

### List of Effective Pages

Page No.	Revision No.	Revision Date	Page No.	Revision No.	Revision Date
VI-1	0	08/01/2016			
VI-2	0	08/01/2016			
VI-3	0	08/01/2016			
VI-4	0	08/01/2016			
VI-5	0	08/01/2016			
VI-6	0	08/01/2016			
VI-7	0	08/01/2016			
VI-8	0	08/01/2016			
VI-9	0	08/01/2016			
VI-10	0	08/01/2016			
VI-11	0	08/01/2016			
VI-12	0	08/01/2016			
VI-13	0	08/01/2016			
VI-14	0	08/01/2016			
VI-15	0	08/01/2016			
VI-16	0	08/01/2016			
VI-17	0	08/01/2016			
VI-18	0	08/01/2016			
VI-19	0	08/01/2016			
VI-20	0	08/01/2016			
VI-21	0	08/01/2016			
VI-22	0	08/01/2016			
VI-23	0	08/01/2016			
VI-24	0	08/01/2016			
VI-25	0	08/01/2016			
VI-26	0	08/01/2016			
VI-27	0	08/01/2016			

Page No.	Revision No.	Revision Date	Original Date
VI-1	0	08/01/2016	08/01/2016

## List of Effective Pages

Page No.	Revision No.	Revision Date	Page No.	Revision No.	Revision Date
VI-28	0	08/01/2016			
VI-29	0	08/01/2016			
VI-30	0	08/01/2016			
VI-31	0	08/01/2016			
VI-32	0	08/01/2016			
VI-33	0	08/01/2016			
VI-34	0	08/01/2016			
VI-35	0	08/01/2016			
VI-36	0	08/01/2016			
VI-37	0	08/01/2016			
VI-38	0	08/01/2016			
VI-39	0	08/01/2016			
VI-40	0	08/01/2016			
VI-41	0	08/01/2016			
VI-42	0	08/01/2016			
VI-43	0	08/01/2016			
VI-44	0	08/01/2016			
VI-45	0	08/01/2016			
VI-46	0	08/01/2016			
VI-47	0	08/01/2016			
VI-48	0	08/01/2016			
VI-49	0	08/01/2016			
VI-50	0	08/01/2016			
VI-51	0	08/01/2016			
VI-52	0	08/01/2016			
VI-53	0	08/01/2016			
VI-54	0	08/01/2016			

Page No.	Revision No.	Revision Date	Original Date
VI-2	0	08/01/2016	08/01/2016

## List of Effective Pages

Page No.	Revision No.	Revision Date	Page No.	Revision No.	Revision Date
VI-55	0	08/01/2016			
VI-56	0	08/01/2016			
VI-59	0	08/01/2016			
VI-60	0	08/01/2016			
VI-61	0	08/01/2016			
VI-62	0	08/01/2016			
VI-63	0	08/01/2016			
VI-64	0	08/01/2016			
VI-65	0	08/01/2016			
VI-66	0	08/01/2016			
VI-67	0	08/01/2016			
VI-68	0	08/01/2016			
VI-69	0	08/01/2016			
VI-70	0	08/01/2016			
VI-71	0	08/01/2016			
VI-72	0	08/01/2016			
VI-73	0	08/01/2016			
VI-74	0	08/01/2016			
VI-74	0	08/01/2016			
VI-75	0	08/01/2016			
VI-76	0	08/01/2016			
VI-77	0	08/01/2016			
VI-78	0	08/01/2016			
VI-79	0	08/01/2016			
VI-80	0	08/01/2016			
VI-81	0	08/01/2016			
VI-82	0	08/01/2016			

Page No.	Revision No.	Revision Date	Original Date
VI-3	0	08/01/2016	08/01/2016



# Outline Powerplant – Part 2, Powerplant Systems and Components, Curriculum

## Instructional Units, Segments and Estimated Instructional Time

### Engine Instrument Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-A)

- |  |          |
|--|----------|
| 9. Troubleshoot, service, and repair electrical and mechanical fluid rate-of-flow indicating systems<br>Ref: 147-C-A9 – 2.5 hrs  | Level 2  |
| A. Troubleshoot and service  | Level 2  |
| 10. Inspect, check, service, troubleshoot, and repair electrical and mechanical engine temperature, pressure, and r.p.m. indicating systems<br>Ref: 147-C-A10 – 19.5 hrs | Level 3  |
| A. Operating principles and installation practices of temperature indicating systems for aircraft engine instrumentations  | Level 1  |
| B. Check, troubleshoot and repair thermocouple and resistance/ratiometer temperature indicating systems  | Level 3  |
| C. Purpose, operating principles and troubleshooting of manifold pressure indication systems   | Level 1  |
| D. Inspect, check troubleshoot and repair engine tachometer systems  | Level 3  |
| E. Purpose, operating principles, requirements and application of engine inlet and outlet temperature indicating systems   | Level 1  |
| F. Purpose, operation principles and applications of pressure indicating and warning systems used with aircraft engines  | Level 1  |
| Estimated Instructional Time:  | 22.0 hrs |

Page No.	Revision No.	Revision Date	Original Date
VI-5	0	08/01/2016	08/01/2016

## Engine Fire Protection Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-B)

11. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems  
Ref: 147-C-B11 – 5.0 hrs Level 3
- A. Inspect, check, troubleshoot and repair engine fire detections systems Level 3
  - B. Inspect, check, service troubleshoot and repair engine fire extinguishing systems Level 3
- Estimated Instructional Time: 5.0 hrs

## Engine Electrical Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-C)

12. Repair engine electrical systems components  
Ref: 147-C-C12 – 19.5 hrs Level 2
- A. Use service manuals and parts catalogs to locate procedures for repair of replacement of engine electrical systems components and to obtain part numbers for replacement parts Level 2
  - B. Check, troubleshoot and repair an aircraft dual DC generator electrical system Level 2
  - C. Determination of approximate, actual, and permissible continuous load on an aircraft electrical generating system Level 2
  - D. Inspect, check and repair solenoid operated valves for engine pneumatic functions Level 2
13. Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices  
Ref: 147-C-C13 – 38.0 hrs Level 3
- A. Types, purposes, applicability and operation of electrical fuses, circuit breakers, and switches. Level 1

Page No.	Revision No.	Revision Date	Original Date
VI-6	0	08/01/2016	08/01/2016

- B. Select and install aircraft electrical switches and wiring to engine electrical components Level 3
- C. Installation requirements and characteristics for aircraft electrical wiring systems and junction boxes Level 1
- D. Install electrical terminals, splices and bonding jumpers, and identify aircraft electrical cables Level 3
- E. Use of quick-disconnect electrical connectors and characteristics of high and low tension electrical wire Level 1
- F. Install and wire solenoid operated switches, determine causes and effects of solenoid switch chatter Level 2

Estimated Instructional Time: 57.5 hrs

### Lubrication Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-D)

- 14. Identify and select lubricants  
Ref: 147-C-D14 – 10.5 hrs Level 2
  - A. Identify characteristics of lubricants Level 1
  - B. Identify the secondary functions of lubrication oils Level 2
  - C. Recognize and identify acceptable lubricants Level 2
- 15. Repair engine lubrication system components  
Ref: 147-C-D15 – 18.0 hrs Level 2
  - A. Inspect, remove, clean and reinstall oil lines Level 2
  - B. Identify and describe oil temperature regulations Level 2
  - C. Explain the procedure for cleaning and testing oil tanks Level 1
  - D. Disassemble and reassemble an engine oil pump Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-7	0	08/01/2016	08/01/2016

16. Inspect, check, service, troubleshoot, and repair engine lubrication systems  
 Ref: 147-C-D16 – 40.5 hrs Level 3
- A. Diagram and explain the operation of wet and dry sump lubrication systems Level 2
  - B. Change oil, check screens Level 3
  - C. Service an oil by-pass valve Level 3
  - D. Service disc-type oil filters Level 3
  - E. Describe purpose of oil pressure gauge line restrictors Level 2
  - F. Identify components of an oil scavenging system and describe operation of the system and troubleshoot Level 2
  - G. Interpret FAA regulations pertaining to oil supply tanks Level 2
  - H. Explain the purpose and describe the operation of an oil dilution system Level 2
  - I. Adjust oil pressure on an operable engine Level 2
  - J. Interpret instrument indications Level 2
  - K. Describe the lubrication of a valve mechanism Level 2
  - L. Install rings on a piston and describe the factors effecting oil consumption in a piston engine Level 3
- Estimated Instructional Time: 69.0 hrs

**Ignition and Starting Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-E)

17. Overhaul magneto and ignition harness  
 Ref: 147-C-E17 – 28.0 hrs Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-8	0	08/01/2016	08/01/2016



- A. Disassemble, identify components, and reassemble a magneto Level 2
  - B. Inspect and select serviceable magneto breaker assemblies Level 2
  - C. Internally time a magneto Level 2
  - D. Install high tension leads Level 2
  - E. Assemble, operate and disassemble an impulse coupling on a magnetos Level 2
18. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components  
Ref: 147-C-E18 – 28.0 hrs Level 2
- A. Operate and test a magneto on a test bench Level 2
  - B. Test and judge the serviceability of condensers Level 2
  - C. Use a coil tester to test ignition coils Level 2
  - D. Demonstrate the effect of faults in an ignition lead and correct the fault Level 2
  - E. Remove, inspect, recondition, test and reinstall spark plugs Level 3
  - F. Time magnetos to an engine Level 3
  - G. Compare and describe the differences between piston engine and turbine engine ignition systems Level 1
19. (a) Inspect, service, troubleshoot, and repair turbine engine electrical starting systems  
Ref: 147-C-E19(a) – 28.0 hrs Level 3
- (b) Inspect, service, and troubleshoot turbine engine pneumatic starting systems  
Ref: 147-C-E19(b) – 2.0 hrs Level 1
- A. Inspect, check, troubleshoot, remove and reinstall wiring to an ignition switch Level 3
  - B. Use an ignition harness tester to identify a shorted ignition lead on an engine Level 3

Page No.	Revision No.	Revision Date	Original Date
VI-9	0	08/01/2016	08/01/2016

- C. Install, inspect, operate, troubleshoot and repair an ignition booster system Level 3
- D. Identify, compare and interpret ignition analyzer patterns Level 2
- E. Inspect, service and troubleshoot, and repair turbine engine electrical starting systems Level 2
- F. Inspect, service, and troubleshoot turbine engine pneumatic starting systems Level 1

Estimated Instructional Time: 85.0 hrs

**Fuel Metering Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-F)

20. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls  
 Ref: 147-C-F20 – 2.0 hrs Level 1

- A. Locate information regarding the inspection, checking and servicing of turbine engine fuel metering systems and electronic engine fuel controls Level 1

21. Overhaul carburetor  
 Ref: 147-C-F21 – 18.0 hrs Level 2

- A. Identify venturi size and describe function Level 2
- B. Interpret and use charts or diagrams to explain fuel and airflow through float and pressure carburetors Level 2
- C. Remove, install and explain the principles of fuel metering through a jet Level 2
- D. Identify and describe the operation of an air bleed Level 2
- E. Locate and describe the operation of the main discharge nozzle in a pressure carburetor Level 2
- F. Identify acceleration systems in float and pressure carburetors and describe the operation of each system Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-10	0	08/01/2016	08/01/2016

- G. Identify economizer and power enrichment systems and describe the operation of the systems in float and pressure type carburetors Level 2
  - H. Identify mixture controls incorporated in float and pressure carburetors and describe the operation of the systems Level 2
22. Repair engine fuel metering system components  
Ref: 147-C-F22 – 6.0 hrs Level 2
- A. Locate, remove, clean and reinstall screens in fuel metering system components Level 2
  - B. Inspect and describe the repair of carburetor floats Level 2
  - C. Inspect float needle and seat, measure and adjust float level of a carburetor Level 2
  - D. Inspect a pressure type carburetor and describe the operation resulting from clogged impact tubes and ruptured diaphragms Level 2
23. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems  
Ref: 147-C-F23 – 26.0 hrs Level 3
- A. Explain temperature, pressure and humidity effects on operation of a carburetor Level 2
  - B. Describe the operation of a float carburetor Level 2
  - C. Identify a pressure type carburetor and direct fuel injection system and describe the operation of each system Level 2
  - D. Explain the function of vapor separators and vapor vents Level 2
  - E. Compare continuous flow fuel injection and direct cylinder injection systems Level 1
  - F. Inspect, remove and install a float type carburetor, operate the engine and adjust idle speed and idle mixture Level 3

Page No.	Revision No.	Revision Date	Original Date
VI-11	0	08/01/2016	08/01/2016

- G. Inspect, remove and install a pressure carburetor or fuel injection system, operate the engine and adjust idle speed and idle mixture Level 3
- H. Identify the dangers of excessively rich and excessively lean fuel air mixtures Level 2
- I. Rig the fuel control unit on a static turbojet engine and describe the trimming of the engine Level 2

