Transport Canada Transports Canada

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Study and Reference Guide

Aircraft Maintenance Engineer Examinations

Revision 1 - August 2005

Canada

STUDY AND REFERENCE GUIDE
AIRCRAFT MAINTENANCE ENGINEER TECHNICAL EXAMINATIONS

INTRODUCTION

The purpose of this Study and Reference guide is to identify topics/subjects that may be covered by the Transport Canada (TC) technical and regulatory examinations required by Canadian Aviation Regulations (CAR) Standard 566.

It is the responsibility of the candidate to be knowledgeable in all areas of aircraft maintenance required to meet the certification requirements associated with the licence.

GENERAL INFORMATION

This Guide is a generic reference document and is not to be interpreted as an all-inclusive list of subjects and topics necessary to complete a specific examination. TC reserves the right to add or remove topics from the Study and Reference Guide.

The applicant feedback letter (Appendix A) will address current topics that reflect the latest technical information relevant to a particular examination or revision of the Study and Reference Guide.

The List of Suggested References (Appendix B) will assist a candidate by outlining a potential source for study material. Appendices A & B are located at the end of the Study and Reference Guide.

EXAMINATIONS

Technical: (90 questions)

Unless otherwise stated, or obvious from the context, all examination questions relate to a normal situation (e.g. in the case of an aircraft, it should be assumed that it is in an airworthy condition, and if in flight, that it is in stable cruise). Questions may be based on knowledge of: theory, components, testing, operation, inspection or troubleshooting of a system.

The examination questions are designed to test the candidate's knowledge of each subject area. The level of knowledge required includes basic principles of the subject areas and their common applications, plus the capability to summarize, analyze and accurately apply the basic principles to a varied range of circumstances.

Regulatory: (50 questions for the M, E and S ratings)
(25 questions for the Balloon rating)

Questions may be based on knowledge of application of the applicable regulation or location of a specific regulation.

Multiple-choice questions consist of an introductory statement (the stem) and four optional answers. The options include the correct answer (the key) and three wrong answers (the distracters). The candidate must select the correct answer from the options given. The number of questions indicated for each exam is approximate.

Examinations may be attempted at most TC offices. Candidates are advised to check with the office in question prior to the examination, to ensure that space is available at the desired time and location.

APPENDICES

Appendix A: Candidate Feedback
Appendix B: List of Suggested Reference Publications

REGULATORY EXAMINATION

(REGS or BREGS)

The Regulatory Requirements (**REGS**) examination is applicable to the M, E and S licence ratings. The Regulatory Requirement (**BREGS**) examination is applicable to the Balloon licence rating.

CARs:

1.0 General Provisions - Interpretation
2.0 Aircraft Identification and Registration and Operation of a Leased Aircraft by a Non-registered Owner – Aircraft marking and Registration
3.0 Personnel Licensing and Training – Aircraft Maintenance Engineering Licenses and Ratings
4.0 Airworthiness
5.0 General Operating and Flight Rules – Aircraft Requirements
6.0 Commercial Air Services – Aircraft Maintenance Requirements for Air Operators

Standards:

7.0 Aircraft Registration
8.0 Airworthiness Directives
9.0 AME Licensing
10.0 Approved Maintenance Organizations (AMO)
11.0 Borrowed Parts
12.0 Defects
13.0 Definitions
14.0 Elementary Work
15.0 Flight Permits; Flight Authorities
16.0 Inspection
17.0 Life Limited Parts
18.0 Maintenance Activities
19.0 Maintenance Control Systems
20.0 Maintenance Release / Release Certification
21.0 Maintenance Schedules
22.0 Modification / Repair
23.0 Non-Destructive Testing (NDT)
24.0 Out-of-Phase items
25.0 Parts Identification
26.0 Performance of Work
27.0 Person Responsible for Maintenance (PRM)
28.0 Restricted Certification Authority (RCA)
29.0 Specialized Maintenance
30.0 Technical Records
31.0 Type/Supplemental Type Certificates
32.0 Used Parts
33.0 Weight and Balance
34.0 (N/A)
35.0 General knowledge on CARs/STDs

1.1.1 STUDY AND REFERENCE GUIDE **"M" RATING TECHNICAL EXAMINATIONS**

STANDARD PRACTICES

The topics contained in this section of the guide are applicable to the SPM - Standard Practices examination for the M rating.

