction scale graduations to a decimal equivalent.

Standard:

Each decimal equivalent will be accurate to three places (thousandths).

- B. Determine ration and percentage of number Level 3

Student Performance Goal

Given:

An information sheet displaying three dimensioned diagrams or drawings of wing aspect ratio, fineness ratio of streamlined shapes, major and minor axes of an ellipse, etc.

Performance:

The student will determine the ratio of one number or dimension to the other. When expressed as a ratio, he will determine the percentage that one number is of the other.

Standard:

The student will determine the ratios and percentages of the dimension for two of the illustrations on the information sheet. The determination of percentages will be accurate to a three-place decimal.

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C. Compute compression ration

Level 3

Student Performance Goal

Given:

A sketch or drawing of a cylinder and piston assembly with stated volumes of the cylinder when the piston is at bottom center and at top center.

Performance:

The student will determine the compression ratio of the cylinder.

Standard:

The compression ratio will be computed to an accuracy of one decimal place.

- 4. Perform algebraic operations involving addition, subtraction, multiplication, and division of positive and negative numbers
(EIT = 6 hrs, T = 3 hrs, L/S = 3 hrs)

Level 3

- A. Add, subtract, multiply and divide positive and negative numbers.

Level 3

Student Performance Goal

Given:

Information sheets containing dimensioned weight and balance diagrams, illustrating datum, main-wheel, nose/tail wheel, and center of gravity positions and moment arms.

Performance:

The student will algebraically label each of the dimensions with a plus or minus sign. He will solve twenty problems involving addition, subtraction, multiplication and division of these signed numbers.

Standard:

Labeling and computations will be without error.

Aircraft Drawings

(Meets the requirements of Part 147, Appendix B-B)

- 5. Use aircraft drawings, symbols, and system schematics
(EIT = 14 hrs, T = 7 hrs, L/S = 7 hrs)

Level 2

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II-18	0	08/01/2016	08/01/2016

A. Identify lines and symbols

Level 2

Student Performance Goal

Given:

Reference information that illustrates and describes outline, hidden, phantom, section, center and dimension lines and copies of typical aircraft detail and assembly drawings.

Performance:

The student will recognize and identify each kind of line as it appears in the drawings. He will interpret the meaning of the lines as they relate to surfaces and details of the part represented by the drawing.

Standard:

The student will point to one example of each type of line on the drawing and describe the detail of the part that is represented by that line. He will observe normal precautions and care for the drawings.

B. Interpret dimensions

Level 2

Student Performance Goal

Given:

Typical aircraft detail drawings, dimensioned in accordance with standard industry practice.

Performance:

The student will locate and interpret any dimension appearing on the drawing, including the application of any limits or tolerance to the dimension.

Standard:

Dimensions will be promptly located and interpreted without error.

C. Interpret electrical system drawings

Level 2

Student Performance Goal

Given:

A diagram or drawing of an electrical system that contains at least five individual circuits.

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Performance:

The student will locate, isolate and extract specific circuits from the diagram. He will trace specifically identified circuits.

Standard:

The student will correctly extract three individual circuits from the system diagram.

D. Use installation diagrams and schematics

Level 2

Student Performance Goal

Given:

Installation drawings or schematic diagrams of three specific systems (fuel, oil, hydraulic, pressurization, etc.) and the maintenance manual for the airplane.

Performance:

The student will recognize the symbols and interpret information pertaining to identification and location of components within the system.

Standard:

The student will describe the location and name all of the components in two of the three system drawings.

6. Draw sketches of repairs and alterations
(EIT = 10 hrs, T = 4 hrs, L/S = 6 hrs)

Level 3

A. Make sketches

Level 3

Student Performance Goal

Given:

Appropriate drafting equipment and three written reports describing major repairs or alterations to the structure of the airplane.

Performance:

The student will make three sketches or drawings illustrating major repairs or alterations.

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Standard:

The sketches or drawings must conform to standard drafting procedures, including correct position of views, adequate dimensions and specification of materials. The sketches or drawings will be of such quality that they could be used as part of the maintenance records of an airplane.

7. Use blueprint information

(EIT = 11 hrs, T = 5 hrs, L/S = 6 hrs)

Level 3

A. Read and interpret drawings

Level 3

Student Performance Goal

Given:

Random copies of aircraft drawings that were drawn to various scales, incorporate different title blocks and changes from the original drawing.

Performance:

The student will read and interpret information.

Standard:

When provided with a list of ten questions pertaining to scale, title block information and changes incorporated on the drawings, the student will correctly answer seven of the questions.

B. Interpret installation diagrams

Level 3

Student Performance Goal

Given:

Installation diagrams or drawings of the type usually associated with Service Bulletins, modifications or Airworthiness Directives,

Performance:

The student will interpret the information necessary to comply with the modification and will describe the procedure required to comply with the publication.

Standard:

The student will use correct nomenclature when describing procedure and will interpret all drawings relating to location of equipment, etc., without error.

8. Use graphs and charts

(EIT = 11 hrs, T = 5 hrs, L/S = 6 hrs)

Level 3

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A. Use manufacturer's charts and graphs

Level 3

Student Performance Goal

Given:

Charts and graphs of the type that appear in manufacture's service and operating manuals.

Performance:

The student will read, interpret, and apply data obtained from an engine power or performance chart.

Standard:

Plotting of information contained in the chart will be accurate within a 10 percent tolerance.

Basic Physics

(Meets the requirements of Part 147, Appendix B-J)

9. Use and understand the principles of simple machines; sound, fluid, and heat dynamics; basic aerodynamics; aircraft structures; and theory of flight
(EIT - 8 hrs, T = 6 hrs, L/S = 2 hrs)

Level 2

A. Relationship of temperature and heat

Level 1

Student Performance Goal

Given:

Written text material, line sketches illustrating three methods of heat transfer without title or labels, and descriptions of heat transfer applications in aircraft.

Performance:

The student will explain the relationship between temperature and heat. He will identify and label three methods of heat transfer and list two examples of where each is applied in an aircraft.

Standard:

All of the diagrams will be correctly labeled. Explanations will be in accordance with text provided. At least four examples of applications will be correctly listed.

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B. Relationship between pressure, temperature and volume of air mass

Level 1

Student Performance Goal

Given:

Appropriate written reference material and questions concerning the relationships between pressure, volume, and temperature of an air mass.

Performance:

The student will write answers to ten questions about relationships between pressure, volume and temperature of an air mass and some of the resultant effects in operation of aircraft.

Standard:

At least seven correct answers.

C. Factors effecting air pressure on an airfoil

Level 1

Student Performance Goal

Given:

Reference material including engine performance data and power curves, questions relating to work, force, and power and a problem in determination of engine power output.

Performance:

The student will answer ten questions dealing with work, force, time, distance and power as they relate to aircraft engine power output and solve a problem to determine the effect of air density on power output using a given power curve and specified temperature and humidity.