Estimated Instructional Time: 52.0 hrs

### **Engine Fuel Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-G)

- 24. Repair engine fuel system components  
Ref: 147-C-G24 – 8.5 hrs Level 2
  - A. Describe the operation of fuel pumps and remove and install a pump on an engine Level 2
  - B. Describe the operation of auxiliary and boost pumps, remove and install an auxiliary or boost pump in a system Level 2

- 25. Inspect, check, service, troubleshoot, and repair engine fuel systems  
Ref: 147-C-G25 – 5.0 hrs Level 3
  - A. Interpret Federal Aviation Regulations governing fuel systems Level 2
  - B. Inspect, check service, troubleshoot and repair an engine fuel system Level 3

Estimated Instructional Time: 13.5 hrs

### **Induction and Engine Airflow Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-H)

Page No.	Revision No.	Revision Date	Original Date
VI-12	0	08/01/2016	08/01/2016

26. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems  
Ref: 147-C-H26 – 4.5 hrs Level 2
- A. Describe induction and icing and identify probable locations Level 2
  - B. Inspect, check, service and repair a carburetor pre-heat system or hot spot Level 2
  - C. Describe the operation of thermal anti-icing systems for turbine engine air intakes Level 2
27. Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems  
Ref: 147-C-H27 – 7.5 hrs Level 1
- A. Inspection and repair of superchargers Level 1
  - B. Inspect, service and check a supercharger systems Level 1
  - C. Inspect heat exchangers and describe methods of repair Level 1
28. Inspect, check, service, and repair carburetor air intake and induction manifolds  
Ref: 147-C-H28 – 6.5 hrs Level 3
- A. Inspect, check, service and repair an air intake duct for a carbureted engine Level 3
  - B. Inspect, check, service and repair a carburetor heater system Level 3
  - C. Inspect and service air screens or oil filters in the engine air intake Level 3
  - D. Inspect, check, service and repair an engine primer systems Level 3
- Estimated Instructional Time: 18.5 hrs

Page No.	Revision No.	Revision Date	Original Date
VI-13	0	08/01/2016	08/01/2016

## Engine Cooling Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-I)

29. Repair engine cooling system components  
Ref: 147-C-I29 – 3.0 hrs Level 2
- A. Repair baffles and re-profile cylinder fins Level 2
30. Inspect, check, troubleshoot, service, and repair engine cooling systems  
Ref: 147-C-I30 – 7.0 hrs Level 3
- A. Inspect, check and service engine cooling systems Level 3
- B. Troubleshoot, and repair engine cooling systems Level 2
- Estimated Instructional Time: 10.0 hrs

## Engine Exhaust and Reverser Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-J)

31. Repair engine exhaust system components  
Ref: 147-C-J31 – 4.0 hrs Level 2
- A. Recognize materials used in exhaust system components and describe repair procedure Level 2
32. Inspect, check, troubleshoot, service, and repair engine exhaust systems  
Ref: 147-C-J32(a) – 10.0 hrs Level 3  
Troubleshoot and repair engine thrust reverser systems and related components  
Ref: 147-C-J32(b) – 3.0 hrs Level 1
- A. Inspect, remove, replace, adjust and repair joints in the exhaust systems Level 3
- B. Inspect, remove and reinstall exhaust heaters Level 3
- C. Identify, inspect and describe the operation of turbo-superchargers and turbo-compound engines Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-14	0	08/01/2016	08/01/2016

D. Describe the operation and inspection of jet engine thrust reversers and noise suppressors Level 1

Estimated Instructional Time: 17.0 hrs

### Propellers

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-K)

33. Inspect, check, service, and repair propeller synchronizing and ice control systems  
Ref: 147-C-K33 – 8.0 hrs Level 1

A. Identify components and describe the operation of propeller anti-icing systems Level 1

B. Locate reference information and describe the operation of propeller synchronizing systems Level 1

34. Identify and select propeller lubricants  
Ref: 147-C-K34 – 2.0 hrs Level 2

A. Identify the lubricant to be used to service a specific propeller Level 2

35. Balance propellers  
Ref: 147-C-K35 – 6.5 hrs Level 1

A. Interpret information and describe the procedure for balancing fixed pitch and variable pitch propellers Level 1

36. Repair propeller control system components  
Ref: 147-C-K36 – 8.0 hrs Level 2

A. Describe the action of a propeller governor and the forces which control propeller pitch Level 2

B. Perform the operation necessary to match direction of governor rotation to the rotation of the engine drive Level 2

37. Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems  
Ref: 147-C-K37 – 27.0 hrs Level 3

Page No.	Revision No.	Revision Date	Original Date
VI-15	0	08/01/2016	08/01/2016

- A. Identify and describe the forces acting on a propeller Level 3
  - B. Measure propeller blade pitch angles Level 3
  - C. Locate and interpret engine-propeller “critical range” information Level 3
  - D. Locate and interpret “static Limit” information for fixed pitch propellers Level 2
  - E. Describe the operation and control counterweight propeller Level 2
  - F. Describe the operation and control of a hydromatic propeller Level 2
  - G. Describe the operation and control of non-counterweight variable pitch, feathering and reversing propellers Level 3
  - H. Describe the operation and control of a turbine engine propeller system Level 2
38. Install, troubleshoot, and remove propellers  
Ref: 147-C-K38 – 18.5 hrs Level 3
- A. Check operation of a full feathering and reversing propeller Level 3
  - B. Remove and install propeller on a tapered shaft Level 3
  - C. Remove and install a propeller on a splined shaft Level 3
  - D. Check track of a propeller Level 3
  - E. Eternally adjust and rig a propeller governor Level 3
  - F. Troubleshoot description of faults in a hydromatic propeller Level 3
39. Repair aluminum alloy propeller blades  
Ref: 147-C-K39 – 8.0 hrs Level 3
- A. Smooth nicks, cuts and scratches in the leading and trailing edges of metal propeller blades Level 3
- Estimated Instructional Time: 78.0 hrs

Page No.	Revision No.	Revision Date	Original Date
VI-16	0	08/01/2016	08/01/2016



**Unducted Fans**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-L)

40. Inspect and troubleshoot unducted fan systems and components

Ref: 147-C-K40 – 6.0 hrs

Level 1

A. Inspect and troubleshoot unducted fan systems and components

Level 1

Estimated Instructional Time:

6.0 hrs

**Auxiliary Power Units**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-M)

41. Inspect and troubleshoot unducted fan systems and components

Ref: 147-C-K41 – 6.0 hrs

Level 1

A. Inspect and troubleshoot Auxiliary Power Units systems and components

Level 1

Estimated Instructional Time:

6.0 hrs

Additional Practice and/or Examinations

5.0 hrs

Grand Total Powerplant – Part 2, Powerplant Systems and Components, Curriculum

444.5 hrs

Page No.	Revision No.	Revision Date	Original Date
VI-17	0	08/01/2016	08/01/2016

**Outline Powerplant – Part 2, Powerplant Systems and  
Components, Curriculum  
Detail  
Instructional Units, Segments and Estimated Instructional Time**

**Engine Instrument Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and  
Components-A)

9. Troubleshoot, service, and repair electrical and mechanical  
fluid rate-of-flow indicating systems  
(EIT = 2.5 hrs, T - 2.0 hrs, L/S = 0.5 hrs) Level 2
- A. Troubleshoot and service Level 2

Student Performance Goal

Given:

Written information, diagrams and charts and questions  
requiring essay type answers or mathematical computations.

Performance:

The student will draw a diagram of a mechanical fuel flow  
indication system for a reciprocating engine and of an electrical  
fuel flow indication system for a turbine engine and with  
reference to these diagrams, where applicable, he will write  
answers to 7 questions regarding the difference between fuel  
flow indicating systems, the purpose and operating principles of  
reciprocating and turbine fuel flow indication systems, and the  
direct relationship between fuel flow and engine power output.

Standard:

Two diagrams drawn, by the student will each show at least 75  
percent of the details shown in the diagrams provided and will  
agree in flow pattern and circuit information. At least 5 questions  
will be answered in accordance with the information provided.

10. Inspect, check, service, troubleshoot, and repair electrical  
and mechanical engine temperature, pressure, and  
r.p.m. indicating systems  
(EIT = 19.5 hrs, T = 12.5 hrs, L/S = 7 hrs) Level 3

Page No.	Revision No.	Revision Date	Original Date
VI-18	0	08/01/2016	08/01/2016

- A. Operating principles and installation practices of temperature indicating systems for aircraft engine instrumentations

Level 1

Student Performance Goal

Given:

Written information, samples of thermocouple, resistance/ratiometer, and vapor pressure types of temperature indicating systems, questions with multiple-choice answers.

Performance:

The student will select answers to 15 questions concerning the identification of each type of temperature indicating system, the operating principles of each type, applications for which each type is most suitable, and installation practices for each type.

Standard:

Select at least 11 correct answers.

- B. Check, troubleshoot and repair thermocouple and resistance/ratiometer temperature indicating systems

Level 3

Student Performance Goal

Given:

Manufacturer's troubleshooting manuals or equivalent written information, an operative engine or a mock-up having thermocouple and resistance/ratiometer types of temperature indicating systems installed and operative, Instrument test equipment and/or a volt- ohmmeter.

Performance:

The student will measure the resistance of the thermocouple, determine the causes of erratic indications and inverse reading in a thermocouple temperature indicating system and an off-scale reading in a ratiometer temperature indicator, and apply markings to the glass face of engine instruments to show operating limits.

Standard:

All work will be performed in accordance with the procedures provided. Malfunction causes will be in agreement with troubleshooting information provided.

Page No.	Revision No.	Revision Date	Original Date
VI-19	0	08/01/2016	08/01/2016

- C. Purpose, operating principles and troubleshooting of manifold pressure indication systems Level 1

Student Performance Goal

Given:

Written information, diagrams or cutaway drawings of a manifold pressure indicating system, and completion type essay statements.

Performance:

The student will complete 10 essay statements concerning the purpose and operating principles of manifold pressure indicating systems, the effects of leaking or broken pressure gauge lines and the effects of a plugged or iced-over static pick up source.

Standard:

Correctly complete at least 7 essay statements.

- D. Inspect, check troubleshoot and repair engine tachometer systems Level 3

Given:

Manufacturer's manual or equivalent written information, an engine or mock-up with provision for installation of a tachometer drive, a flexible shaft tachometer system, an electric tachometer system, and a voltohmmeter.

Performance:

The student will install and check operation of a flexible drive tachometer system, and an electric tachometer system. After a malfunction has been introduced by the instructor into the electrical tachometer system, resulting in failure of operation, he will determine the cause of the failure by inspection and use of a voltohmmeter and repair the system.

Standard:

Installation and operational checks will be performed in accordance with procedures provided. Determination of cause of failure will be correct and repair will be accomplished at return-to-service standards.

Page No.	Revision No.	Revision Date	Original Date
VI-20	0	08/01/2016	08/01/2016

E. Purpose, operating principles, requirements and application of engine inlet and outlet temperature indicating systems

Level 1

Student Performance Goal

Given:

Written information, questions with multiple choice answers concerning reciprocating and turbine engine temperature indication.

Performance:

The student will select answers for 10 questions dealing with the requirements for a carburetor air temperature indicating system, the types and applications of thermocouples used to indicate turbine engine temperatures, including how turbine inlet temperature (TIT) is obtained and used, and how discharge temperature is sensed.

Standard:

Select at least 7 correct answers.

F. Purpose, operation principles and applications of pressure indicating and warning systems used with aircraft engines

Level 1

Student Performance Goal

Given:

Manufacturer's manuals or equivalent written information, schematic diagrams, and questions with multiple-choice answers dealing with oil and fuel pressure indication and warning systems.

Performance:

The student will select answers to 12 multiple choice questions concerning types and operating principles of oil pressure indicating and warning systems, fuel pressure indicating and warning systems as used with reciprocating and turbine engines, and the sensing of turbine engine pressure ratio (EPR) indication.

Standard:

Select correct answers for at least 8 questions.

Page No.	Revision No.	Revision Date	Original Date
VI-21	0	08/01/2016	08/01/2016

## Engine Fire Protection Systems

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-B)

11. Inspect, check, service, troubleshoot, and repair engine fire detection and extinguishing systems  
(EIT = 5 hrs, T = 2.5 hrs, L/S = 2.5 hrs) Level 3

A. Inspect, check, troubleshoot and repair engine fire detections systems Level 3

### Student Performance Goal

#### Given:

Manufacturer's manuals or equivalent written information, an aircraft or mock-up with an engine fire detection system installed, test equipment, tools and parts suitable for checking and repairing the fire detection system.

#### Performance:

The student will test the operation of an engine fire detection system, check continuity of the circuit, check individual fire detectors, locate and correct a malfunction introduced by the instructor.

#### Standard:

Test of system, check of continuity and of individual detectors will be accomplished in accordance with procedures provided. Correction of malfunction will be accomplished to return-to-service standards.