1.0 MATHEMATICS AND PHYSICS

1.1 Shop mathematics, graphs and charts - Theory and application
1.2 Measurement systems and conversion - Calculation and application
1.3 Speed acceleration and motion - Theory and application
1.4 Stress and strain - Theory and application
1.5 Energy and work - Theory and application
1.6 Chemical and physical nature of matter - Theory and application
1.7 Gas laws and fluid mechanics - Theory and application
1.8 Properties of atmosphere - Theory and application

2.0 ELECTRICITY AND ELECTRONICS

2.1 Safety procedures around electrical equipment - Theory and application
2.2 Sources of electrical energy - Basic theory
2.3 Batteries, primary cells and secondary cells - Theory and application
2.4 Magnetism/electromagnetism - Theory and application
2.5 DC theory - Application
2.6 AC theory - Application
2.7 Power distribution - Theory and application
2.8 Wiring practices - Theory and application
2.9 Digital integrated circuits - Theory and application
2.10 Boolean Expression, logic gates and truth tables - Theory and application
2.11 Basic semiconductor circuits - Theory and application
2.12 AC and DC Motors - Theory and application
2.13 Switches and relays - Theory and application
2.14 Fuses and circuit breakers - Theory and application
2.15 Synchros - Theory and application
2.16 Diodes - Theory and application
2.17 Transistors - Theory and application
2.18 Electrical load analysis - Theory and calculation
2.19 Decimal, binary, hexadecimal and octal number systems - Computation and conversion

3.0 AIRCRAFT HARDWARE

3.1 Specifications and standards - Basic theory and application
3.2 Rivets - Identification and use
3.3 Threaded fasteners - Identification and use
3.4 Special fasteners - Theory and application - Identification and use
3.5 Control cables, terminals and turnbuckles - Identification and use
3.6 Bearings and seals - Identification and application
3.7 Gears - Identification, proper use and gear ratio calculation
3.8 Electrical hardware - Wire, terminals, splices, connectors, switches - Identification and use
3.9 Rigid lines, flexible lines and fittings - Characteristics, fabrication, material and size designation
3.10 Sealant - Types and application

4.0 AIRCRAFT DRAWING

4.1 Types of drawings - Application
4.2 Interpretation of drawings, diagrams and charts - Theory and application
4.3 Station diagrams - Theory and application

5.0 WEIGHT AND BALANCE

5.1 *C of G* design limits and range - Knowledge and application
5.2 Weighing procedures and calculations - Knowledge and application

6.0 METALURGY AND CORROSION PREVENTION

6.1 Types of corrosion - Identification
6.2 Inspection processes - Theory and application
6.3 Removal and treatment of corrosion - Theory and application
6.4 Heat treatment, annealing and temper designation - Theory and application

7.0 NONDESTRUCTIVE TESTING

7.1 Inspection techniques - Theory, types and application

8.0 GENERAL SERVICING AND STANDARD PRACTICES

8.1 Fire protection - Types, prevention and extinguishing
8.2 Jacking, hoisting and leveling - Theory and application
8.3 Ground servicing equipment - Theory and application
8.4 Aircraft fueling and defueling procedures - Theory and application
8.5 Aviation fluids including fuel and additive - Types and application

9.0 TOOLS AND MEASURING DEVICES

9.1 Hand tools - Identification and use
9.2 Power tools - Identification and use
9.3 Measuring devices - Identification and use
9.4 Test equipment - Identification and application

10.0 AIRCRAFT SHEET METAL, TUBULAR, WOOD AND COMPOSITE STRUCTURES

10.1 Sheet metal materials - Theory and application
10.2 Aircraft fabrics - Theory and application
10.3 Wood - Theory and application
10.4 Plastics, fiberglass and composite materials - Theory and application
10.5 Basic welding - Theory and application
10.6 Rivet layout pattern designs and installation - Theory and application

AIRFRAME

The topics contained in this section of the guide are applicable to the AF - Airframe examination for the M rating.