Standard:

Correct answers for at least seven questions and power output determination within ten percent.

D. Physical factors effecting engine output power

Level 2

Student Performance Goal

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Given:

Reference material including engine performance data and power curves, questions relating to work, force, and power and a problem in determination of engine power output.

Performance:

The student will answer ten questions dealing with work, force, time, distance and power as they relate to aircraft engine power output and solve a problem to determine the effect of air density on power output using a given power curve and specified temperature and humidity.

Standard:

Correct answers for at least seven questions and power output determination within ten percent.

E. Relationship between pressure, area and force Level 1

Student Performance Goal

Given:

Written reference information and two diagrams without labels or direction arrows.

Performance:

The student will indicate in a diagram the relationship between pressure, area, and force as applied to the transmission of power in a hydraulic system. He will explain by arrows and label a diagram which illustrates the relationship between pressure and the rate of flow of liquid through an orifice.

Standard:

Not more than one error in each diagram.

F. The incline plane, the level and the pulley Level 1

Student Performance Goal

Given:

Sketches without labels of simple machines, illustrating the inclined plane, the lever, and the pulley.

Performance:

The student will label the sketches. He will indicate the effect of resistance, friction, efficiency and mechanical advantage by arrows and descriptive notes.

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Standard:

Three of the four sketches will be labeled without error.

G. Origin of sound

Level 2

Student Performance Goal

Given:

Reference text material and sketches of origin, propagation and control of sound.

Performance:

The student with reference to the sketches, will write brief explanations of:

- a. Temperature effect on speed of sound.
- b. Origin of sound (vibration) and resonance ("beat").
- c. Sympathetic vibration and reflection of sound waves
- d. Methods of control and reduction of excessive sound
- e. Methods of protection, against excessive sounds.

Standard:

Of five explanations, four must be in accord with the given reference material.

H. Centrifugal/centripetal forces

Level 2

Student Performance Goal

Given:

Reference information and an unlabeled diagram.

Performance:

The student will illustrate the two forces acting on a body in circular motion. He will label the diagram and add arrows to show centrifugal and centripetal force, linear and angular velocity.

Standard:

Diagram to have at least four labels and four arrows correct.

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Basic Electricity

(Meets the requirements of Part 147, Appendix B-A)

10. Calculate and measure capacitance and inductance
(EIT = 4 hrs, T = 4 hrs, L/S = 0 hrs)

Level 2

A. Capacitance, inductance and impedance

Level 2

Student Performance Goal

Given:

Appropriate text material, and 14 questions with multiple choice answers covering capacitance, inductance and impedance.

Performance:

The student will select correct answers to questions concerning capacitance, and capacitive reactance, inductance and inductive reactance, and the combined effects of these two reactance in an AC circuit.

Standard:

Given 14 questions, select at least 10 correct answers.

B. Measure capacitance in aircraft applications

Level 2

Student Performance Goal

Given:

A schematic diagram of an aircraft capacitor fuel quantity system, a capacity tester, examples of capacitors used in aircraft, written information.

Performance:

The student will select correct multiple choice answers to questions concerning capacitance as used for aircraft fuel quantity measurement, the principle and use of a tester for measuring the fuel quantity capacitor units and cables. He will measure the capacity of capacitors selected from examples of aircraft capacitor applications.

Standard:

Select correct answers for at least 10 of 14 multiple choice questions and list correct value and unit of measurement for at least 4 of 6 capacitors selected.

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II-26	0	08/01/2016	08/01/2016

11. Calculate and measure electrical power
(EIT = 4 hrs, T = 4 hrs, L/S = 0 hrs) Level 2

A. Determine aircraft electrical power requirements Level 2

Student Performance Goal

Given:

Written information and charts specifying the efficiency of an aircraft electric motor and the load at which it is to operate, and listing the various electrical units of a selected aircraft electrical system with load ratings for each unit.

Performance:

The student will calculate the electrical power required to operate the electric motor and the total power which must be furnished by the generator of the selected aircraft to supply its electrical system.

Standard:

Calculate the power requirement of each within 70% of the specifications as set forth by the aircraft manufacturer.

12. Measure voltage, current, resistance, and continuity
(EIT = 14 hrs, T = 8 hrs, L/S = 6 hrs) Level 3

A. Meaning of electrical quantity prefixes Level 2

Student Performance Goal

Given:

A list of twelve electrical quantitative terms using the prefixes kilo, milli, micro, meg or mega.

Performance:

The student will write the meaning and numerical value for each of the following terms; kilovolt, kilowatt, kilohertz, milliamper, millivolt, microampere, microvolt, microfarad, megohm, megahertz, megawatt and kilovoltampere (KVA).

Standard:

Write correct meaning and numerical value for at least ten of the terms given.

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B. Use DC electrical instruments

Level 3

Student Performance Goal

Given:

Appropriate text material covering basic principles of a galvanometer and DC electrical instruments.

Performance:

The student will draw a diagram of a basic DC meter movement of the d'Arsonval type, labeling the magnet, springs, moving coil, pointer, and scale, and indicate polarity of the magnet. He will draw four simple circuits showing how a galvanometer indicates intensity and polarity of an electric current, how an ammeter is used to measure amount of current flow and how a voltmeter is used to measure voltage across a battery and across an electrical load.

Standard:

At least five items will be correctly labeled and three of the four circuits will be correctly drawn in accordance with the given text material.

C. Connect voltmeters and ammeters

Level 3

Student Performance Goal

Given:

A mock-up of a DC power source connected through appropriate switches to three aircraft electrical units, a voltmeter, an ammeter, an ammeter shunt, and test leads.

Performance:

The student will connect a voltmeter into the circuit of the mock-up to read the voltage at the source and at each unit. He will connect an ammeter into the circuit with a shunt to read the total current flow and the current flow through each separate unit.

Standard:

All connections correctly made and all readings without error within the accuracy of the instruments.

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D. Use a volt ohmmeter

Level 3

Student Performance Goal

Given:

A voltohmmeter (Simpson 260 or equivalent), various DC and voltage sources, a selection of typical aircraft electrical units.

Performance:

The student will perform 15 tests using a voltohmmeter. He will select suitable meter functions and ranges to measure five different DC or AC voltages, to test continuity and measure resistance of five aircraft electrical units and measure the current required to operate five DC aircraft units.

Standard:

Out of each group of five tests, the student will perform four without error.

E. Detect electrical leakage

Level 2

Student Performance Goal

Given:

Aircraft cable harness, electrical connectors, and terminal strips which include ten leakage faults due to poor insulation, corrosion or moisture permeation, and a voltohmmeter or electrical leakage tester.

Performance:

The student will perform tests to detect electrical leakage in typical aircraft electrical cable harness, connectors and terminal strips. He will use a volt- ohmmeter or leakage tester to identify the type of fault causing the leakage and to determine where it is located.