B. Inspect, check, service troubleshoot and repair engine fire extinguishing systems Level 3

### Student Performance Goal

#### Given:

Manufacturer's manual or equivalent written information, an engine fire extinguishing system on an aircraft or mock-up, test equipment and tools suitable for checking and repairing the fire extinguishing: system.

Page No.	Revision No.	Revision Date	Original Date
VI-22	0	08/01/2016	08/01/2016

**Performance:**

The student will inspect all components of the fire extinguishing system, check for correct operation of the system with the container removed, check for proper arming and firewall shut-down, check pressure of the container, install a charged container and secure it in ready condition, inspect indicator discs for being properly seated<sup>5</sup> and list three possible causes for failure of an engine fire extinguishing system to operate.

**Standard:**

Inspection, checking and container installation will be accomplished in accordance with procedures provided. Three possible causes of system malfunction will be correctly listed.

**Engine Electrical Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-C)

**12. Repair engine electrical systems components**

(EIT = 19.5 hrs, T = 11.0 hrs, L/S = 8.5 hrs)

Level 2

- A. Use service manuals and parts catalogs to locate procedures for repair or replacement of engine electrical systems components and to obtain part numbers for replacement parts

Level 2

**Student Performance Goal**

**Given:**

A manufacturer's service manual and parts catalog for a specific aircraft and a list of two faults in engine electrical systems and three defective engine electrical components applicable to the specified aircraft.

**Performance:**

The student will use the service manual provided to locate procedures for repair of the faults listed and replacement of the defective parts, listing all reference pages. He will use the parts catalog provided to list the part number and nomenclature for parts needed for the engine electrical components to be replaced.

Page No.	Revision No.	Revision Date	Original Date
VI-23	0	08/01/2016	08/01/2016

Standard:

At least 80 percent of the reference pages will be correctly listed and 70 percent of the parts needed will be correctly listed as to part number and nomenclature.

- B. Check, troubleshoot and repair an aircraft dual DC generator electrical system Level 2

Student Performance Goal

Given:

Written information, manufacturer's instruction manual, an aircraft or mock-up with an operative DC dual generator system appropriate tools and test equipment.

Performance:

The student will read and record voltage and output current for

- C. Determination of approximate, actual, and permissible continuous load on an aircraft electrical generating system Level 2
  - D. Inspect, check and repair solenoid operated valves for engine pneumatic functions Level 2
13. Install, check, and service engine electrical wiring, controls, switches, indicators, and protective devices (EIT = 38 hrs, T = 18.5 hrs, L/S = 19.5 hrs) Level 3
- A. Types, purposes, applicability and operation of electrical fuses, circuit breakers, and switches. Level 1

Student Performance Goal

Given:

Written information dealing with types of switches and circuit protectors used in engine electrical circuits, AC 43.13-1 or equivalent publication, and questions concerning switches and circuit protection devices used with engine electrical components.

Page No.	Revision No.	Revision Date	Original Date
VI-24	0	08/01/2016	08/01/2016



Performance:

The student will write answers for 12 questions concerning purposes, applicability and operation of fuses, circuit breakers and switches used with aircraft engine electrical components. He will draw a wiring diagram showing the circuit for a reversible electric motor, such as is used to actuate cowl flaps or an oil cooler door, including type of switch used and how circuit breakers are used for the control circuit and the motor operation circuit.

Standard:

At least nine questions answered correctly in accordance with the Information provided. Circuit diagram correctly drawn to show switch control for both directions of motor operation and circuit breakers for the motor and the control circuits.

- B. Select and install aircraft electrical switches and wiring to engine electrical components Level 3

Student Performance Goal

Given:

Written information, AC 43.13-1 or equivalent publication, a mock-up with provisions for mounting components and switches, aircraft engine electrical components, assorted, aircraft electrical wire and switches, a DC power supply, an AWG wire gauge and suitable electrical tools.

Performance:

The student will determine the current required for an engine electrical starter, use an AWG chart to select wire of adequate size for 1 volt drop, and on the mock-up, connect the starter to a solenoid relay. He will install a suitable switch and connect it to energize the solenoid coil of the relay.

Standard:

Switch and wire selection and installation will comply with specifications provided. The starter and relay will be correctly connected and will operate properly.

- C. Installation requirements and characteristics for aircraft electrical wiring systems and junction boxes Level 1

Page No.	Revision No.	Revision Date	Original Date
VI-25	0	08/01/2016	08/01/2016

## Student Performance Goal

### Given:

Written information, AC 43.13-1 or equivalent publication, questions with multiple-choice answers.

### Performance:

The student will select answers to 14 questions pertaining to the characteristics of single-wire electrical systems, the strength requirements for electrical cable terminals, the purpose, applicability, and use of terminal strips, installation requirements for junction boxes in areas around engines or in nacelle areas for powerplant use, and the criteria for selecting aluminum or copper wire, especially for engine electrical components where current requirements are large.

### Standard:

Select correct answers for at least 10 questions.

- D. Install electrical terminals, splices and bonding jumpers, and identify aircraft electrical cables

Level 3

## Student Performance Goal

### Given:

AC 43-13-1 or equivalent publication, manufacturer's instructions dealing with electrical terminals, assorted samples of aircraft wire and cable, terminals, splices, sleeving, bonding, jumpers, a mock-up with aircraft engine electrical components requiring bonding, two junction boxes connected by a conduit, and appropriate tools and equipment for soldering, crimping and installing wiring.

### Performance:

The student will install five soldered and ten crimped terminal lugs on aircraft cable, including two on aluminum cable; splice cables with five crimped splices; select and install five bonding jumpers for aircraft engine electrical components which require bonding. He will list identifying data for ten different aircraft engine electrical cable samples and will install six electric wires in a conduit connecting two junction boxes on a mock-up.

Page No.	Revision No.	Revision Date	Original Date
VI-26	0	08/01/2016	08/01/2016

Standard:

At least 80 percent of the terminals, splices and bonds will meet specifications in AC 43.13-1 or manufacturer's instructions. At least seven cable samples will be correctly identified. Wiring installed through conduit will meet specifications provided.

- E. Use of quick-disconnect electrical connectors and characteristics of high and low tension electrical wire Level 1

Student Performance Goal

Given:

Written information, AC 43.13-1 or equivalent publication, questions with multiple choice answers concerning the use of quick-disconnect plugs and receptacles, samples of aircraft connector plugs and mating receptacles, samples of high-tension and low-tension wire for electrical wiring associated with aircraft engines.

Performance:

The student will select answers for 14 questions dealing with, the use of aircraft electrical quick-disconnect plugs and receptacles used in powerplant areas, methods of sealing against fluids and vapors, checking and care of pins and sockets, tightening and securing or safetying quick-disconnect connectors, and purposes of various types of inserts, seals, sleeves and grommets used in plugs and receptacles. He will write labels showing type and probable uses for 8 samples of high-and low-tension aircraft engine electric wiring cable including thermocouple wire.

Standard:

Select correct answers for ten questions. Write correct information labels for at least 3 samples each of high-and low-tension wire.

- F. Install and wire solenoid operated switches, determine causes and effects of solenoid switch chatter Level 2

Student Performance Goal

Page No.	Revision No.	Revision Date	Original Date
VI-27	0	08/01/2016	08/01/2016

**Given:**

Written information concerning aircraft solenoid switches, an aircraft or mock-up with power source, and an aircraft component to be controlled by a solenoid switch, samples of solenoid switches and relays which have been subjected to switch chatter in varying degrees of severity.

**Performance:**

The student will install a solenoid operated switch and connect it from a power source to an engine electrical component with appropriate control circuit and circuit protection devices. He will inspect five solenoid switches and relays which have been damaged to varying degrees by switch chatter arcing, list the probable causes, extent of damage and serviceability for each sample.

**Standard:**

The solenoid switch will be installed in accordance with specifications provided and the component it controls will operate correctly when the solenoid switch is energized. Cause, extent of damage, and serviceability will be correctly listed for at least four solenoid switches inspected.

**Lubrication Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-D)

**14. Identify and select lubricants**

(EIT = 10.5 hrs, T = 5 hrs, L/S = 5.5 hrs)

Level 2

**A. Identify characteristics of lubricants**

Level 1

**Student Performance Goal**

**Given:**

A matching type ten question examination identifying lubricants. The content of the examination will refer to base type, film strength, viscosity index and flashpoint of lubricating oils.

**Performance:**

The student will match the characteristics to the various types of lubricants.

Page No.	Revision No.	Revision Date	Original Date
VI-28	0	08/01/2016	08/01/2016

Standard:

The student will correctly associate seven of the characteristics of lubricating oils with the base type of lubricant.

- B. Identify the secondary functions of lubrication oils      Level 2

Student Performance Goal

Given:

A list of twenty statements which identify the functions of a lubricating oil.

Performance:

The student will identify those statements associated with the cooling, sealing and cleaning of an engine.

Standard:

The student will correctly identify five statements related to each of 3 secondary functions of the lubricating oil.

- C. Recognize and identify acceptable lubricants      Level 2

Student Performance Goal

Given:

Containers (oil cans) for a variety of aircraft lubricants, i.e., compounded, detergent, dispersant, etc., and the aircraft/engine service manuals for at least three different models of airplanes and engines.

Performance:

For three different models of airplanes and engines the student will: recognize the containers and identify the type of lubricant; locate appropriate information in the manuals specifying the type of lubricant recommended for the specific engine; and explain the general precautions to be observed when adding oil (or changing oil) and the probable results or damage which may result when various grades, or incorrect types of lubricants are used.

Standard:

The student will identify the lubricants, interpret the manuals and explain the procedures without error.

Page No.	Revision No.	Revision Date	Original Date
VI-29	0	08/01/2016	08/01/2016

15. Repair engine lubrication system components  
(EIT = 18 hrs, T = 11 hrs, L/S = 7 hrs) Level 2

A. Inspect, remove, clean and reinstall oil lines Level 2

Student Performance Goal

Given:

An operable engine incorporating a dry sump oil system, the applicable manufacturer's service manuals, appropriate Federal Aviation Regulations, and 10 statements describing size, condition and repair of oil lines.

Performance:

The student will locate and interpret the FAA regulations governing the size of oil lines. He will inspect oil lines and remove, clean and reinstall one section of line in the oil system. He will select statements from the list describing size, condition and acceptable repair of oil lines.

Standard:

The student will select 8 correct statements from the list. The removal, cleaning and reinstallation of the oil line will be accomplished at return-to-service standards.

B. Identify and describe oil temperature regulations Level 2

Student Performance Goal

Given:

An oil cooler assembly incorporating a viscosity valve or thermostatic valve and a pressure relief valve, an appropriate diagram of the oil cooler, and reference information and ten statements pertaining to oil temperature regulation.

Performance:

The student will label the oil cooler diagram, identifying the components of the assembly. He will draw arrows to indicate the oil flow path during both low and high oil temperature conditions. He will point to both the thermostatic and by-pass element on the oil cooler and when provided with ten statements describing the operation of the oil temperature regulating system, he will select those statements that are related to the operation of the oil cooler.

Page No.	Revision No.	Revision Date	Original Date
VI-30	0	08/01/2016	08/01/2016

Standard:

The student will correctly label components of the oil cooler in the diagram. He will organize those statements that are related to normal and abnormal operation of the oil cooler.

- C. Explain the procedure for cleaning and testing oil tanks

Level 1

Student Performance Goal

Given:

Twenty written statements correctly or incorrectly describing the cleaning and testing of oil supply tanks, manufacturer's service information and the appropriate Federal Aviation Regulations.

Performance:

The student will interpret information from the manuals and regulations concerning the cleaning and testing of oil supply tanks. From twenty written statements describing procedures that might be used, the student will identify the correct statements.

Standard:

The student will select all correct statements.

- D. Disassemble and reassemble an engine oil pump

Level 2

Student Performance Goal

Given:

An engine oil pump from an aircraft engine and the manufacturer's service information.

Performance:

The student will disassemble the pump, identify the component parts and reassemble the pump.

Standard:

The reassembled pump will be in such condition that it could be operated on the engine. The disassembly and reassembly will be in accordance with the manufacturer's service information.

Page No.	Revision No.	Revision Date	Original Date
VI-31	0	08/01/2016	08/01/2016

16. Inspect, check, service, troubleshoot, and repair engine lubrication systems  
(EIT = 40.5 hrs, T = 22 hrs, L/S = 18.5 hrs) Level 3

A. Diagram and explain the operation of wet and dry sump lubrication systems Level 2

Student Performance Goal

Given:

Schematic diagrams of both wet and dry sump lubrication systems and appropriate reference information.

Performance:

The student will explain the principles and indicate by arrows on the diagrams the oil flow through both types of lubrication systems.

Standard:

Explanations and indication of oil flow will be in accordance with the reference information.