11.0 BASIC AERODYNAMICS

11.1 Fixed-wing aircraft - Theory of flight
11.2 The atmosphere - Theory and application
11.3 Aerodynamic lift - Theory and application

12.0 AIRCRAFT STRUCTURES

12.1 Fuselages and aircraft structures - Types, inspection and repair
12.2 Structures that produce and control lift - Theory, inspection, repair, servicing and installation
12.3 Windows and doors - Inspection, repair, servicing and installation

13.0 FIXED WING CONTROLS AND RIGGING

13.1 Mechanical/servo powered flight controls - Theory and application
13.2 Symmetry check and adjustments - Theory and application
13.3 Control surface rigging - Theory and application

14.0 FUNDAMENTALS OF ROTARY-WING AIRCRAFT

14.1 Rotary-wing aircraft - Theory of flight
14.2 Types of rotor systems - Characteristics, components, inspection and construction
14.3 Rigging of controls - Theory and application
14.4 Vibration analysis - Theory and application
14.5 Power train - Transmissions and clutches - Theory and operation
14.6 Auto rotation - Theory and application

15.0 ROTARY WING CONTROLS AND RIGGING

15.1 Flight control system rigging - Theory and application
15.2 Rotor tracking/balancing - Theory and application
15.3 Gearboxes and drive shaft system - Theory and application

16.0 METAL STRUCTURAL

16.1 Sheet metal structures - Theory and application
16.2 Types of structural stress - Theory and application
16.3 Heat treatment, annealing and temper designation - Theory and application

17.0 WOOD AND COMPOSITE STRUCTURE

17.1 Wood components and characteristics - Theory and application
17.2 Finishing wood surfaces - Theory and application
17.3 Plywood skin repairs - Theory and application
17.4 Composite material - Theory and application
17.5 Honeycomb structures - Identification and repairs

18.0 FABRIC COVERING

18.1 Aircraft fabric - Terminology, specification and application
18.2 Repairs and inspection of fabric coverings - Theory and application
18.3 Dope and finishing materials - Theory and application

19.0 WELDING AND TUBULAR STRUCTURE

19.1 Inspection of welds - Theory and application
19.2 Tubular repairs - Theory and application

20.0 PAINTING AND FINISHING

20.1 Metal aircraft and parts - Theory and application
20.2 Fabric aircraft and parts - Theory and application

21.0 ICE AND RAIN PROTECTION

21.1 Ice detection systems - Components, adjustments and operating principles
21.2 Anti ice systems - Components, adjustments and operating principles
21.3 De-ice systems - Components, adjustments and operating principles
21.4 Windshield wiper systems - Components, adjustments and operating principles
21.5 Rain repellent systems - Components, adjustments and operating principles

22.0 22.0 HYDRAULIC AND PNEUMATIC SYSTEMS

22.1 Safety precautions - Theory and application
22.2 High pressure bottles/accumulators - Theory and application
22.3 Hydraulic systems - Components, adjustments and operating principles
22.4 Pneumatic systems - Components, adjustments and operating principles.....

23.0 LANDING GEAR SYSTEMS

23.1 Landing gear systems - Components, adjustment, theory and application
23.2 Nose wheel steering systems - Components, adjustments and application
23.3 Skids, floats and skis - Components, adjustments and operating principles
23.4 Wheels, tires and brakes - Theory, components, adjustments and operating principles

24.0 AIRCRAFT CABIN AND ATMOSPHERIC CONTROL SYSTEMS

24.1 Pressurization systems - Theory, inspection and operating principles
24.2 Air conditioning systems - Theory, components, inspection and operating principles
24.3 Heating systems - Theory, components, inspection and operating principles
24.4 Oxygen systems - Theory, components, inspection and operating principles

25.0 AIRCRAFT FUEL SYSTEMS

25.1 Gravity and pressure-feed systems - Safety, theory, components, inspection and operating principles
25.2 Storage and distribution - Safety, theory, components, inspection and operating principles

26.0 AIRCRAFT FIRE PROTECTION SYSTEMS

26.1 Fire detection systems - Components, adjustments and operating principles
26.2 Fire extinguishing systems - Components, adjustments and operating principles

27.0 AIRCRAFT ELECTRICAL SYSTEMS

27.1 Batteries - Theory, construction, inspection and operating principles
27.2 AC and DC electrical systems - Theory, construction, inspection and application
27.3 Wiring - Construction and inspection
27.4 Aircraft electrical systems - Troubleshooting

28.0 AIRCRAFT INSTRUMENT SYSTEMS

28.1 Instrument systems - Theory and application
28.2 Pitot-static systems - Theory and application, inspection and operating principles
28.3 Compass systems - Theory and application, inspection and operating principles
28.4 Air data computer - Theory and application, inspection and operating principles

29.0 COMMUNICATION - NAVIGATION AND RECORDING SYSTEMS

29.1 Radio transceivers - Theory, inspection and operating principles
29.2 Antennas - Theory, inspection and operating principles
29.3 Weather radar - Theory, installation, inspection and operating principles
29.4 Navigation systems - Theory, inspection and operating principles
29.5 Traffic Collision Avoidance System TCAS - Theory
29.6 Emergency frequencies and safety procedures - Application and operating principles
29.7 Flight Data Recorder (FDR) - Theory, components and inspection/test
29.8 Cockpit Voice Recorder (CVR) - Theory, components and inspection/test

30.0 **30.0 AUTOPILOT SYSTEMS**

30.1 Autopilot systems - Theory and operating principles
30.2 Flight management systems - Theory and operating principles

POWERPLANT

The topics contained in this section of the guide are applicable to the PP - Power Plant examination for the M rating.