Standard:

Correctly locate and identify seven leakage faults,

F. Measure AC voltage

Level 3

Student Performance Goal

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Given:

A mock-up of an AC electrical circuit having a power supply of 115 volts AC, a transformer supplying a 12 volt light, four 28 volt lights connected in series to the 115 volt supply, and a voltohmmeter (Simpson 260 or equivalent).

Performance:

The student will measure AC voltage across the power source, the transformer secondary, and from one side of the line to each point between the sockets of the lights in series, having all lights lighted and then with one light removed.

Standard:

Record all voltages without error within the accuracy of the instrument.

13. Determine the relationship of voltage, current, and resistance in electrical circuits

(EIT = 26.5 hrs, T = 14 hrs, L/S = 12.5 hrs)

Level 3

A. Calculate current

Level 3

Student Performance Goal

Given:

An electrical series circuit having a lamp, a battery, rheostats and a voltohmmeter.

Performance:

The student will measure the resistance of the rheostat at a selected setting, voltages at the battery, the lamp, and the rheostat, and will calculate the current flow through the lamp.

Standard:

The student will calculate and measure without error within the accuracy of the meter used.

B. Calculate voltage drop

Level 3

Student Performance Goal

Given:

A battery, electrical wire, and five different color coded resistors of various tolerances.

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Performance:

The student will hook up and read the current flow through each resistor, calculate the voltage drop across each resistor and check his answers with a voltmeter.

Standard:

Calculate the voltage drop correctly for five resistors and read meters without error within the accuracy of the meters used.

- C. Determine current carrying capacity of wire Level 3

Student Performance Goal

Given:

Aircraft wire, a battery, adjustable resistor, electrical cable charts, electric test meters, wire size gauge, measuring tape, an oven, and electrical wire tables.

Performance:

The student will calculate, and confirm by measurement, the current carrying capacity of the wire in free air, for a one-volt drop. He will determine the resistance of the wire and the effect on resistance and voltage drop of an increase in wire temperature by heating in the oven.

Standard:

He will read meters without error and calculate current within 20% of meter readings.

- D. Calculate electrical power Level 3

Student Performance Goal

Given:

Ten problems concerning DC electrical power when voltage and current or resistance values are given.

Performance:

The student will calculate the power requirements of aircraft electrical components or devices when values of voltage and current or resistance are known. He will state correct units of measurement.

Standard:

Correctly answer at least seven problems.

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- E. Measure current flow in a parallel and serial electrical circuit Level 3

Student Performance Goal

Given:

A DC electrical mock-up with parallel circuits to an aircraft motor, three lamps in parallel, and a solenoid relay.

Performance:

The student will measure the current flow to each component in the mock-up and the total current flow with all components operating.

Standard:

All meter readings without error and total of all individual readings within 10 percent of total current reading.

- F. Demonstrate characteristics of magnetism Level 2

Student Performance Goal

Given:

Permanent magnets, iron rod, wire, iron filings, paper, battery, compass, galvanometer, fish scale and written information.

Performance:

The student will perform demonstrations showing line of force around permanent and electro-magnets, around wires with current flowing in them and around wires in which current is induced by electro-magnetic force of attraction, and induction of current as indicated by a galvanometer.

Standard:

The student will perform at least ten demonstrations assigned by the instructor without error.

- G. Electromagnetic inductions Level 2

Student Performance Goal

Given:

Twenty questions concerning electromagnetism.

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Performance:

The student will answer questions covering the principles of electromagnetic induction, generator action, transformer action, self-induction, inductance coils and magnetos.

Standard:

Correctly answer at least fourteen questions.

14. Read and interpret aircraft electrical circuit diagrams, including solid-state devices and logic functions (EIT = 16 hrs, T = 8 hrs, L/S = 8 hrs)

Level 3

A. Identify commonly used aircraft electrical and electronic symbols

Level 3

Student Performance Goal

Given:

Examples of aircraft wiring diagrams and schematics which include, without labels, all commonly used electrical electronic symbols presently used in aircraft electrical system diagrams.

Performance:

The student will locate and label the symbols for the following electrical units: batteries, generators, motors, fuses, circuit breakers, switches, solenoids, relays, pressure switches, capacitors, single-phase and three-phase transformers, single and bridge rectifiers, SCR's, solid state amplifiers and gates, lights, ammeters, voltmeters, resistors, rheostats, potentiometers, bells, horns, terminal strips, plugs and receptacles.

Standard:

Of twenty-eight different symbols, locate and label correctly at least twenty-two.

B. Trace circuits with aircraft wiring diagram

Level 3

Student Performance Goal

Given:

Aircraft electrical wiring diagrams for a variable brightness light, a relay controlled motor and an outside temperature sensor and indicator; mock-ups containing all units shown in the selected diagrams; wire, hardware, and power sources to properly connect each circuit shown.

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Performance:

The student will trace each circuit and connect the units as shown in each wiring diagram to provide the following operating systems: a variable brightness cockpit light, a remotely controlled electrical motor, and an aircraft outside temperature indicating system. He will attach labels to each wire to correspond with the numbers in the diagram.

Standard:

All wiring will correspond to the wiring diagrams so that each system will operate as designated and without electrical hazard.

C. Electronic symbols and schematics in aircraft use Level 2

Student Performance Goal

Given:

Aircraft electrical schematics which include unlabeled schematic symbols for electronic solid state switching and controlling

Performance:

The student will identify and label twenty schematic symbols for solid-state devices including: transistors, diodes, logic gates, amplifiers, and sensor or proximity switches.

Standard:

Correctly label at least fourteen symbols.

D. Identify electrical malfunctions by reference to circuit diagrams Level 3

Student Performance Goal

Given:

Five typical reports of malfunctions in aircraft electrical systems, and circuit diagrams of the systems Involved.

Performance:

The student will identify the failed components or circuit faults which could be the cause of each malfunction, by reference to the circuit diagrams for each of the systems involved.

Standard:

Identify correctly at least one component or circuit fault which could be the cause of each reported malfunction.

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- E. Basic operating principles and internal circuits of aircraft DC generators and alternators Level 3

Student Performance Goal

Given:

Written information, schematic diagrams, and questions with multiple choice answers.

Performance:

The student will select answers for 20 questions dealing with basic principles of operation and internal electrical circuits for series, shunt and compound wound aircraft DC generators.

Standard:

Select at least 14 correct answers.

- F. Characteristics and operation principles of aircraft electric motors Level 2

Student Performance Goal

Given:

Written information and multiple choice essay statements concerning characteristics and operating principles of aircraft electric motors.

Performance:

The student will complete essay statements, by filling in the blanks which deal with the speed and load characteristics of series, shunt, and compound wound electric motors, the function of a commutator and brushes in an electric motor, the operating principles of magnetic clutches and brakes in aircraft electric motors, and the data that is needed for determining a suitable replacement motor.

Standard:

Complete at least seven essay statements correctly.

- G. Basic principles of solid-state devices, logic functions and computers Level 2

Student Performance Goal

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II-35	0	08/01/2016	08/01/2016

Given:

Written information, schematic diagrams, and questions with multiple-choice answers.