B. Change oil, check screens Level 3

Student Performance Goal

Given:

An operating aircraft engine, a quantity of aircraft lubricating oil, appropriate tools, equipment and reference information.

Performance:

The student will drain oil, clean and inspect the screens, safety the drain plugs and refill the system with lubricating oil. He will explain the reasons for changing oil at the specified intervals and the significance of metallic particles found in screens and filters.

Standard:

All procedures and standards of performance will be in accordance with the manufacturer's service instructions.

Page No.	Revision No.	Revision Date	Original Date
VI-32	0	08/01/2016	08/01/2016



C. Service an oil by-pass valve

Level 3

Student Performance Goal

Given:

A lubrication system (installed in an airplane or mock-up) incorporating a by-pass valve as a part of an oil cooler or oil filter and the service instructions for the lubrication system.

Performance:

The student will interpret the service instructions, physically locate the by-pass valves in the system. He will disassemble one by-pass valve, explain the operation of the valve and reassemble the valve into the component or system.

Standard:

The task will be accomplished in accordance with the service instructions. Correct nomenclature will be used throughout the explanation. The reassembled valve will operate normally.

D. Service disc-type oil filters

Level 3

Student Performance Goal

Given:

A stacked disc, edge filtration type oil filter; a crankshaft incorporating sludge chambers and appropriate reference information.

Performance:

The student will disassemble, inspect and reassemble the oil filter. He will identify the sludge chambers in the crankshaft and explain the purpose of such chambers. He will interpret the service instructions pertaining to the removal, cleaning and reinstallation of disc type filters.

Standard:

Service work will be performed at a return-to-service standard. Explanations will be in accordance with the service information.

Page No.	Revision No.	Revision Date	Original Date
VI-33	0	08/01/2016	08/01/2016

E. Describe purpose of oil pressure gauge line restrictors

Level 2

Student Performance Goal

Given:

A diagram of an oil pressure gauge mechanism and gauge line, a direct reading oil pressure gauge and appropriate reference information.

Performance:

The student will label the diagram and explain the purpose of the restricted orifice in the gauge line and physically identify the orifice in the instrument.

Standard:

The student will correctly interpret the reference information and use correct terminology and nomenclature as part of the explanation.

F. Identify components of an oil scavenging system and describe operation of the system and troubleshoot

Level 2

Student Performance Goal

Given:

A diagram or line drawing of the oil scavenging system: components of the scavenging system, appropriate reference information, ten written statements describing faulty operation of an oil system.

Performance:

The student will label the diagram, naming each component from a display of parts and describe the operation of a scavenging system, and identify conditions that are caused by failure of the scavenging system.

Standard:

The components will be identified and named without error. The description of operation will be in accordance with the manufacturer's manual and will include use of correct nomenclature. From the description of faulty operation of an oil system, the student will identify five conditions that could be caused by failures of the scavenging system.

Page No.	Revision No.	Revision Date	Original Date
VI-34	0	08/01/2016	08/01/2016

G. Interpret FAA regulations pertaining to oil supply tanks

Level 2

Student Performance Goal

Given:

Appropriate section of the Federal Air Regulations and the manufacturer's manuals for at least two twin engine airplanes; a line drawing of an oil supply tank incorporating a hopper.

Performance:

The student will locate and interpret the FAA regulations which govern expansion space requirements and the marking of oil tank filler openings. Using the diagram or drawing of an oil supply tank, he will describe the methods commonly employed to maintain a reserve supply of oil for propeller feathering.

Standard:

The student will locate and interpret the regulations without error.

H. Explain the purpose and describe the operation of an oil dilution system

Level 2

Student Performance Goal

Given:

Service manuals and a line drawing or diagram of an oil dilution system.

Performance:

The student will label the diagram and explain the purpose of an oil dilution system. He will describe the sequence of operation or procedure applicable to a specified model of engine or airplane.

Standard:

The procedure described will be in accordance with manufacturer's manual. Correct nomenclature will be used to label the diagram and as a part of the description and explanation.

Page No.	Revision No.	Revision Date	Original Date
VI-35	0	08/01/2016	08/01/2016

- I. Adjust oil pressure on an operable engine Level 2

Student Performance Goal

Given:

An operable aircraft engine and the manufacturer's service manual,

Performance:

The student will adjust the oil pressure.

Standard:

The student will follow the correct procedure and achieve an adjusted pressure within the operating range specified in the manual.

- J. Interpret instrument indications Level 2

Student Performance Goal

Given:

Five statements describing instrument indications of operating trouble symptoms within the lubrication system and the manufacturer's manuals for a specific engine.

Performance:

The student will interpret the described instrument indications and determine the probable cause of the trouble symptoms or probable defect and explain the reason for his decision.

Standard:

Correctly identify the cause or defect in four of the five descriptions of operational trouble symptoms.

- K. Describe the lubrication of a valve mechanism Level 2

Student Performance Goal

Given:

A line drawing of an overhead valve mechanism and the manufacturer's service or overhaul manual.

Performance:

The student will interpret information from the manual, label the diagram to illustrate oil flow and describe the lubrication of the valve mechanism.

Page No.	Revision No.	Revision Date	Original Date
VI-36	0	08/01/2016	08/01/2016

**Standard:**

Components of the valve mechanism will be correctly identified and the drawing will be labeled to illustrate direction of oil flow. Correct nomenclature will be used as part of all descriptions.

- L. Install rings on a piston and describe the factors effecting oil consumption in a piston engine Level 3

**Student Performance Goal**

**Given:**

A piston, set of rings, the manufacturer's manual, a twenty question multiple-choice examination pertaining to oil consumption in a piston engine, ring installation tools.

**Performance:**

The student will install a set of rings on the piston. He will answer the questions relating to the control of oil on the cylinder wall and the effect of engine wear on the operation of the lubrication system and oil consumption of the engine.

**Standard:**

Rings will be installed on the piston in accordance with the instructions contained in the manufacturer's manual. The student will correctly answer 15 of the 20 examination questions.

**Ignition and Starting Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-E)

- 17. Overhaul magneto and ignition harness Level 2  
(EIT = 28 hrs, T = 13 hrs, L/S = 15 hrs)

- A. Disassemble, indentify components, and reassemble a magneto Level 2

**Student Performance Goal**

Page No.	Revision No.	Revision Date	Original Date
VI-37	0	08/01/2016	08/01/2016

Given:

A complete magneto (not necessarily capable of operation) including a rotating magnet and bearings, main magneto housing with pole pieces, a coil, cam and breaker assembly, condenser, distributor rotor; written reference information applicable to the specific magneto; charts, diagrams or similar visual aids which will identify the components of the magneto and an unlabeled drawing or diagram of the magneto.

Performance:

The student will disassemble the magneto, identify the components, describe the materials and design features, label the drawing and reassemble the magneto

Standard:

The disassembly and reassembly will be accomplished as recommended in the written instructions. The reassembled magneto will have all bolts and other assembly devices correctly installed, torqued and safetied. Correct nomenclature will be used to identify and describe the components and label the drawing.

- B. Inspect and select serviceable magneto breaker assemblies

Level 2

Student Performance Goal

Given:

A display of five typical magneto breaker assemblies, two of which are not serviceable; a magneto of the type using the breaker assemblies represented in the display; a manufacturer's manual describing the installation and adjustment of breaker point clearances; recommended tools and equipment.

Performance:

The student will inspect the breaker assemblies and select a serviceable assembly. He will install and adjust the breaker assembly in the magneto.

Standard:

A serviceable breaker assembly must be selected. Installation procedures will be followed and tools will be used as recommended. The installed breaker assembly will meet the tolerances specified in the manual.

Page No.	Revision No.	Revision Date	Original Date
VI-38	0	08/01/2016	08/01/2016

C. Internally time a magneto

Level 2

Student Performance Goal

Given:

A magneto, manufacturer's service information and tools and equipment necessary to check internal timing and establish "E" gap position.

Performance:

The student will disassemble and reassemble the magneto, maintaining the internal timing and verifying the "E" gap position.

Standard:

Disassembly and reassembly will be in accordance with the procedures specified in the manual. Tools will be correctly used and tolerances specified will be maintained.

D. Install high tension leads

Level 2

Student Performance Goal

Given:

Examples of distributor blocks, shielded manifolds, flexible shielding and associated connectors; lengths of high tension ignition wire; manufacturer's manuals or written service information describing the inspection, testing and installation of replacement wiring in the ignition manifold; recommended tools and equipment.

Performance:

The student will inspect leads and use test equipment as a means of determining the serviceability of ignition wiring. He/she will install replacement wiring in an ignition manifold.

Standard:

Information will be correctly interpreted. The recommended procedures will be followed and tools correctly used. The completed harness will meet the specifications established in the reference specifications.

Page No.	Revision No.	Revision Date	Original Date
VI-39	0	08/01/2016	08/01/2016

- E. Assemble, operate and disassemble an impulse coupling on a magnetos Level 2

Student Performance Goal

Given:

An operational magneto; a disassembled impulse coupling that was designed for use on the magneto; manufacturer's service information describing the assembly, operation and disassembly of the impulse coupling and magneto; recommended tools and a means of driving the magneto as a test of the completed assembly.

Performance:

The student will assemble the impulse coupling. He will mount the impulse onto the magneto drive shaft and check the operation of the assembly. He will remove and disassemble the impulse coupling following the operational check.

Standard:

Information contained in the reference publications will be correctly interpreted. Recommended procedures will be followed. Tools and equipment will be properly used and cared for. The disassembled impulse coupling will be stored in a manner that; will minimize damage and loss of parts.

18. Inspect, service, troubleshoot, and repair reciprocating and turbine engine ignition systems and components (EIT = 28 hrs, T = 14 hrs, L/S = 14 hrs) Level 2

- A. Operate and test a magneto on a test bench Level 2

Student Performance Goal

Given:

Two operational magnetos, one with a weak breaker spring and one with a weak charge in the rotating magnet; a test bench provided with a spark rack, drive and associated leads and test meters; manufacturer's manuals or equivalent written information.

Performance:

The student will operate and test both magnetos, identifying the fault in each magneto and demonstrating the effects of a weak breaker spring or low charge in the rotating magnet of the magneto.

Page No.	Revision No.	Revision Date	Original Date
VI-40	0	08/01/2016	08/01/2016



Standard:

Test specifications, procedures and results will be correctly interpreted. Operations will be accomplished without damage to the tools, equipment or components.

B. Test and judge the serviceability of condensers Level 2

Student Performance Goal

Given:

Three condensers of the type normally installed in a typical high-tension aircraft magneto; a condenser tester and written information and specifications applicable to the use of the test equipment.

Performance:

The student will test the condensers and record the test results. He will compare the results with the condenser specifications and judge whether the condensers meet specifications.

Standard:

Operation of the test equipment will be in accordance with the written instructions. Tests will be accurate within the accuracy of the tester and the condensers will be judged according to specifications contained in the written information.

C. Use a coil tester to test ignition coils Level 2

Student Performance Goal

Given:

A coil tester, written specifications and information pertaining to the operation of the test equipment and the interpretation, of test results; a coil from a typical high-tension aircraft magneto, a transformer coil from low tension ignition system and a booster coil; and specifications for each of the specific coils.

Performance:

The student will test each of the coils for "opens", "shorts", and compliance with the manufacturer's specifications.

Page No.	Revision No.	Revision Date	Original Date
VI-41	0	08/01/2016	08/01/2016

Standard:

Each of the coils will be identified as a means of establishing the applicable specifications. Tests will be accomplished as recommended in the written information and will not impose a safety hazard or cause damage to the test equipment or components,

- D. Demonstrate the effect of faults in an ignition lead and correct the fault

Level 2

Student Performance Goal

Given:

An operational magneto mounted on a test bench that is equipped with an adjustable spark rack and drive; an ignition harness which has a single shorted lead and two or more open leads, replacement ignition leads or lengths of ignition cable which may be used to repair the harness; written operating instructions.

Performance:

The student will operate the magneto and check for leads which are open and shorted. He will describe the effects of continued operation with these faults. He will replace the leads or repair the harness and test as sufficiently wide spark gaps to induce an open in the serviceable harness and demonstrate the effects of an open in the circuit.

Standard:

Correctly detect defective leads. Replacement leads and harness repairs will meet return-to-service standards. Operation of the test bench and ignition system will not exceed limits established by the instructor or cause damage to the components.

- E. Remove, inspect, recondition, test and reinstall spark plugs

Level 3

Student Performance Goal

Page No.	Revision No.	Revision Date	Original Date
VI-42	0	08/01/2016	08/01/2016

Given:

An operational reciprocating aircraft engine; a random display of aircraft spark plugs of the shielded type, long reach, short reach, massive and fine wire electrode, hot plug, cold plug, etc. spark plug specifications applicable to the specific engine and reference information and tools necessary to remove, inspect, service and test spark plugs.

Performance:

The student will interpret the specifications and select spark plugs that are approved for installation in the specified engine. He will remove the spark plugs previously installed in the engine, inspect, recondition, and test them, then reinstall them and check engine operation.