31.0 RECIPROCATING ENGINES

31.1 Reciprocating engines - Theory and application, inspection and operating principles
31.2 Engine mounts - Theory, construction, and inspection
31.3 Corrosion prevention - Theory, types, prevention and inspection
31.4 Gear boxes - Theory and operation
31.5 Engine instruments - Theory, inspection and operating principles
31.6 Trend monitoring - Theory and application

32.0 RECIPROCATING ENGINE FUEL AND CONTROL

32.1 Carburetion - Theory and operation
32.2 Fuel injection systems - Theory and operation
32.3 Turbo charger systems - Theory and application
32.4 System indication - Theory and application

33.0 RECIPROCATING ENGINE IGNITION AND STARTING SYSTEMS

33.1 Ignition systems - Types, theory, inspection and operation
33.2 Starting systems - Types, theory, inspection and operation

34.0 RECIPROCATING ENGINE LUBRICATION AND COOLING SYSTEMS

34.1 Engine lubrication - Components, theory, inspection and operation
34.2 Engine cooling - Components, theory, inspection and operation
34.3 Spectrometric Oil Analysis Program (SOAP) - Theory and application

35.0 ENGINE FIRE PROTECTION SYSTEMS

35.1 Engine fire detection - Components, theory, inspection and operation
35.2 Engine fire extinguishing - Components, theory, inspection and operation

36.0 TURBINE ENGINES

36.1 Turbine engines - Theory and application, inspection and operating principles
36.2 Engine instruments - Theory, inspection and operating principles
36.3 Gear boxes, accessory drives and gear reduction - Construction and operating principles
36.4 Engine mounts - Design and inspection
36.5 Trend monitoring - Theory and application

37.0 TURBINE ENGINE LUBRICATION AND COOLING SYSTEMS

37.1 Engine lubrication - Components, theory, inspection and operation
37.2 Engine cooling - Components, theory, inspection and operation

38.0 TURBINE ENGINE FUEL AND CONTROL

38.1 Electronic and hydro-mechanical control - Theory and application
38.2 Governors - Theory and application
38.3 Manifolds and nozzles - Theory and application
38.4 Fuel Heaters - Theory and application
38.5 Oil coolers - Theory and application
38.6 Filters - Theory and application
38.7 System indication - Theory and application

39.0 TURBINE ENGINE INDUCTION AND EXHAUST SYSTEMS

39.1 Inlets and inlet screens - Construction
39.2 Exhaust - Theory, inspection and operating principles`
39.3 Thrust reversers - Construction and operating principles
39.4 Anti-ice systems - Theory, inspection and operating principles

40.0 POWER PLANT RECORDING AND INDICATING SYSTEMS

40.1 Speed/temperature/pressure indication - Theory and application
40.2 Fuel and Oil - Theory and application
40.3 Ratio/torque/vibration - Theory and application
40.4 Built In Test Equipment (BITE) - Theory and application
40.5 Fault detection - Theory and application

41.0 WATER INJECTION

41.1 Water methanol injection systems - Theory and application

42.0 PROPELLERS AND SYSTEMS

42.1 Propellers - Fixed/controllable pitch types, theory and application
42.2 Propeller systems - Components, terminology, theory, inspection and application

STUDY AND REFERENCE GUIDE
"E" RATING - TECHNICAL EXAMINATIONS

STANDARD PRACTICES - AVIONICS

The topics contained in this section of the guide are applicable to the SPE - Standard Practices Avionics examination for the E rating.