Performance:

The student will select answers for 20 questions dealing with basic principles of operation and internal electrical circuits for solid-state devices, logic functions and computers.

Standard:

Select at least 14 correct answers.

15. Inspect and service batteries

EIT = 10 hrs, T = 5 1/2 hrs, L/S = 4 1/2 hrs)

Level 3

A. Principles of battery construction and operation

Level 2

Student Performance Goal

Given:

Written information, charts or diagrams and unlabeled cutaway drawings of lead-acid and nickel-cadmium aircraft storage batteries.

Performance:

Answer twenty questions concerning the principles of construction of lead-acid and nickel-cadmium batteries, the chemical actions that take place during charge and discharge, the factors that affect voltage, current and ampere-hour capacity, and label the components of each type of battery in cutaway drawings.

Standard:

Correctly answer at least 14 questions and properly label at least 6 components of a possible 9 in each of the two cutaway drawings.

B. Characteristic of aircraft storage batteries

Level 2

Student Performance Goal

Given:

Multiple choice questions concerning aircraft storage battery characteristics, and written text material.

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Performance:

The student will select correct answers for 20 questions concerning aircraft storage battery characteristics including effects of series and parallel connections of cells and batteries, cell internal resistance effects, charging rate effects, constant voltage and current charging methods, safety precautions in battery servicing, temperature effects, specific gravity of electrolyte, and comparative advantages of lead-acid and nickel-cadmium batteries.

Standard:

Select correct answers for at least 14 questions.

- C. Inspect and recharge aircraft storage batteries Level 3

Student Performance Goal

Given:

Aircraft storage batteries of lead-acid and nickel-cadmium type, appropriate battery charging equipment, hydrometer, high rate discharge tester, voltmeter and written information conforming to manufacturer's specifications.

Performance:

The student will perform the following battery service procedures for both lead-acid and nickel-cadmium batteries: case inspection, check state of charge, check electrolyte level and replenish to specified level, prepare and connect batteries for recharging. He will also perform a high rate discharge test for a lead-acid battery and describe how to prepare a dry-charged lead-acid battery for service.

Standard:

Perform all procedures without error in accordance with the written information provided.

- D. Perform removal, installation and compartment maintenance for aircraft batteries. Level 3

Student Performance Goal

Given:

A battery compartment of an aircraft or a mock-up of same, with an aircraft battery installed, and related written information and procedures.

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Performance:

The student will remove the aircraft battery and spilled electrolyte, treat adjacent areas, inspect and clean terminal connectors and reinstall the battery.

Standard:

All work will be accomplished in accordance with the written procedures and to return-to-flight standard.

Fluid Lines and Fittings

(Meets the requirements of Part 147, Appendix B-D)

- 16. Fabricate and install rigid and flexible fluid lines and fittings (EIT = 25 hrs, T = 8.5 hrs, L/S = 16.5 hrs) Level 3
- A. Bend aluminum and stainless steel tubing Level 3

Student Performance Goal

Given:

Written information, samples of aluminum and stainless steel tubing of various diameters, tube bending tools and equipment.

Performance:

The student will make three bends in soft aluminum tubing using hand-bending methods. He will make 3 bends each in aluminum alloy and stainless steel tubing using hand or production bending tools.

Standard:

All bends will meet return-to-service standards for circular shape and smooth appearance and will conform to minimum bend radii rules.

- B. Perform beading of tubing Level 3

Student Performance Goal

Given:

Aluminum tubing, beading tools and reference information pertaining to the beading of tubing.

Performance:

The student will form a bead at the tubing ends of two different diameters of aluminum, tubing.

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Standard:
The beads formed on the tubing will comply with MIL Specifications and comply with the dimensions and quality of workmanship established by these specifications.

C. Fabricate flares on tubing Level 3

Student Performance Goal

Given:

Aluminum tubing, flaring tools and reference Information pertaining to the flaring of tubing.

Performance:

The student will form a single flare at one end of the tubing and a double flare at the other end.

Standard:

The flares will meet MIL Specifications and be free of the defects identified in AC 43.13-1.

D. Fabricate and install flexible hoses Level 3

Student Performance Goal

Given:

Field replaceable fittings, flexible hose, installation tools and appropriate reference information.

Performance:

The student will identify and select the correct hose materials and fittings from stock, make-up and Install a flexible hose assembly in a fluid system.

Standard:

The hose assembly and installation will be of such quality that it will function without leakage under the operating pressures of the system.

E. Recognize defects in metal tubing Level 3

Student Performance Goal

Given:

Random samples of metal tubing that may display defects that would cause the tubing to be rejected.

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II-39	0	08/01/2016	08/01/2016

Performance:

The student will select one sample section of tubing that would be rejected due to each of the following defects:

- a. Deep scratches or dents.
- b. Flattened tube bends
- c. Defective flare

Standard:

The identification of samples containing defects will be without error.

F. Install a section of tubing

Level 3

Student Performance Goal

Given:

Sections of replacement tubing and various fluid carrying systems installed in an airplane or mock-up and an appropriate manual.

Performance:

The student will install a replacement section of tubing as a procedure to repair the fluid systems. He will determine the proper routing and support of the tubing section by reference to the manuals, install the replacement tubing with AN, MS and hose clamp type fittings and make an operational check of the systems.

Standard:

The installation will be of such quality that the system functions normally and there is no leak in the replacement section of the system.

Material and Processes

(Meets the requirements of Part 147, Appendix B-E)

17. Identify and select appropriate nondestructive testing methods

(EIT = 7 hrs, T = 7 hrs, L/S = 0 hrs)

Level 1

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II-40	0	08/01/2016	08/01/2016

A. Aircraft uses for non-destructive testing

Level 1

Student Performance Goal

Given:

Written descriptions of six typical aircraft defects or flaws including engine crankshaft flaws, surface cracks in aluminum castings and forgings, cracks in materials where only one side of the material is accessible, component defects requiring radiography or X-ray inspection for proper detection, and written information concerning nondestructive testing.

Performance:

The student will select which method of testing is best suited for detection and evaluation of each described defect or flaw and briefly states how the inspection should be accomplished.

Standard:

Select proper method for at least four of the described defects or flaws and at least four statements of how inspection is to be alone to be in accordance with written information provided.

18. Perform dye penetrant, eddy current, ultrasonic and magnetic particle inspections
(EIT = 12.5 hrs, T = 4 hrs, L/S = 8.5 hrs)

Level 2

A. Perform dye penetrant inspection

Level 2

Student Performance Goal

Given:

A specimen aircraft part with known invisible surface cracks, a dye penetrant inspection kit with applicable operating instructions, and AC 43.13-1 or an equivalent publication.

Performance:

The student will prepare the specimen part for inspection, apply and remove the penetrant, apply develop, inspect for cracks of aluminum alloy.

Standard:

Correctly answer at least three questions in each of the three categories.