Standard:

The task will be accomplished in full accordance with the reference instructions. The identification of spark plugs to be used will be without error. Reconditioned spark plugs will test and operate within specified tolerances. The installation of the spark plugs will be accomplished at a return-to-service standard.

F. Time magnetos to an engine

Level 3

Student Performance Goal

Given:

An operational engine; two magnetos, at least one incorporating an impulse coupling, manufacturer's manual or written information describing the installation and timing of the magneto to the engine, tools and equipment as recommended in the reference information.

Performance:

The student will install and time magnetos and operate the engine.

Standard:

The work will be accomplished in accordance with the reference publications. Instructions will be interpreted without error. The completed installation will meet the tolerances specified in the manual or other written reference information.

Page No.	Revision No.	Revision Date	Original Date
VI-43	0	08/01/2016	08/01/2016

- G. Compare and describe the differences between piston engine and turbine engine ignition systems Level 1

Student Performance Goal

Given:

Schematic diagrams, drawings and suitable reference information describing the operation, servicing and repair of ignition systems for turbine engines, examples of turbine engine igniter plugs, and multiple completion essay statements.

Performance:

The student will complete ten statements comparing and describing the differences between piston engine and turbine engine ignition systems, and describing the removal, inspection and installation of turbine engine igniter plugs.

Standard:

At least seven statements will be correctly completed.

19. (a) Inspect, service, troubleshoot, and repair turbine engine electrical starting systems (EIT = 28 hrs, T = 10 hrs, L/S = 20 hrs) Level 3  
 (b) Inspect, service, and troubleshoot turbine engine pneumatic starting systems (EIT = 2 hrs, T = 2 hrs, L/S = 0 hrs) Level 1  
 A. Inspect, check, troubleshoot, remove and reinstall wiring to an ignition switch Level 3

Student Performance Goal

Given:

An ignition switch installed in an airplane or test stand, and connected to control the magnetos of an operational engine; a drawing or diagram illustrating the switch electrical circuit and suitable equipment for checking circuit continuity.

Performance:

The student will inspect the ignition switch circuitry and check operation of the switch by operating the engine. The instructor will introduce a fault into the switch circuit and the student will troubleshoot the fault and remove and reinstall wiring as a means of correcting the fault.

Page No.	Revision No.	Revision Date	Original Date
VI-44	0	08/01/2016	08/01/2016

Standard:

The drawing or diagram will be correctly interpreted and used in the analysis of the fault. Electrical test equipment will be correctly used and cared for. The ignition switch circuit, following correction of the fault, will be capable of operating as it was designed to operate. The procedure followed in the accomplishment of this task shall not impose a safety hazard.

- B. Use an ignition harness tester to identify a shorted ignition lead on an engine Level 3

Student Performance Goal

Given:

An operational engine with one shorted ignition lead, an ignition harness tester, written information describing the use and operation of the harness tester.

Performance:

The student will operate the engine and identify the symptoms associated with a shorted ignition lead. He will use the ignition harness tester to identify a shorted lead.

Standard:

Operation of the engine and tester will be in accordance with the written instructions. The task will be accomplished without imposing unnecessary safety hazards. Written information and test results will be correctly interpreted.

- C. Install, inspect, operate, troubleshoot and repair an ignition booster system Level 3

Student Performance Goal

Given:

A magneto that incorporates provisions for a booster or induction vibrator reference information that describes the inspection, operation and procedure for troubleshooting the specific booster system, tools and equipment as recommended by the reference manual, and the induction vibrator or booster coil.

Page No.	Revision No.	Revision Date	Original Date
VI-45	0	08/01/2016	08/01/2016

Performance:

The student will install the magneto on a suitable magneto test bench, connect the boost system and check operation. He will inspect the system after the instructor has introduced a fault into the booster system and make repairs to restore the system to normal operation.

Standard:

All work will be accomplished in accordance with the reference information. Information will be correctly interpreted. Following troubleshooting and repair, the system will operate within the tolerances specified in the reference manual.

- D. Identify, compare and interpret ignition analyzer patterns

Level 2

Student Performance Goal

Given:

An operational reciprocating aircraft engine; a random display of aircraft spark plugs of the shielded type, long reach, short reach, massive and fine wire electrode, hot plug, cold plug, etc. spark plug specifications applicable to the specific engine and reference information and tools necessary to remove, inspect, service and test spark plugs.

Performance:

The student will interpret the specifications and select spark plugs that are approved for installation in the specified engine. He will remove the spark plugs previously installed in the engine, inspect, recondition, and test them, then reinstall them and check engine operation.

Standard:

The task will be accomplished in full accordance with the reference instructions. The identification of spark plugs to be used will be without error. Reconditioned spark plugs will test and operate within specified tolerances. The installation of the spark plugs will be accomplished at a return-to-service standard.

Page No.	Revision No.	Revision Date	Original Date
VI-46	0	08/01/2016	08/01/2016

- E. Inspect, service and troubleshoot, and repair turbine engine electrical starting systems Level 2

Student Performance Goal

Given:

Obtain manufacturer service manual for aircraft starter and airframe installation or test stand. Obtain Service Bulletin information and AD notes if applicable. Obtain multimeter and other appropriate tools for inspection of starter installation.

Performance:

The student will follow procedures for trouble shooting for a non-operational starter, as per manufacturer instructions. The student will check relays, solenoids, switches, control circuits and associated wiring. The student will inspect the starter for damage, proper connections and condition including brushes, commutator and the drive shaft coupling and splines. The student will check starter cable resistance and voltage drop during cranking.

Standard:

The student will determine proper system function after detection of a number of induced faults in the starting system. He will use the outlined procedures as per the service information and the maintenance instructions. The student will give an oral explanation of the process to the instructor.

- F. Inspect, service, and troubleshoot turbine engine pneumatic starting systems Level 1

Student Performance Goal

Given:

Several recent service information bulletins and trade articles regarding operation and maintenance of turbine engine pneumatic starting systems.

Performance:

The Student will read the service information and take notes about the procedures for troubleshooting, repair, inspection, operation and maintenance of turbine pneumatic starting systems.

Page No.	Revision No.	Revision Date	Original Date
VI-47	0	08/01/2016	08/01/2016

**Standard:**

The student will identify and recall the various troubleshooting discussions in the service information. The student will write a brief summary of the maintenance and troubleshooting highlights and answer written questions about maintenance and troubleshooting procedures. The student will have a minimum of 70% accuracy for the questions.

**Fuel Metering Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-F)

20. Troubleshoot and adjust turbine engine fuel metering systems and electronic engine fuel controls

Ref: 147-C-F20 – 2.0 hrs

Level 1

- A. Locate information regarding the inspection, checking and servicing of turbine engine fuel metering systems and electronic engine fuel controls Level 1

**Student Performance Goal**

**Given:**

Written reference information pertaining to turbine engine fuel metering systems and electronic engine fuel systems.

**Performance:**

The student will locate information and answer a twenty question multiple-choice examination dealing with the effect of atmospheric conditions; indications of incorrect flow rate; and the effects of failure on high power performance.

**Standard:**

Reference information will be located and fifteen of the multiple-choice questions will be correctly answered.

21. Overhaul carburetor

(EIT = 18 hrs, T = 10 hrs, L/S = 8 hrs)

Level 2

- A. Identify venturi size and describe function Level 2

**Student Performance Goal**

Page No.	Revision No.	Revision Date	Original Date
VI-48	0	08/01/2016	08/01/2016



Given:

Typical aircraft carburetors, both float and pressure types, incorporating round, rectangular and boost venturi; reference manuals or written information specifying the size and describing the venturi to be used in a specific carburetor.

Performance:

The student will interpret information from the reference publications, point to the venturi in one specific carburetor and identify the venturi by size or part number. He will describe the function of a venturi in a carburetor.

Standard:

Reference information will be correctly interpreted. Correct nomenclature will be a part of the description.

- B. Interpret and use charts or diagrams to explain fuel and airflow through float and pressure carburetors      Level 2

Student Performance Goal

Given:

Charts, diagrams, drawings or similar visual aids illustrating the passageways and internal flow paths through float and pressure carburetors, written reference information describing the fuel-air ratios required by the engine at various operating conditions.

Performance:

The student will interpret and use the charts and diagrams to explain fuel and airflow through both float and pressure carburetors.

Standard:

The principles of differential pressures in both fuel and air flows will be correctly explained. Correct nomenclature and terminology will be a part of the explanation.

- C. Remove, install and explain the principles of fuel metering through a jet      Level 2

Student Performance Goal

Page No.	Revision No.	Revision Date	Original Date
VI-49	0	08/01/2016	08/01/2016

Given:

A typical aircraft carburetor incorporating a fixed orifice jet, reference drawings or information describing the location, size and function of the jet and special tools necessary to remove and reinstall a jet.

Performance:

The student will remove, measure the size and reinstall a metering jet in a carburetor. He/she will use and interpret information from reference information and explain the purpose of the jet

Standard:

The procedure and tools used to remove, measure and reinstall the jet will be in accordance with written instructions contained in the reference manual. Correct nomenclature will be used throughout the explanation.

D. Identify and describe the operation of an air bleed      Level 2

Student Performance Goal

Given:

A typical carburetor incorporating air bleed; a schematic or diagram of the carburetor and written reference information describing the operation of the air bleed in the specific carburetor.

Performance:

The student will disassemble the carburetor to the degree that he/she may point to the air bleed. He will interpret reference information and describe the operation of the air bleed.

Standard:

The air bleed will be correctly identified. Correct nomenclature will be used as a part of the explanation and description of operation.

E. Locate and describe the operation of the main discharge nozzle in a pressure carburetor      Level 2

Student Performance Goal

Page No.	Revision No.	Revision Date	Original Date
VI-50	0	08/01/2016	08/01/2016

Given:

A typical pressure discharge aircraft carburetor, appropriate drawings, schematic diagrams and reference information.

Performance:

The student will point to the main discharge nozzle of a pressure carburetor and describe the operation and possible malfunctions of the main discharge system.

Standard:

The discharge nozzle will be correctly identified. Correct nomenclature will be a part of the explanation and description of the operation. Reference information will be correctly interpreted when describing malfunctions of the system.

- F. Identify acceleration systems in float and pressure carburetors and describe the operation of each system

Level 2

Student Performance Goal

Given:

A typical aircraft float carburetor incorporating a pump type accelerating system, a cutaway pressure carburetor displaying the accelerating system, appropriate drawings, schematic diagrams and reference information describing the operation of the acceleration systems of each carburetor.

Performance:

The student will identify the acceleration systems in each carburetor, associate the components with the drawings or diagrams and interpret reference information describing the operation of each system.

Standard:

Components of the acceleration systems will be correctly identified. Correct nomenclature will be a part of the explanation and description of operation.

- G. Identify economizer and power enrichment systems and describe the operation of the systems in float and pressure type carburetors

Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-51	0	08/01/2016	08/01/2016

Given:

A typical aircraft float carburetor incorporating an economizer, a cutaway pressure carburetor displaying the power enrichment valve, appropriate drawings, schematic diagrams and reference information describing the operation of the economizer and power enrichment systems.

Performance:

The student will identify the economizer and power enrichment components in each carburetor, associate the components with drawings or diagrams and interpret reference information describing the operation of each system.

Standard:

Components of the systems will be correctly identified. Correct nomenclature will be a part of the explanation and description of the operation.

- H. Identify mixture controls incorporated in float and pressure carburetors and describe the operation of the systems

Level 2

Student Performance Goal

Given:

Typical float and pressure type aircraft carburetors incorporating needle type, back suction type, and automatic mixture control devices; appropriate drawings, schematic diagrams and reference information describing the operation of the mixture control systems,

Performance:

The student will identify the mixture control components in each carburetor, associate the components with the drawings or diagrams and interpret the reference information describing the operation of the mixture control systems.

Standard:

Components of the systems will be correctly identified. Correct nomenclature will be a part of the explanation and description of operation.

Page No.	Revision No.	Revision Date	Original Date
VI-52	0	08/01/2016	08/01/2016

22. Repair engine fuel metering system components  
(EIT = 6 hrs, T = 3 hrs, L/S = 3 hrs)

Level 2

- A. Locate, remove, clean and reinstall screens in fuel metering system components

Level 2

Student Performance Goal

Given:

A typical aircraft carburetor or fuel metering device incorporating a fuel inlet screen; manufacturer's service information applicable to the specific unit; and recommended materials, tools and equipment as recommended in the reference information.

Performance:

The student will use and interpret information necessary to identify, remove, clean and reinstall the screens in the fuel-metering unit.

Standard:

The procedures, tools and techniques recommended in the service information will be followed without error or omission. The task will be accomplished at a return-to-service standard.

- B. Inspect and describe the repair of carburetor floats

Level 2

Student Performance Goal

Given:

Five typical floats from aircraft carburetors (two will be unacceptable for return-to-service), representing floats that were made of brass, stainless steel and molded rubber; reference information describing the inspection and repair of floats.