1.0 STANDARD PRACTICES

1.1 Safety practices
1.2 Chemical and physical nature of matter - Theory and application
1.3 Gas laws and fluid mechanics - Theory and application
1.4 Properties of the atmosphere - Pressure, humidity, density characteristics
1.5 Properties of solids and liquids - Theory and application
1.6 Velocity, acceleration, mass and force - Theory and calculation
1.7 Heat, temperature, heat transfer and measurement - Calculation
1.8 Work, energy and power - Theory and calculation
1.9 Sound production, reproduction, propagation, speed and quality - Calculation
1.10 Light propagation, reflection and refraction - Theory
1.11 Aircraft electrical wiring - Lacing, clamping, crimping, splicing and routing, including safety precautions
1.12 Aircraft electrical wiring - Grounding, bonding and shielding
1.13 Soldering and desoldering techniques
1.14 Instrument panel layout and instrument mounting
1.15 Measurement systems and conversion – Calculation
1.16 Shop mathematics, graphs and charts - Theory and application
1.17 Aircraft electrical load analysis - Theory and calculation
1.18 ATA Specification 100 - Chapters relevant to maintenance of aircraft systems
1.19 Safety wiring (lock wiring) procedures

2.0 AERODYNAMICS

2.1 Theory of flight - Fixed wing aircraft
2.2 Theory of flight - Rotary wing aircraft

3.0 AIRCRAFT HARDWARE

3.1 Specifications and standards - Basic theory and application
3.2 Electrical hardware - Terminals, splices, connectors, switches, protective devices
3.3 Aircraft electrical wiring - Types, characteristics, wire sizes
3.4 Special fasteners - Theory and application
3.5 Rivets - Identification and use
3.6 Threaded fasteners - Identification and use
3.7 Control cables, terminals and turnbuckles - Identification and use

4.0 AIRCRAFT DRAWING

4.1 Types of drawings - Application
4.2 Interpretation of drawings, diagrams and charts - Theory and application
4.3 Station diagrams - Theory and application

5.0 WEIGHT AND BALANCE

5.1 *C of G* design limits and range - Knowledge and application
5.2 Weighing procedures and calculations - Knowledge and application

6.0 PITOT STATIC SYSTEMS

6.1 Types - Identification

6.2 Inspection processes - Theory and application

7.0 METALURGY AND CORROSION PREVENTION

7.1 Types of corrosion - Identification
7.2 Inspection processes - Theory and application
7.3 Removal and treatment of corrosion - Theory and application

8.0 STRUCTURES

8.1 Aircraft structures - Fixed wing aircraft
8.2 Aircraft structures - Rotary wing aircraft

9.0 FLIGHT CONTROLS AND RIGGING

9.1 Flight control systems - Theory, types and application

10.0 NONDESTRUCTIVE TESTING

10.1 Inspection techniques - Theory, types and application

11.0 GENERAL HANDLING AND SERVICING

11.1 Shop safety - Theory and application
11.2 Fire protection - Types, prevention and extinguishing
11.3 Safety on the flight line – Foreign Object Damage (FOD) and hazardous areas
11.4 Jacking, hoisting and leveling - Theory and application
11.5 Ground servicing equipment - Theory and application

12.0 TOOLS AND MEASURING DEVICES

12.1 Hand tools - Identification and use
12.2 Power tools - Identification and use
12.3 Measuring devices - Identification and use
12.4 Test equipment - Identification and application

13.0 SHEET METAL

13.1 Structural and non-structural repairs - Identification and modification requirements
13.2 Special fasteners - Theory and application
13.3 Scratch inspection - Theory and application
13.4 Sealant - Theory and application

14.0 POWERPLANT

14.1 Piston Engines – Theory and application
14.2 Turbine Engines – Theory and application

15.0 FUEL SYSTEMS

15.1 Storage and Distribution - Theory and application

16.0 HYDRAULIC AND PNEUMATIC SYSTEMS

16.1 Sources and common application - Theory and application
16.2 Operation and components - Theory and application
16.3 Maintenance and service - Theory and application
16.4 Storage and distribution – Theory and application

17.0 FIRE PROTECTION

17.1 Detection, and suppression – Theory and application

18.0 IGNITION SYSTEMS

18.1 Low, high tension - Theory and application

19.0 ENVIRONMENTAL CONTROL SYSTEMS

19.1 Pressurization – Theory, application and function testing
19.2 Air conditioning - Theory, application and function testing
19.3 Ventilation - Theory, application and function testing
19.4 Oxygen - Theory, application and function testing

20.0 LANDING GEAR SYSTEMS

20.1 Assemblies - Theory and application
20.2 Retraction systems - Theory and application
20.3 Indication systems - Theory and application
20.4 Wheels and brakes - Theory and application
20.5 Steering systems - Theory and application