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B. Perform magnetic particle inspection

Level 2

Student Performance Goal

Given:

A steel aircraft part having a known sub-surface flaw or fracture, magnetic particle inspection equipment, applicable operating instructions, and AC 43.1-1 or an equivalent publication.

Performance:

The student will use the magnetic particle inspection method to locate and identify a sub-surface flaw or fracture and properly demagnetize the part after completing the inspection.

Standard:

Perform all steps in accordance with instructions provided, locate and identify at least one flaw or fracture.

C. Perform inspections of welded assemblies

Level 2

Student Performance Goal

Given:

Samples of aircraft welded assemblies which have known cracks and/ or blow-holes not easily visible to the unaided eye, magnifying glass (10 power or greater), dye penetrant or Zyglo test equipment, magnetic particle test equipment, AC 43.13-1 or equivalent publication and operating instructions for the test equipment.

Performance:

The student will locate cracks and/or blowholes in each of five welded assemblies using a magnifying glass, dye-penetrant, and magnetic particle tests as applicable for the kind of material being tested.

Standard:

Locate and identify flaws in at least three of the welded assemblies and perform inspection in accordance with instructions provided.

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- D. Perform tests to distinguish between heat treatable and weldable aluminum alloys Level 2

Student Performance Goal

Given:

Written information concerning aluminum alloy identification, samples of heat treatable and weldable aluminum alloys which lack legible code markings, and a kit of testing chemicals for aluminum alloy identification.

Performance:

The student will perform tests on six samples of aluminum alloy to determine and mark those which are heat treatable and those which are weldable.

Standard:

Correctly test and mark at least two samples of heat treatable and two samples of weldable aluminum alloy.

19. Familiarize students with basic heat-treating processes (EIT = 6 hrs, T = 5 hrs, L/S = 1 hr) Level 1

- A. Effects of heat treatment Level 1

Student Performance Goal

Given:

Written technical information and questions with multiple-choice answers concerning the effects of various forms of heat treatment on metal alloys.

Performance:

The student will select correct answers for ten questions concerning the relationship between tensile strength and metal hardness, how hardness and tensile strength are determined, the effects of heat treatment processes on aluminum alloys, and the results of incorrect heat treatment procedures.

Standard:

Select at least seven correct answers.

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B. Identify aluminum alloy code designation of heat-treatability

Level 1

Student Performance Goal

Given:

Samples of aluminum, alloy sheet and AC 43.13-1 or equivalent written data concerning identification of aluminum alloys.

Performance:

The student will identify samples of aluminum alloys, at least five of which are considered heat-treatable, five non-heat treatable, and three with trademarks indicating surface corrosion prevention treatment.

Standard:

Correctly identify at least two types of heat-treatable aluminum alloys, at least three types of non-treatable, and two types with surface corrosion prevention treatment.

20. Identify and select aircraft hardware, composites, and materials

(EIT = 38 hrs, T = 21 hrs, L/S = 17 hrs)

Level 3

A. Identify and install aircraft bolts

Level 3

Student Performance Goal

Given:

A random display of aircraft quality bolts, a bolted installation problem on an aircraft powerplant or mock-up and written information.

Performance:

On an aircraft, powerplant, or mock-up, the student will determine the correct length of bolts to install some bolts with castle nuts and some with self-locking nuts and torque to correct values.

Standard:

Correctly identify ten different bolts from AN markings and by measurement and install bolts and nuts in accordance with return- to-flight standards.

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B. Identify aluminum alloys

Level 3

Student Performance Goal

Given:

A random display of sheet aluminum samples including at least ten different alloy types and written aluminum alloy reference data.

Performance:

The student will identify ten samples of the various family groups of aluminum alloy by visual recognition of code designators and select appropriate alloys for ten specified aircraft applications.

Standard:

Correctly select at least eight aluminum family group samples and at least eight alloys for specified applications.

C. Identify steel alloys

Level 3

Student Performance Goal

Given:

Random selection of aircraft steel alloy tubing and sheet, and SAE or AISA code publications.

Performance:

The student will identify the SAE code markings and, referring to the SAE or AISA publications, interpret the coding for ten samples,

Standard:

Identification of material and interpretation of code will be without error.

D. Recognition of economic and engineering criteria in selection of aircraft materials

Level 1

Student Performance Goal

Given:

Written information and a series of questions, with multiple-choice answers, concerning the economic and engineering criteria involved in selection of materials for specific aircraft applications.

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Performance:

The student will select answers for thirty questions covering the economic and engineering criteria involved in selecting materials for specific aircraft applications. The questions will be concerned with shaping and forming of metals, joining of materials, composition of metal alloys, plastics, and rubber, and the determination of the mechanical properties of materials.

Standard:

Select correct answers for at least twenty-one questions.

E. Identify rivets by physical characteristics

Level 3

Student Performance Goal

Given:

A random unlabeled display consisting of 30 different types of AN, MS, NAS and trademark aircraft rivets and standard rivet publications.

Performance:

The student will identify each rivet by head shape, alloy, dimensions, and where applicable, type letter designating strength characteristics. He will answer ten questions concerning use limitations for certain types of rivets, chilling, "age hardening," and which types of rivets need, heat treatment.

Standard:

Correctly identify at least twenty-five types of rivets and correctly answer at least eight questions.

F. Identify material used in aircraft firewalls and exhaust shrouds

Student Performance Goal

Given:

Written technical information and samples of materials suitable for use in aircraft firewalls and exhaust shrouds.

Performance:

The student will identify six samples of materials suitable for use in aircraft firewalls and exhaust shrouds. He will use pertinent technical reference information or aircraft manuals to illustrate the suitability of the materials.

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Standard:

At least five materials will be correctly identified and at least five applications correctly listed.

G. Determine suitability of materials for aircraft repairs Level 2

Student Performance Goal

Given:

Written technical information and sample materials for structural aircraft repairs.

Performance:

The student will select suitable materials for use in aircraft structural repairs to pressurized sections of a fuselage, fuel cell areas, wing rib sections, flight control surfaces and honeycomb or laminated structures. He will use and interpret information pertaining to the specific types of repairs.

Standard:

Proper selection of material in conformance with technical information provided.

H. Identify aircraft control cables Level 3

Student Performance Goal

Given:

Written technical information and samples of aircraft control cables including non-flexible, flexible and extra-flexible types.

Performance:

The student will identify six different samples of aircraft control cable as to type of cable, number of strands, number of wires per strand, material, and whether preformed or non- preformed.

Standard:

Correctly identify at least five samples.

21. Inspect and check welds
(EIT = 5 hrs, T = 1 hrs, L/S = 4 hrs) Level 3

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II-47	0	08/01/2016	08/01/2016

A. Inspect and evaluate welds

Level 3

Student Performance Goal

Given:

Assorted aircraft welded assemblies of acceptable and unacceptable quality, written information concerning welding including AC 43.13-1 or equivalent publication.