Performance:

The student will inspect the floats, interpret the reference information and describe the repair of carburetor floats.

Standard:

The two unacceptable floats will be identified and the reason, for rejection will be explained. Reference information will be correctly interpreted. Correct nomenclature will be used as a

Page No.	Revision No.	Revision Date	Original Date
VI-53	0	08/01/2016	08/01/2016

- C. Inspect float needle and seat, measure and adjust float level of a carburetor Level 2

Student Performance Goal

Given:

A float carburetor with two replacement float needles and valve seat assemblies, one of which is unserviceable; a manufacturer's service manual and recommended equipment necessary to measure and adjust the float level of the carburetor.

Performance:

The student will inspect the needle and seat assemblies and identify the serviceable assembly. He will install the serviceable needle and seat assembly and adjust the float level.

Standard:

All procedures will be in accordance with the information contained in the manual. Information will be correctly interpreted and the adjusted float level will be within specified tolerance.

- D. Inspect a pressure type carburetor and describe the operation resulting from clogged impact tubes and ruptured diaphragms Level 2

Student Performance Goal

Given:

Examples of pressure type carburetors, at least one of which will have clogged impact tubes and a ruptured fuel or air diaphragm; drawings or schematic diagrams of the specific carburetor; reference information describing the function of impact tubes and diaphragms within the carburetor.

Performance:

The student will use procedures in the manual to determine how the carburetor is clogged.

Standard:

The carburetor with clogged impact tubes will be detected. Reference information will be correctly interpreted and explanations and descriptions will include use of correct nomenclature.

Page No.	Revision No.	Revision Date	Original Date
VI-54	0	08/01/2016	08/01/2016

23. Inspect, check, service, troubleshoot, and repair reciprocating and turbine engine fuel metering systems (EIT = 26 hrs, T = 11 hrs, L/S = 15 hrs) Level 3

A. Explain temperature, pressure and humidity effects on operation of a carburetor Level 2

Student Performance Goal

Given:

Appropriate reference information (charts, visual aids or manufacturer's manuals) that describes the effect of air density on carburetor operation.

Performance:

The student will describe the operation of carburetor and explain how variations in temperature, pressure and humidity of the air will effect the operation of the engine.

Standard:

The student will correctly interpret charts and reference data. He will use correct nomenclature and terminology throughout the descriptions and explanations.

B. Describe the operation of a float carburetor Level 2

Student Performance Goal

Given:

A typical float carburetor incorporating an idle metering system, an accelerating and main discharge system, idle and altitude mixture control systems; appropriate reference information describing the operation and systems of the specific carburetor; an unlabeled line drawing or sketch illustrating the components of the carburetor.

Performance:

The student will interpret information contained in the manual disassemble the carburetor and label the sketch as a means of identifying the components and systems. He will describe the operation of each system, pointing to the passageway of the carburetor he will trace the flow of fuel and air and describe how it is metered to the engine. He will reassemble the carburetor.

Page No.	Revision No.	Revision Date	Original Date
VI-55	0	08/01/2016	08/01/2016

Standard:

Information will be correctly interpreted. Correct nomenclature will be used when labeling the drawing and correct terminology and phraseology will be a part of all descriptions and explanations, Disassembly and reassembly will be in accordance with the procedure described in the reference publications.

- C. Identify a pressure type carburetor and direct fuel injection system and describe the operation of each system

Level 2

Student Performance Goal

Given:

A typical pressure carburetor; the component of a direct cylinder fuel injection system; appropriate reference information describing the operation of each system; line drawings, schematics or diagrams of the systems.

Performance:

The student will point to the component or carburetor and name the part. He will interpret information from the reference publications and describe the operation of both systems. He will compare the advantages and limitations of the two systems.

Standard:

Components will be correctly identified by name. Correct nomenclature and terminology will be used throughout the description of operation.

- D. Explain the function of vapor separators and vapor vents

Level 2

Student Performance Goal

Given:

Diagrams, schematics or written information describing the purpose and function of vapor separators and vapor vents; unlabeled line drawings or sketches of the vapor return system of a specific model of airplane and the manufacturer's manual for that airplane.

Page No.	Revision No.	Revision Date	Original Date
VI-56	0	08/01/2016	08/01/2016



Performance:

The student will explain the function of vapor separators and vapor vents as incorporated into a pressure carburetor of a fuel injection system. He will label the drawing as a means of identifying the components and operation of the system.

Standard:

The drawing will be correctly labeled. Correct nomenclature will be used throughout all descriptions and explanations.

- E. Compare continuous flow fuel injection and direct cylinder injection systems Level 1

Student Performance Goal

Given:

Pictures diagrams, schematics of written information pertaining to the continuous flow method of fuel injection and the direct cylinder injection system.

Performance:

The student will describe the two systems and will name the components that are required for operation of each system.

Standard:

Correct nomenclature will be used when naming the components of each system.

- F. Inspect, remove and install a float type carburetor, operate the engine and adjust idle speed and idle mixture Level 3

Student Performance Goal

Given:

An operational engine equipped with a float carburetor, appropriate written operating and service instructions for the specific engine and carburetor.

Performance:

The student will inspect, remove and install the carburetor and operate the engine. He will adjust the idle speed and idle mixture.

Page No.	Revision No.	Revision Date	Original Date
VI-57	0	08/01/2016	08/01/2016

Standard:

The procedure will be in accordance with the written service instructions. The adjustments will result in an engine operating condition within the tolerances specified in the operating instructions.

- G. Inspect, remove and install a pressure carburetor or fuel injection system, operate the engine and adjust idle speed and idle mixture

Level 3

Student Performance Goal

Given:

An operational engine equipped with a pressure carburetor or a fuel injection system, appropriate written operating and service instructions for the specific engine and fuel metering system.

Performance:

The student will inspect, remove and install the carburetor or fuel injection system and operate the engine. He/she will adjust the idle speed and idle mixture.

Standard:

The procedures will be in accordance with the written service instructions. The adjustment will result in an engine operating condition within the tolerances specified in the operating instructions.

- H. Identify the dangers of excessively rich and excessively lean fuel air mixtures

Level 2

Student Performance Goal

Given:

A 20 question matching type of examination relating the cause and effect of excessively rich and excessively lean fuel-air mixtures; 10 examples of engine components that have been damaged by rich and lean mixtures (valves, exhaust manifolds, carburetor heat boxes, etc.) and manufacturer's service manuals.

Performance:

The student will match the described effect with the probable cause and select a typical component that reflects the condition described by the examination question.

Page No.	Revision No.	Revision Date	Original Date
VI-5	0	08/01/2016	08/01/2016

**Standard:**

Fifteen questions will be correctly answered. The student will correctly identify five engine components that show evidence of damage due to incorrect fuel-air mixtures.

- I. Rig the fuel control unit on a static turbojet engine and describe the trimming of the engine Level 2

**Student Performance Goal**

**Given:**

A turbojet engine, statically mounted to include a thrust lever, fuel control unit and associated instrumentation and linkage necessary to trimming of the engine and written instructions describing the procedure for accomplishing this adjustment.

**Performance:**

The student will interpret the information, describe and simulate the procedure for rigging the fuel control and trimming a turbojet engine.

**Standard:**

Reference information will be correctly interpreted. Correct nomenclature and terminology will be used throughout the description of the procedure.

**Engine Fuel Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-G)

- 24. Repair engine fuel system components (EIT = 8.5 hrs, T = 3.5 hrs, L/S = 5 hrs) Level 2

- A. Describe the operation of fuel pumps and remove and install a pump on an engine Level 2

**Student Performance Goal**

**Given:**

A vane type fuel pump, a diaphragm type fuel pump and the service information applicable to each type of pump.

Page No.	Revision No.	Revision Date	Original Date
VI-59	0	08/01/2016	08/01/2016

Performance:

The student will interpret the service information, identify the parts of the pumps and describe the operation of fuel pumps. He will remove and reinstall a fuel pump on an engine.

Standard:

The description of operation and the removal and reinstallation will be in full accordance with the service instructions. Correct nomenclature and terminology will be used as a part of the description of operation.

- B. Describe the operation of auxiliary and boost pumps, remove and install an auxiliary or boost pump in a system Level 2

Student Performance Goal

Given:

Fuel system diagrams, the service instructions for one specific type of auxiliary or boost pump and a fuel pump of that type.

Performance:

The student will explain the purpose of auxiliary and fuel boost pumps. He will describe the operation of various types of pumps. He will remove and reinstall an auxiliary or boost pump in the fuel system.

Standard:

The explanations and descriptions will include use of the correct nomenclature and terminology. The installation and removal of the pump will be in accordance with the service instructions.

- 25. Inspect, check, service, troubleshoot, and repair engine fuel systems (EIT = 5 hrs, T = 2 hrs, L/S = 3 hrs) Level 3

- A. Interpret Federal Aviation Regulations governing fuel systems Level 2

Student Performance Goal

Given:

Copies of the applicable Federal Aviation Regulations, manufacturer's service manual and specifications for the fuel system of a particular airplane.

Page No.	Revision No.	Revision Date	Original Date
VI-60	0	08/01/2016	08/01/2016

**Performance:**

The student will locate and Interpret information from the reference publications and describe how the regulations govern the strainers, lines, vents, expansion space and sumps of the specific fuel system.

**Standard:**

The reference information will be interpreted without error. Correct terminology and nomenclature will be used as a part of the description.

- B. Inspect, check service, troubleshoot and repair an engine fuel system Level 3

**Student Performance Goal**

**Given:**

An operational fuel system including a fuel tank, tank outlet strainers, lines, sump drains, selector valves, main fuel strainer and carburetor or fuel injection system, and the manufacture’s service instructions for the specific system.

**Performance:**

The student will inspect, check, service, troubleshoot and repair problems introduced into the system by the instructor.

**Standard:**

The inspections servicing and repair of the system will be incomplete accordance with the service instructions. As a part of the troubleshooting procedure, the student will identify, isolate and correct a simulated problem caused by contamination and vapor lock.

**Induction and Engine Airflow Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-H)

- 26. Inspect, check, troubleshoot, service, and repair engine ice and rain control systems (EIT = 4.5 hrs, T = 2 hrs, L/S = 2.5 hrs) Level 2

- A. Describe induction and icing and identify probable locations Level 2

Page No.	Revision No.	Revision Date	Original Date
VI-61	0	08/01/2016	08/01/2016

## Student Performance Goal

### Given:

Unlabeled drawings of an air induction system for supercharged and non-supercharged reciprocating engines and a turbine engine and appropriate texts or manufacturer's manuals.

### Performance:

The student will interpret the reference publications and describe the formation of ice in the induction systems of both reciprocating and turbine engines. He will label the line drawings to illustrate the most common location for the build up of ice in the induction system.

### Standard:

Reference information will be correctly interpreted and the illustrations will be correctly labeled. Correct nomenclature will be used as a part of the description.

- B. Inspect, check, service and repair a carburetor pre-heat system or hot spot

Level 2

## Student Performance Goal

### Given:

A typical carburetor pre-heat system incorporating an exhaust muff heater, connecting hose and shutter operated heat box; an intake manifold hot spot; appropriate reference information pertaining to carburetor heaters and hot spots.

### Performance:

The student will inspect, check, and service the heater muff, connecting duct and heater box and shutter. He will describe the repairs that are normally accomplished and will verify that the shutter of the heat box has full travel.

### Standard:

The student will correctly detect any defects that exist in the system. The system will function as it was designed to operate or necessary adjustments will be made by the student to achieve this standard. Correct nomenclature will be used during all descriptions of repairs.

Page No.	Revision No.	Revision Date	Original Date
VI-62	0	08/01/2016	08/01/2016

- C. Describe the operation of thermal anti-icing systems for turbine engine air intakes Level 2

Student Performance Goal

Given:

Written reference information, drawings or schematics describing and illustrating thermal anti-icing of turbine engine air intakes.

Performance:

The student will interpret the information and drawings and describe the operation of the anti-icing systems.

Standard:

Reference information will be correctly interpreted. Correct nomenclature and terminology will be used to describe the operation of the systems.

27. Inspect, check, service, troubleshoot, and repair heat exchangers, superchargers, and turbine engine airflow and temperature control systems (EIT = 7.5 hrs, T = 4 hrs, L/S = 3.5 hrs) Level 1

- A. Inspection and repair of superchargers Level 1

Student Performance Goal

Given:

Typical superchargers of the mechanically driven and exhaust turbo types, sufficiently complete, but not necessarily capable of being operated, that the supercharger may be inspected in accordance with the manufacturer's manual and the required repairs described.

Performance:

The student will inspect a mechanically driven and an exhaust turbo supercharger. He will make measurements of clearance and visual inspection for defects and describe the repairs as recommended by the manual.

Standard:

Reference information will be correctly interpreted. The inspection and description of repair will be in accordance with the manufacturer's manual.

Page No.	Revision No.	Revision Date	Original Date
VI-63	0	08/01/2016	08/01/2016

B. Inspect, service and check a supercharger systems Level 1

Student Performance Goal

Given:

An operational engine or mock-up equipped with a mechanically driven or a turbo-supercharging system, appropriate reference information or manuals describing the operation, servicing and inspection of the system, necessary servicing tools or equipment and an unlabeled line drawing or a normally aspirated, a mechanically driven and turbo- supercharged system.

Performance:

The student will operate the engine or mock-up and check the operation of the supercharger system. He will inspect and service the system as recommended in the reference publications and label each of the three drawings of the intake manifold systems, identifying the approximate pressures and temperature that will exist at various positions in the system.

Standard:

The operation and inspection of the supercharging system will be fully in accordance with the reference publications. The temperature and pressures shown in the drawings will be sufficiently correct that comparisons may be made between the different systems,

C. Inspect heat exchangers and describe methods of repair Level 1

Student Performance Goal

Given:

Typical aircraft heat exchangers, at least one of which is defective due to cracks, burns or defective radiator core and appropriate reference information or manuals describing the inspection of repair of the specific types of heat exchangers displayed.

Performance:

The student will interpret information contained in the publications and inspect the heat exchangers. He will identify the defective heat exchanger and describe the repair procedure recommended in the manual.

Page No.	Revision No.	Revision Date	Original Date
VI-64	0	08/01/2016	08/01/2016



Standard:

Information will be correctly interpreted. The defective heat exchanger will be identified without error or omission. Correct nomenclature will be used to describe the recommended repair.

28. Inspect, check, service, and repair carburetor air intake and induction manifolds

(EIT = 6.5 hrs, T = 2.5 hrs, L/S = 4 hrs)

Level 3

A. Inspect, check, service and repair an air intake duct for a carbureted engine

Level 3

Student Performance Goal

Given:

An operational engine provided with a ram air carburetor intake duct, manufacturer's service information pertaining to the inspection, servicing and repair of the intake ducting.

Performance:

The student will operate the engine as a means of recognizing; normal operation. He will again operate the engine after the instructor has introduced a partial obstruction into the intake air duct; and record the symptoms. The student will inspect, check, service and repair the system to correct the obstruction in the intake duct.

Standard:

Operation of the engine, inspection, checking, servicing and repair will be in accordance with the recommendations contained in the manufacturer's service information. The intake duct and engine will operate normally following corrections of the fault.

B. Inspect, check, service and repair a carburetor heater system

Level 3

Student Performance Goal

Given:

An operational engine that is equipped with a carburetor heater system, manufacturer's service manuals or equivalent written reference information describing the inspection, servicing, adjustment and repair of the carburetor heater system.

Page No.	Revision No.	Revision Date	Original Date
VI-65	0	08/01/2016	08/01/2016

Performance:

The student will operate the engine with a carburetor heat control that is improperly rigged. He will record the instrument indications and re-rig and adjust the carburetor heat control.

Standard:

Engine operation will be in accordance with the written reference information. Information will be correctly interpreted and the rigging and adjustment of control travel and response will meet return-to-service standards.

- C. Inspect and service air screens or oil filters in the engine air intake

Level 3

Student Performance Goal

Given:

An engine air intake or mock-up incorporating an air screen or air filter; manufacturer's service instructions and the equipment and materials recommended to inspect and service air screens and filter.

Performance:

The student will remove the screen or filter from the airplane or mock-up, inspect, service and reinstall the unit into the engine air intake. He will describe the rigging of an alternate air intake door.

Standard:

Service instructions will be interpreted without error or omission. The completed job will reflect return-to-service standards.

- D. Inspect, check, service and repair an engine primer systems

Level 3

Student Performance Goal

Given:

An operational engine priming system, mounted in an airplane or on a mock-up, written service instructions pertaining to the inspection, servicing and repair of the system, and gaskets, seals, and tools normally required in the repair of the system.

Page No.	Revision No.	Revision Date	Original Date
VI-66	0	08/01/2016	08/01/2016

**Performance:**

The student will operate, inspect, service and repair the priming, system correcting a fault introduced into the system by the instructor.

**Standard:**

The system will operate as it was designed to operate and will be free of internal and external leaks.

**Engine Cooling Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-I)

29. Repair engine cooling system components

(EIT = 3 hrs, T = 0.5 hrs, L/S = 2.5 hrs)

Level 2

A. Repair baffles and re-profile cylinder fins

Level 2

**Student Performance Goal**

**Given:**

Typical samples of cracked and damaged cylinder head and inter- cylinder baffles, scrapped air-cooled cylinders, and the manufacturer's service and parts manuals.

**Performance:**

The student will identify those sample baffles that are repairable and will stop-drill and make riveted repairs as specified in the service manual. He will identify those baffles requiring welded repairs and determine the part number of the baffle by reference to the manufacturer's parts catalogue. He will profile one cylinder fin.

**Standard:**

The baffles and cylinder need not meet return-to-flight standards. The procedures, limits and tolerances specified in the manual, will be adhered to for all activities.

30. Inspect, check, troubleshoot, service, and repair engine cooling systems

(EIT = 7 hrs, T = 3 hrs, L/S = 4 hrs)

Level 3

A. Inspect, check and service engine cooling systems

Level 3

Page No.	Revision No.	Revision Date	Original Date
VI-67	0	08/01/2016	08/01/2016

## Student Performance Goal

### Given:

Drawings or other visual aids that illustrate the fins on an aircraft cylinder, airflow patterns through pressure babbles and fan-cooled helicopter engines, airflow patterns through augmenters and fluid flow within liquid cooling systems; a completely cowled and baffled air-cooled engine and the manufacturer's service instructions for this specific engine installation.

### Performance:

The student will inspect, check and service the cooling system of the completely cowled and baffled engine. He will interpret information from the manufacturer's manual and describe the effects of excessive heat, cowl flaps, baffles, augmenters and fuel-air ratios.

### Standard:

The inspection, servicing and description of operation will be in accordance with the manufacturer's service instructions. Correct nomenclature will be used as a part of all descriptions and explanations.

## B. Troubleshoot, and repair engine cooling systems      Level 2

## Student Performance Goal

### Given:

An operational aircraft engine, provided with complete cowling and baffling; written operating instructions and the manufacturer's service manual, cowl flaps and oil cooler shutters.

### Performance:

The student will operate the engine and record oil and cylinder head temperatures as they respond to changes in the cowl flap position, oil cooler shutter position, and fuel-air ratios. He will relate this information to the troubleshooting information appearing in the manufacturer's service manual and describe the corrective action that would be taken. He will remove and re-install the cylinder head baffles and inter-cylinder baffles on the engine.

Page No.	Revision No.	Revision Date	Original Date
VI-68	0	08/01/2016	08/01/2016

**Standard:**

Engine operation, removal and reinstallation of the baffles will be in accordance with the manufacturer's service manual. Interpretation of troubleshooting procedure will be without error. Correct nomenclature will be used throughout the explanations and descriptions.

**Engine Exhaust and Reverser Systems**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-J)

**31. Repair engine exhaust system components**

(EIT = 4 hrs, T = 2 hrs, L/S = 2 hrs)

Level 2

- A. Recognize materials used in exhaust system components and describe repair procedure

Level 2

**Student Performance Goal**

**Given:**

Ten samples of exhaust system components from both piston and jet engines and appropriate reference information describing the repair of exhaust components.

**Performance:**

The student will identify five exhaust system components by name and use appropriate reference information as a means of determining the materials used in the component. He will interpret the information describing the repair of one exhaust system component.

**Standard:**

The student will correctly identify five of the ten sample parts by name. He will correctly Interpret and describe the repair of one component.

**32. Inspect, check, troubleshoot, service, and repair engine exhaust systems**

(EIT = 10 hrs, T = 3 hrs, L/S = 7 hrs)

Level 3

Troubleshoot and repair engine thrust reverser systems and related components

(EIT = 3 hrs, T = 3 hrs, L/S = 0 hrs)

Level 1

Page No.	Revision No.	Revision Date	Original Date
VI-69	0	08/01/2016	08/01/2016

A. Inspect, remove, replace, adjust and repair joints in the exhaust systems

Level 3

Student Performance Goal

Given:

An aircraft engine with a complete exhaust manifold system, spare replacement sections of manifold, the service manual for the specific engine and appropriate tools and equipment to inspect an exhaust manifold.

Performance:

The student will inspect the exhaust manifold and make a written record of condition. He will remove, replace, and adjust a replacement section of manifold as directed by the instructor. He will interpret Information from the service manual and describe the repairs permitted in the exhaust system.

Standard:

The inspection, removal, reinstallation, and adjustment of the manifold will be in accordance with the procedures specified in the manual. Correct terminology will be used as a part of the description of repairs.

B. Inspect, remove and reinstall exhaust heaters

Level 3

Student Performance Goal

Given:

An exhaust manifold incorporating a cabin or carburetor heater, the manufacturer's service instructions applicable to that specific manifold and heat exchanger assembly.

Performance:

The student will inspect the heater and muffs, test the condition of the heat exchanger and make a written record describing the condition of the heater.

Standard:

The inspection, testing and reinstallation will be in accordance with the procedures specified in the service manual. The heater itself need not meet the return-to-service standards. The written record will accurately reflect the condition of the heater.

Page No.	Revision No.	Revision Date	Original Date
VI-70	0	08/01/2016	08/01/2016

- C. Identify, inspect and describe the operation of turbo-superchargers and turbo-compound engines Level 2

Student Performance Goal

Given:

Charts, diagrams or other suitable reference information; components of the turbo-supercharger and turbo-compound systems and the service information applicable to one specific system.

Performance:

The student will distinguish between turbo-supercharging and turbo-compounding of engines. He will describe the operation of both systems and the inspection procedure that would apply to one specific system of turbo-supercharging.

Standard:

Correct nomenclature and terminology will be a part of all descriptions and explanations. The inspection procedures will be interpreted without error.

- D. Describe the operation and inspection of jet engine thrust reversers and noise suppressors Level 1

Student Performance Goal

Given:

Charts, drawings, diagrams or other visual aids and reference information illustrating and describing the jet engine exhaust nozzle, thrust reversers and noise suppression devices.

Performance:

The student will interpret the reference information and describe the operation and inspection procedures applicable to the nozzles, reversers and silencers of jet engines.

Standard:

Reference information will be correctly interpreted. Correct nomenclature and terminology will be used as a part of all descriptions and explanations.

Page No.	Revision No.	Revision Date	Original Date
VI-71	0	08/01/2016	08/01/2016

## Propellers

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-K)

33. Inspect, check, service, and repair propeller synchronizing and ice control systems

(EIT - 8 hrs, T = 8 hrs, L/S = 0 hrs)

Level 1

A. Identify components and describe the operation of propeller anti-icing systems

Level 1

Student Performance Goal

Given:

Reference information and drawings or diagrams describing alcohol, chemical and thermal types of propeller anti-icing systems; sample components including alcohol reservoirs, pumps and slinger rings; samples of brush blocks, slip rings and thermal boots.

Performance:

The student will identify the components, locate information pertaining to the system in the reference publications and describe the operation of each type of anti-icing system.

Standard:

The student will correctly identify the components and use correct nomenclature as a part of the description.

B. Locate reference information and describe the operation of propeller synchronizing systems

Level 1

Student Performance Goal

Given:

Reference information describing the operation of a propeller synchronizing system and suitable diagrams or drawings illustrating the location of components within the system.

Performance:

The student will locate reference information and describe the operation of a propeller synchronizing system.

Standard:

The student will correctly identify the components necessary to the system and use correct nomenclature as a part of the description of operation.

Page No.	Revision No.	Revision Date	Original Date
VI-72	0	08/01/2016	08/01/2016



34. Identify and select propeller lubricants  
(EIT = 2 hrs, T = 1 hrs, L/S = 1 hr.) Level 2

A. Identify the lubricant to be used to service a specific propeller Level 2

Student Performance Goal

Given:

Manufacturer's manuals or other reference information specifying the kind of lubricant recommended for use on four specific makes and models of propellers; a data sheet to be completed with information obtained from the manuals or reference information.

Performance:

The student will locate and interpret information in the reference publications for each of the four propellers and will list the correct lubricant and special procedures that need to be considered in lubricating each model of propeller.

Standard:

Reference specifications will be interpreted without error.

35. Balance propellers  
(EIT = 6.5 hrs, T = 2.5 hrs, L/S = 4 hrs) Level 1

A. Interpret information and describe the procedure for balancing fixed pitch and variable pitch propellers Level 1

Student Performance Goal

Given:

Manufacturer's manuals containing information describing the balancing of fixed pitch metal propellers, fixed pitch wood propellers and controllable pitch propellers.

Performance:

The student will locate and interpret information in the manuals and describe the procedure for balancing one propeller of each type.