Performance:

The student will inspect and evaluate the quality of the weld in each of ten welded aircraft assemblies. He will point out any faults or defects in each weld and decide whether it is acceptable or should be rejected.

Standard:

Decision of acceptance or rejection will be correct for at least 8 welded assemblies and at least 80 percent of the defects and flaws pointed out will be valid in accordance with written information provided.

22. Perform precision measurements

(EIT = 12 hrs, T = 2 hrs, L/S = 10 hrs)

Level 3

A. Inspect aircraft components for wear

Level 3

Student Performance Goal

Given:

Used and worn aircraft components including shafts, bearings, bearing journals, cylinders with associated pistons, connecting rods, crankshaft, sheet metal parts, and inspection tools, including micrometers, calipers, hole and snap gauges, dial indicators, "V" blocks, surface plates and written inspection data, blank report forms and status tags.

Performance:

The student will perform inspections using appropriate inspection tools to detect wear and/or deterioration in twenty used and worn aircraft components and complete typical report forms or status tags indicating acceptance or rejection of the Inspected components,

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Standard:

At least fifteen inspections and report forms will be completed in conformance with the written data provided.

Cleaning and Corrosion

(Meets the requirements of Part 147, Appendix B-G)

23. Identify and select cleaning Materials and perform aircraft cleaning

(EIT = 12 hrs, T = 4 hrs, L/S = 8 hrs)

Level 3

A. Identify caustic cleaners

Level 3

Student Performance Goal

Given:

Samples of caustic cleaners and aluminum alloys.

Performance:

The student will apply caustic cleaning materials to the aluminum alloy samples and observe the effects of varying soak times. He will recognize and point out damage due to excessive strengths and soak times should they appear in the samples being cleaned.

Standard:

From a display of aluminum alloy samples, the student will recognize those samples that have been damaged by excessive cleaning.

B. Identify cleaning agents for aircraft engine parts

Level 3

Student Performance Goal

Given:

Manufacturer's information sheets, manuals, product catalogues, and typical aircraft and engine parts.

Performance:

The student will use the reference information to guide his selection of the correct cleaning material for steel, aluminum, titanium, and magnesium parts. He will demonstrate his ability to identify and use approved cleaners and brighteners.

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Standard:

The student will interpret information from the reference manuals and catalogues without error. He will correctly identify packaged cleaning and brightening agents and follow printed instruction for use of such products.

- C. Clean aircraft and aircraft components Level 3

Student Performance Goal

Given:

Appropriate cleaners and equipment.

Performance:

The student will select and employ the correct materials and clean, the aircraft and aircraft components.

Standard:

The task will be accomplished without damage to the finish and components or systems of the airplane.

24. Inspect for aircraft corrosion plus identify, remove and treat aircraft corrosion

(EIT = 26 hrs, T = 8 hrs, L/S = 18 hrs) Level 3

- A. Clean exterior of aircraft Level 3

Student Performance Goal

Given:

Appropriate cleaners and equipment.

Performance:

The student will select and employ the correct materials and clean, the exterior surfaces of an airplane.

Standard:

The task will be accomplished without damage to the finish and components or systems of the airplane.

- B. Identify corrosion Level 3

Student Performance Goal

Given:

Sample corroded aluminum parts.

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Performance:

The student will select those parts which indicate inter-granular corrosion. He will describe two methods of preventing and/or* controlling this type of corrosion.

Standard:

The student will identify at least 80 percent of the samples showing corrosion.

C. Remove corrosion

Level 3

Student Performance Goal

Given:

Corroded aluminum parts, appropriate cleaning agents, equipment, and facilities. Reference information.

Performance:

The student will remove corrosion products, such as metal flakes, scale, powder and salt deposits from aluminum parts. He will describe how parts are protected from dissimilar metal corrosion.

Standard:

Removal of corrosion products shall not involve unnecessary removal of solid metal. Description of corrosion protection methods shall be in accordance with specific reference information.

D. Apply protective coatings

Level 3

Student Performance Goal

Given:

Typical aircraft component parts, protective paints, and organic coatings.

Performance:

The student will apply paints and/or similar organic coating to aircraft parts. He will clean and protect battery compartments and adjacent areas by neutralizing the acid, removing corrosion, and applying acid-proof paints. He will identify "fretting" corrosion.

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Standard:

Resultant finishes will be of return-to-service standard. When shown sample parts, the student will be able to distinguish between chemically induced and "fretting corrosion."

E. Clean rubber products

Level 3

Student Performance Goal

Given:

Sample aircraft rubber products (tires, tubes, boots, etc.).

Performance:

Prom sample rubber products that show the deteriorating effects of various cleaning materials, acids, caustics, hydrocarbons, sunlight, heat, etc. the student will describe the probable cause, He will demonstrate acceptable methods of removing oil, hydraulic fluid, battery acid, solvents and caustics from tires.

Standard:

Provided with ten samples displaying evidence of deterioration the student will identify the probable cause in 70% of the sample cases. Cleaning of tires will be accomplished without further damage to the tire.

Ground Operations and Servicing

(Meets the requirements of Part 147, Appendix B-F)

25. Start, ground operate, move, service, and secure aircraft and identify typical ground operation hazards (EIT = 22 hrs, T = 8 hrs, L/S = 14 hrs)

Level 2

A. Use fueling equipment

Level 2

Student Performance Goal

Given:

Fueling equipment, airplane fuel tanks nearly empty, a specified fuel load, and an airplane fueling procedures manual with fuel charts.

Performance:

The student will perform fueling of the airplane to bring the total fuel in the tanks up to the specified load, with distribution between tanks as specified in the fueling manual.

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Standard:

Total fuel load and amount in each tank will be within 10 percent of the amounts specified in the fuel charts and fueling will be accomplished in accordance with specified procedures without error.

B. Start and operate aircraft engines

Level 2

Student Performance Goal

Given:

Aircraft engines equipped with float type carburetors, pressure injection carburetors, and internal superchargers. Written engine operating procedures for each given type of engine, and auxiliary power requirements, and operating specifications.

Performance:

The student will perform two starts with each type of engine, operate each type through its normal operating range and perform complete shut down for each type. He will select, connect, and operate an adequate external auxiliary electrical power source.

Standard:

All starts, operation, and shutdowns will comply with given procedures without error and auxiliary power will be selected corrected and operated as specified.

C. React to fire in inductions system

Level 2

Student Performance Goal

Given:

CO2 fire extinguisher equipment and written Information on fire extinguishment.

Performance:

The student will operate a fire extinguisher to properly extinguish burning fuel in an open pit or container and take proper firefighting action for a simulated aircraft induction system fire.

Standard:

Handling and operation of fire extinguisher in accordance with procedures provided. CO2 will be properly directed into induction system from start at fireguard position within five seconds.

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- D. Connect and operate an external hydraulic power source Level 2

Student Performance Goal

Given:

An aircraft or hydraulic system mock-up with normal hydraulic operating pressure specified, an external hydraulic power source, and written operating instructions.

Performance:

The student will connect the external hydraulic power source to the aircraft or mock-up and operate the external source to obtain specified hydraulic pressure in the aircraft or mock-up hydraulic system.

Standard:

Connections and operation will conform to the written instructions and specified pressure will be maintained in the aircraft or mock-up during system operation from the external power source.

- E. Direct the movement of aircraft Level 2

Student Performance Goal

Given:

Hand signal charts or instructions, live or simulated aircraft movements.

Performance:

The student will use accepted hand signals in providing directions to the movement of aircraft during towing, taxiing, and parking.

Standard:

Signals must be sharp, clear and in conformance to instructions. Response to changing conditions must be instantaneous.

- F. Prepare and aircraft for outside storage Level 2

Student Performance Goal

Given:

Aircraft for outside storage, written storage procedures, and necessary securing equipment.

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Performance:

The student will prepare an aircraft for outside storage. He will analyze requirements and secure the aircraft for normal weather conditions at that location.

Standard:

Aircraft will be tied down and secured to prevent damage under normal weather conditions.

26. Identify and select fuels

(EIT = 4 hrs, T = 2.5 hrs, L/S = 1.5 hrs)

Level 2

A. Identify aircraft fuels

Level 2

Student Performance Goal

Given:

Aircraft operator's manual, a list of colors and octane rating ranges and a fuel system of an airplane.

Performance:

The student will obtain fuel samples from the fuel system of an airplane and verify that the fuel at least equals the minimum required octane rating. He will associate each color with the correct octane range, and describe how volatility is related to vapor lock, and will discuss the advantages and limitations of kerosene as a turbine fuel.

Standard:

Matching of color to octane rating will be 100 percent correct.

Maintenance Publications

(Meets the requirements of Part 147, Appendix B-K)

27. Demonstrate ability to read, comprehend, and apply information contained in FAA and manufacturers' aircraft maintenance specifications, ATA codes, air carrier background elements, minimum equipment lists, configuration deviation lists, data sheets, manuals, publications, and related Federal Aviation Regulations, AD, and advisory material

(EIT - 13 hrs, T = 6.5 hrs, L/S = 6.5 hrs)

Level 3

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A. Locate reference data

Level 3

Student Performance Goal

Given:

An index and sample random copies of the FAA Aircraft Specification Sheets and listing.

Performance:

When provided with the manufacturer's name, model and serial number, the student will locate the specification sheets for five airplanes.

Standard:

The student will locate the specification sheets, promptly and without error.

B. Use information from the aircraft specifications

Level 3

Student Performance Goal

Given:

An indexed sample file of Aircraft Specifications and associated manufacturer's service manuals.

Performance:

The student will locate and interpret information pertaining to weighing, useful load, center of gravity range, and approved items of equipment for two specifically identified makes and models of aircraft.

Standard:

The student will locate and interpret information without error.

C. Use information from the manufacturer's manuals to verify control surface travel

Level 3

Student Performance Goal

Given:

Any specified model of aircraft and the appropriate specification sheets and manufacturer's service manual.

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Performance:

The student will compare the control surface travel specified, in each publication. He will measure the travel of the controls on the airplane and determine whether the travel is acceptable.

Standard:

Interpretation of information will be without error. Measurement of travel will be within plus or minus one degree.

- D. Identify and relate regulations governing airworthiness certificates

Level 3

Student Performance Goal

Given:

Sample copy of an airworthiness certificate and applicable Federal Air Regulations.

Performance:

The student will explain the purpose of an airworthiness certificate, the duration and requirements for keeping the certificate in effect.

Standard:

The student will use the correct references and interpret the regulations without error.

- E. Select and use technical standards orders

Level 3

Student Performance Goal

Given:

A random file of technical standard orders (TSO), and five sample parts that were manufactured under a TSO.

Performance:

The student will select the applicable TSO and interpret the information to determine whether the sample components comply,

Standard:

The student will correctly interpret those provisions of the TSO pertaining to identification of components.

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- F. Use manufacturer's manuals and other publications Level 3

Student Performance Goal

Given:

A selection of manufacturers' maintenance/service/overhaul/operating publications, a display of instruments, and typical oversize and undersize airframe and powerplant components.

Performance:

The student will refer to the appropriate manual. He will interpret the information as a prelude to inspecting the range marking of instruments and identify the displayed oversize and undersize parts.

Standard:

The student will locate information in the reference publications without omission or error.

- G. Select and use supplementary type certificates and airworthiness directives Level 3

Student Performance Goal

Given:

A reference summary file of airworthiness directives and supplementary type certificate listing.

Performance:

The student will write a correct and complete list of all AD's applicable to a specified make and model aircraft.

Standard:

The listing will be without error.

28. Read technical data (EIT = 6 hrs, T = 3 hrs L/S = 3 hrs) Level 3

- A. Read, understand and relate technical information Level 3

Student Performance Goal

Given:

A file of technical reference information (manufacturer's reports, bulletins, service letters, inspection aids, etc.).

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Performance:

The student will interpret and apply this information as a method of solving two maintenance problems described by the instructor.

Standard:

The student will locate applicable technical data within reasonable time limits. Interpretation of information will be without error.

Mechanic Privileges and Limitations

(Meets the requirements of Part 147, Appendix B-L)

29. Exercise mechanic privileges within the limitations prescribed by Part 65 of this chapter (EIT = 5 hrs, T = 2 hrs, L/S = 3 hrs)

Level 3

A. Interpret FAR 65

Level 3

Student Performance Goal

Given:

FAR 65.

Performance:

The student will read and interpret the regulations governing issuance, duration, experience, and limitations of mechanic certificates and an inspection authorization. He will answer a ten question multiple choice examination based on FAR 65.

Standard:

The student will answer eight questions correctly.

B. Classify aircraft repairs

Level 3

Student Performance Goal

Given:

FAR Part 43 and the associated advisory circulars and maintenance forms.

Performance:

The student will apply and interpret Federal Air Regulations Part 43 as a means of classifying major repairs, minor repairs, major and minor alterations and routine (preventative) maintenance, and make simulated maintenance record entries.

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Standard:
Interpretation of Federal Air Regulations will be without error.
Simulated maintenance record entries shall comply with Federal Air Regulations.

- C. Interpret regulations governing repairs and alterations Level 3

Student Performance Goal

Given:
Reference file of Federal Air Regulations and advisory circulars and samples of aircraft maintenance records.

Performance:
The student will describe the procedure to be followed and then submit the necessary forms and substantiating data to permit approval of a major repair and a major alteration of an airplane or powerplant or propeller.

Standard:
The procedure described and the data submitted will be without error.

- D. Interpret repair station regulations Level 3

Student Performance Goal

Given:
PAR, part 145 and sample copies of repair orders, work/time sheets, inventory and parts control records, etc.

Performance:
The student will interpret the regulations pertaining to the economics, organization and management of an aircraft repair shop. He will answer a twenty question quiz based on typical shop management problems.