Standard:

Information will be interpreted without error. Correct nomenclature and terminology will be used as a part of each description and explanation.

Page No.	Revision No.	Revision Date	Original Date
VI-73	0	08/01/2016	08/01/2016

36. Repair propeller control system components  
(EIT = 8 hrs, T = 3 hrs, L/S = 5 hrs)

Level 2

- A. Describe the action of a propeller governor and the forces which control propeller pitch

Level 2

Student Performance Goal

Given:

A propeller governor equipped with a manual control and a governor equipped with an electric control head, manufacturer's manuals describing the operation of each type of propeller; diagrams or drawings illustrating the relationship of governor action to propeller pitch.

Performance:

The student will interpret information from the manuals and point to the control, passage way or portion of the governor that provides propeller control during on-speed, under-speed and over-speed operating conditions. He will describe the governor action which controls propeller pitch and engine speed.

Standard:

Interpretation of information will be without error. Correct nomenclature and terminology will be used as a part of the description and explanation.

- B. Perform the operation necessary to match direction of governor rotation to the rotation of the engine drive

Level 2

Student Performance Goal

Given:

A propeller governor assembled for either clockwise or counter-clockwise rotation; an engine with a governor drive pad, appropriate reference information describing the procedure necessary to change the direction of rotation of the governor.

Performance:

The student will determine the direction of rotation of the governor drive on the engine. He will accomplish the procedure necessary to match the direction of governor rotation to the direction of the engine drive and mount the governor on the engine.

Page No.	Revision No.	Revision Date	Original Date
VI-74	0	08/01/2016	08/01/2016

Standard:

The procedure specified in the reference information will be followed without exception. The direction of governor drive will match the engine drive, and provide a standard that permit safe and satisfactory operation of the units.

37. Inspect, check, service, and repair fixed-pitch, constant-speed, and feathering propellers, and propeller governing systems  
(EIT = 27 hrs, T = 11 hrs, L/S = 16 hrs)

Level 3

- A. Identify and describe the forces acting on a propeller Level 3

Student Performance Goal

Given:

Completely assembled and disassembled sample propellers of the fixed pitch and variable pitch types; diagrams or drawings illustrating the forces acting on a propeller, and the manufacturer's service manual for one specific propeller.

Performance:

The student will point to and use the correct nomenclature to identify the hub, splines, blade face, blade back, blade tip, blade retaining device, counterweight and pitch control mechanism. Using the diagrams or drawings, he will describe and explain the forces acting on a propeller and the reasons for using variable pitch. He will interpret information from the service manual and describe the operation of a particular controllable pitch propeller.

Standard:

Correct nomenclature will be used throughout all descriptions and explanations. The explanation of forces acting on the propeller and the theory of variable pitch will be in accordance with the information in the manual.

- B. Measure propeller blade pitch angles

Level 3

Student Performance Goal

Page No.	Revision No.	Revision Date	Original Date
VI-75	0	08/01/2016	08/01/2016

Given:

A fixed pitch and a variable pitch type propeller; manufacturer's service information applicable to the two different propellers and the tools and equipment necessary to measure propeller blade angles.

Performance:

The student will check the propeller blade angles on a fixed and a variable pitch propeller and determine whether the propeller conforms to the tolerance specified by the manufacturer.

Standard:

The propellers need not meet return-to-service standards, but the procedures for checking blade angles will be fully in accordance with the manufacturer's instructions. Blade angle measurement will permit a tolerance of 1/4 degree.

C. Locate and interpret engine-propeller "critical range" information

Level 3

Student Performance Goal

Given:

Copies of Aircraft Specification Sheets for five different airplanes, including copies of three aircraft-engine-propeller combinations which have "critical range" vibration problems; samples of placards which describe the "critical range" precautions or warnings and a copy of one Manufacturer's Operating Manual which describes a critical vibration range.

Performance:

The student will review the Aircraft Specification Sheets, selecting those three specifications identifying "critical range" vibrations for the airplane-engine-propeller combination. He will select the sample placard which should be installed on the instrument panel of the airplanes so identified, and explain the reason for the placard.

Standard:

Interpretation of information from the Specification Sheets and the manufacturer's manual will be without error or omission. The student will correctly identify those airplanes-engines-propellers which have critical range vibration problems.

Page No.	Revision No.	Revision Date	Original Date
VI-76	0	08/01/2016	08/01/2016

- D. Locate and interpret “static Limit” information for fixed pitch propellers Level 2

Student Performance Goal

Given:

Copies of Aircraft Specification Sheets for five different airplanes using fixed pitch propellers.

Performance:

The student will locate and interpret information that specifies the static RPM limits for each of the airplane-engine-propeller combinations.

Standard:

Information will be interpreted without error.

- E. Describe the operation and control counterweight propeller Level 2

Student Performance Goal

Given:

A counterweight propeller, cutaway or mock-up, and written information or a manual describing the operation of the propeller.

Performance:

The student will interpret reference information contained in the reference publications and describe the operation and control of a counterweight propeller.

Standard:

The information will be interpreted without error. Correct nomenclature will be used throughout the explanation and description of operation and control.

- F. Describe the operation and control of a hydromatic propeller Level 2

Student Performance Goal

Given:

A hydromatic type propeller, cutaway or mock-up and written reference information or manual describing the operation of the propeller.

Page No.	Revision No.	Revision Date	Original Date
VI-77	0	08/01/2016	08/01/2016

Performance:

The student will interpret information contained in the reference publications and describe the operation and control of a hydromatic type propeller.

Standard:

Information will be interpreted without error. Correct nomenclature will be used throughout the explanation and description of operation and control.

- G. Describe the operation and control of non-counterweight variable pitch, feathering and reversing propellers

Level 3

Student Performance Goal

Given:

Diagrams, drawings, cutaways or mock-ups of McCauley, Hartzell, Aeromatic or other variable pitch, feathering and reversing propellers and written reference information or manuals describing the operation and control of these types of propellers.

Performance:

The student will interpret information contained in the reference publications and describe the operation and control of at least one of the types of propellers.

Standard:

Information will be interpreted without error. Correct nomenclature will be used throughout the explanation and description of operation and control.

- H. Describe the operation and control of a turbine engine propeller system

Level 2

Student Performance Goal

Given:

Diagrams, drawings, cutaways or mock-ups of the system and components of a turbine engine propeller and written reference information or manuals describing the operation and control of these propellers.

Page No.	Revision No.	Revision Date	Original Date
VI-78	0	08/01/2016	08/01/2016

Performance:

The student will interpret information contained in the reference publications and describe the operation and control of the propeller on at least one model of turbine-powered airplane.

Standard:

Information will be interpreted without error. Correct nomenclature will be used throughout the explanation and description of operation.

38. Install, troubleshoot, and remove propellers  
(EIT = 18.5 hrs, T = 6.5 hrs, L/S = 12 hrs)

Level 3

- A. Check operation of a full feathering and reversing propeller

Level 3

Student Performance Goal

Given:

An operational engine equipped with a full feathering, reversing propeller; and written operating instructions.

Performance:

The student will operate the engine and check the propeller for full feather and reverse pitch operation. He will explain the operation and function of feathering and reversing systems.

Standard:

All procedures and explanations will be in accordance with the written operating instructions.

- B. Remove and install propeller on a tapered shaft

Level 3

Student Performance Goal

Given:

An engine or mock-up provided with a tapered propeller shaft, a propeller and hub for a tapered shaft, propeller key, snap ring; written reference information or manuals describing the procedure for checking the contact areas between shaft and propeller hub; service manuals specifying the procedure and torque values for installation of the propeller.

Page No.	Revision No.	Revision Date	Original Date
VI-79	0	08/01/2016	08/01/2016

Performance:

The student will remove the propeller from the shaft. He will check the contact between the tapered propeller shaft and the hub and reinstall the propeller.

Standard:

The procedures specified will be followed without error or omission. The installed propeller will meet return-to-service standards.

C. Remove and install a propeller on a splined shaft      Level 3

Student Performance Goal

Given:

An engine or mock-up provided with a splined propeller shaft, a propeller of a type approved for installation on this shaft; written reference information or service manuals describing the procedure, torque values and tools required for installation and removal of the propeller.

Performance:

The student will remove and reinstall the propeller on the shaft.

Standard:

The procedures specified in the reference information will be followed without error or omission. The installed propeller will meet return-to-service standards.

D. Check track of a propeller      Level 3

Student Performance Goal

Given:

A fixed pitch propeller and a variable pitch propeller mounted on engines or propeller shaft mock-ups; written information describing the procedure for determining the track of a propeller and the manual specifying the limits applicable to each type of propeller.

Performance:

The student will check the track of both propellers and using the specifications appearing in the manual will judge whether the propeller meets return-to-service standards.

Page No.	Revision No.	Revision Date	Original Date
VI-80	0	08/01/2016	08/01/2016



Standard:

The procedures will be interpreted and followed without error or omission. The judgment of flight standard and application of tracking limits will be accurate within the limits of the measuring methods used.

- E. Eternally adjust and rig a propeller governor Level 3

Student Performance Goal

Given:

An operational engine mounted in an airplane or test stand and equipped with a propeller governor and constant speed propeller; written operating instructions and procedures describing the rigging of propeller governor controls and the adjustment of the propeller governor stops.

Performance:

The student will check the operation of the propeller and propeller governor. He will adjust the rigging of the governor controls and the governor after the instructor has introduced a fault into the propeller governor adjustment or control rigging.

Standard:

All operations and procedures will be in accordance with the written reference information. The propeller governor and controls following adjustment will function as it was designed to operate and will be within the limits established in the written instructions.

- F. Troubleshoot description of faults in a hydromatic propeller Level 3

Student Performance Goal

Given:

Reference manuals, publications and ten written descriptions of conditions that are related to oil leaks at the rear cone, piston dome seal, blade butts; malfunctions of the pitch changing mechanism or governor control rigging; and a matching list of most probable causes for the malfunction.

Performance:

The student will interpret reference information and associate the described condition and the most probable cause.

Page No.	Revision No.	Revision Date	Original Date
VI-81	0	08/01/2016	08/01/2016

**Standard:**

The student will correctly associate the most probable cause with the described condition in seven of the ten examples.

**39. Repair aluminum alloy propeller blades**

(EIT – 8 hrs, T = 1 hrs, L/S = 7 hrs)

Level 3

- A. Smooth nicks, cuts and scratches in the leading and trailing edges of metal propeller blades

Level 3

**Student Performance Goal**

**Given:**

Sample serviceable and non-serviceable metal propellers, blades and hubs; AC 43.13-1, manufacturer's manual or equivalent written information describing the repair of nicks, scratches, and similar minor propeller repairs.

**Performance:**

The student will inspect and correctly judge whether the propeller meets return-to-service standards. He will smooth nicks, cuts and scratches in the leading and trailing edges of metal propeller blades.

**Standard:**

All procedures will be in accordance with the written reference information.

**Unducted Fans**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-L)

**40. Inspect and troubleshoot unducted fan systems and components**

(EIT = 6 hrs, T= 1 hrs, L/S = 5 hrs)

Level 1

- A. Inspect and troubleshoot unducted fan systems and components

Level 1

**Student Performance Goal**

Page No.	Revision No.	Revision Date	Original Date
VI-82	0	08/01/2016	08/01/2016

**Given:**

Classroom lecture, manufacturers manuals or other reference materials describing theory of operation, maintenance and unducted fan types, designs and construction. Including energy efficiency and noise comparison to ducted turbofans.

**Performance:**

The student will interpret provided information to identify unducted fan types and describe their function, including potential operational problems and solutions.

**Standard:**

The student will correctly locate and interpret the given reference data for the Unducted fan types. The student will correctly determine potential maintenance problems and solutions. Student will able to correctly draw basic diagrams of unducted fans.

**Auxiliary Power Units**

(Meets the requirements of Part 147, Appendix D-Powerplant Systems and Components-M)

41. Inspect and troubleshoot unducted fan systems and components

(EIT = 6 hrs, T= 2 hrs, L/S = 4 hrs)

Level 1

A. Inspect and troubleshoot Auxiliary Power Units systems and components

Level 1

**Student Performance Goal**

**Given:**

Classroom lecture, manufacturers manuals or other reference materials describing theory of operation, maintenance and auxiliary power unit types such as single and dual spool, designs and construction. Including also electrical and pneumatic load types and their effect on APU turbine performance and temperature.

**Performance:**

The student will interpret provided information to identify APU types and describe their function, including potential operational problems and solutions.

Page No.	Revision No.	Revision Date	Original Date
VI-83	0	08/01/2016	08/01/2016

Standard:

The student will correctly locate and interpret the given reference data for the Auxiliary Power Unit (APU) types. The student will correctly determine potential maintenance problems and solutions. The student will be able to correctly draw basic diagrams of APU's.

Page No.	Revision No.	Revision Date	Original Date
VI-84	0	08/01/2016	08/01/2016