Standard:
The student will correctly answer 14 or the 20 questions.

- E. Recognize legal and ethical responsibilities Level 3

Student Performance Goal

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II-60	0	08/01/2016	08/01/2016

Given:

A description of ten circumstances or conditions relating to legal or ethical practices of the trade.

Performance:

The student will judge each circumstance and indicate his decision.

Standard:

In a multiple choice test, the student will judge ten hypothetical cases and react in a manner that is both legal and generally accepted as "standard practice" within the industry. He will correctly judge 7 of the ten cases.

Maintenance Forms and Records

(Meets the requirements of Part 147, Appendix B-I)

30. Write descriptions of work performed, including aircraft discrepancies and corrective actions, using typical aircraft maintenance records

(EIT = 5 hrs, T = 2 hrs, L/S = 3 hrs)

Level 3

A. Inspect an aircraft and prepare a conditions report

Level 3

Student Performance Goal

Given:

An airplane, the manufacturer's service manual or General Aviation Inspection Aids, and a typical aircraft condition report form.

Performance:

The student will conduct an inspection of the airplane that will reveal the status of that particular airplane with regard to a specific service problem. He will prepare the condition report to indicate the results of the inspection.

Standard:

The completed report will be clear, concise and sufficiently detailed so that it reflects the status and condition of the airplane at the time of the inspection.

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B. Write a description of major/minor repairs and routine maintenance

Level 3

Student Performance Goal

Given:

The manufacturer's service manual a copy of AC 43-13-1 and written descriptions of a major repair, a minor repair and a preventative maintenance task that had been performed on a specific airplane.

Performance:

The student will make entries in the aircraft maintenance records describing the work that has been accomplished.

Standard:

The written entries will be legible, concise, and use appropriate nomenclature and terminology. All entries will conform to the minimum requirements of the Federal Air Regulations,

31. Complete required maintenance forms, records, and inspection reports

(EIT = 8 hrs, T = 6.5 hrs, L/S = 1.5 hrs)

Level 3

A. Make maintenance record entries

Level 3

Student Performance Goal

Given:

FAR Parts 91 and 43, AC43.13-1 and a written description of five typical aircraft maintenance tasks.

Performance:

Using the appropriate references, the student will define "time in service" and explain the application of this term to entries in the maintenance records. From the written descriptions of maintenance tasks, the student will make three entries in the maintenance records.

Standard:

All three entries will comply with the requirements of FAR 43 and AC 43-9.

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B. Use inspection guides

Level 3

Student Performance Goal

Given:

Typical 100-hour (annual) inspection report forms or the manufacturer's recommended inspection guide form, the Summary of Airworthiness Directives and the service manual for a specific airplane.

Performance:

The student will make simulated entries on the form and appropriate entries in the aircraft records to describe the inspection and the compliance with Airworthiness Directives.

Standard:

Simulated entries will comply with the requirements of the Federal Air Regulations.

C. Evaluate aircraft records for compliance with Federal Air Regulations

Level 3

Student Performance Goal

Given:

A complete record file for an airplane, including Registration and Airworthiness Certificates, Operations Limitations Manual and/or placards, Radio Station License, Weight and Balance and Equipment Records, airframe and powerplant logbooks, prior Repair and Alteration records and the applicable parts of the Federal Air Regulations.

Performance:

The student will examine the file and judge whether it complies with the Federal Air Regulations.

Standard:

The student will correctly interpret and apply the regulations and judge the records without error or omission.

Weight and Balance

(Meets the requirements of Part 147, Appendix B-C)

32. Weigh aircraft

(EIT = 13 hrs, T = 4.5 hrs, L/S = 8.5 hrs)

Level 2

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II-63	0	08/01/2016	08/01/2016

A. Locate, interpret and apply weight and balance information

Level 2

Student Performance Goal

Given:

Manufacturer's publications, weight and balance records for a specific airplane and the necessary weighing equipment.

Performance:

The student will locate and interpret information necessary to the weighing of that airplane. He will describe the procedures and precautions to be observed in the weighing process, and will:

- a. Position jacks, scales and level the aircraft.
- b. Locate and identify all required items of equipment.
- c. Make the measurements necessary to determine arms.
- d. Read the scale weights and compute the empty center gravity.

Standard:

Interpretation of information, weighing of the aircraft and computation of the empty center of gravity within + .1" of empty center of gravity.

33. Perform complete weight-and-balance check and record data

(EIT = 27 hrs, T = 10 hrs, L/S = 13 hrs)

Level 3

A. Solve weight and balance problems

Level 3

Student Performance Goal

Given:

Manufacturer's aircraft specifications.

Performance:

Provided with the necessary weight and balance information, the student will solve five problems involving computation of the empty center of gravity of an airplane.

Standard:

Computation of empty center of gravity will be accurate to one-tenth inch.

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B. Compute forward and aft loaded center of gravity Level 3

Student Performance Goal

Given:

Necessary data to compute center of gravity loading on two different aircraft.

Performance:

The student will compute the forward and aft center of gravity condition on the specified aircraft. He will describe the hazards associated with exceeding the limits and will determine the necessary ballast, baggage reduction or loading schedule to preclude exceeding the approved limits.

Standard:

Problems will be solved to an accuracy of one-tenth inch.

C. Compute effect of equipment changes and loading schedules Level 3

Student Performance Goal

Given:

Sample loading schedules and equipment specifications for a specific model of airplane.

Performance:

The student will compute the effects of equipment changes on the empty center of gravity of the airplane. He will prepare a loading schedule after solving a problem involving maximum baggage, cargo load or maximum gross loaded center of gravity conditions,

Standard:

The computed center of gravity will be accurate to one-tenth inch. The loading schedule will meet FAA and/or manufacturer's requirements.

D. Compute weight and balance on a helicopter Level 3

Student Performance Goal

Given:

Weight, loads and balance information applicable to a helicopter.

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Performance:

The student will solve one problem requiring computation of center of gravity of a helicopter.

Standard:

The computed center of gravity will be accurate to one-tenth inch.

E. Examine weight and balance records

Level 2

Student Performance Goal

Given:

Samples files of weight and balance records for three different airplanes.

Performance:

The student will examine the records and judge which records are complete, accurate and current.

Standard:

The student will select the most complete, accurate and current record from the three sample files.

Human Factors/Maintenance Resource Management

(Meets the requirements of Part 147, Appendix B)

34. Conduct a short computer-assisted instruction course in basic MRM principles followed by integrated applications (EIT = 8 hrs, T = 8.0 hrs, L/S = 0.0 hrs)

Level 1

A. Examine elements of human factors, the Pear model, and Human errors

Level 1

Student Performance Goal

Given:

Written technical information and questions with multiple-choice answers concerning elements of human factors, the Pear model, and Human errors.

Performance:

The student will select correct answers for eight questions concerning elements of human factors, the Pear model, and Human errors.

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Standard:

Select at least six correct answers.

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