21.0 STARTING SYSTEMS

21.1 Turbine engine starters – Theory, application, inspection and servicing
21.2 Electrical starters - Theory, application, inspection and servicing
21.3 Starter-generators - Theory, application, inspection and servicing

22.0 ICE AND RAIN SYSTEMS

22.1 Ice detection - Theory and application
22.2 Anti-ice - Theory and application
22.3 De-ice - Theory and application
22.4 Rain repellant - Theory and application

23.0 ELECTRICITY AND ELECTRONICS

23.1 Safety procedures around electrical equipment - Theory and application
23.2 Sources of electrical energy - Basic theory
23.3 Batteries, primary cells and secondary cells - Theory and application
23.4 Magnetism/electromagnetism- Theory and application
23.5 DC theory - Application
23.6 AC theory - Application
23.7 Power distribution - Theory and application
23.8 Wiring practices - Theory and application
23.9 Digital integrated circuits - Theory and application
23.10 Solid-state devices - Theory and application
23.11 Basic semiconductor circuits - Theory and application
23.12 AC and DC Motors- Theory and application
23.13 Switches and relays - Theory and application
23.14 Fuses and circuit breakers - Theory and application
23.15 Synchros - Theory and application
23.16 Decimal, binary, hexadecimal and octal number systems - Computation and conversion
23.17 Digital data display - Theory and application
23.18 Boolean expressions, logic gates and truth tables - Theory and application
23.19 Electrical load analysis – Theory and application

"E" RATING - AVIONICS

The topics contained in this section of the guide are applicable to the AV - Avionics examination for the E rating.

24.0 24.0 NAVIGATION AND COMMUNICATION SYSTEMS

24.1 Radio waves and radio signals - Theory and application
24.2 Antennas - Theory, construction, installation and inspection
24.3 Communication - FM, VHF, HF systems - Theory, components and inspection
24.4 Radio-Navigation systems - Theory, components and inspection
24.5 Radio altimeter systems - Theory, components and inspection
24.6 Weather radar – Theory, components and inspection
24.7 RMI - Theory, components and inspection
24.8 Ground Proximity Warning System - Theory, components and inspection/calibration
24.9 Compass systems - Theory, components and inspection
24.10 TCAS - Theory, construction and inspection

25.0 AUTOFLIGHT SYSTEMS

25.1 Autopilot systems - Theory, components and inspection
25.2 Flight Management Computer System - Theory, components and inspection
25.3 Autothrottle and thrust management systems - Theory, components and operation
25.4 Automatic landing system - Theory, components and operation
25.5 Mach trim system - Theory, components and inspection

26.0 ELECTRICAL SYSTEMS

26.1 Safety procedures around electrical equipment - Theory and application
26.2 DC generation – Theory and application
26.3 AC generation – Theory and application
26.4 Batteries, nicad and lead acid – Theory, application and maintenance
26.5 Power distribution - Theory and application
26.6 Digital integrated circuits - Theory and application
26.7 Aircraft electrical systems – Troubleshooting and repair
26.8 Aircraft electrical systems - Wiring diagram interpretation
26.9 Starter generator - Theory and application

27.0 RECORDING AND EMERGENCY SYSTEMS

27.1 Cockpit Voice Recorder (CVR) - Theory, components and inspection/test
27.2 Flight Data Recorder (FDR) - Theory, components and inspection/test
27.3 Emergency Locator Transmitter - Theory, components and inspection/test
27.4 Underwater Location Device (ULD) - Theory, components and inspection/test

28.0 INSTRUMENT SYSTEMS

28.0 Flight instruments - Theory, construction and inspection
28.1 Air Data Computer - Theory, construction and inspection

STUDY AND REFERENCE GUIDE
"S" RATING TECHNICAL EXAMINATIONS

The topics contained in this section of the guide are applicable to the SPS - Standard Practices Structures examination for the S rating.

1.0 STANDARD PRACTICES

1.1 Safety practices
1.2 Gas laws and fluid mechanics - Theory and application
1.3 Properties of the atmosphere - Pressure, humidity, density characteristics
1.4 Properties of solids and liquids - Theory and application
1.5 Velocity, acceleration, mass and force - Theory and calculation
1.6 Heat, temperature, heat transfer and measurement - Calculation
1.7 Work, energy and power - Theory and calculation
1.8 Aircraft electrical wiring - Types, characteristics, wire sizes
1.9 Aircraft grounding and bonding - Theory and calculation
1.10 Instrument panel layout and instrument mounting - Theory and application
1.11 Flight control systems - Theory and application
1.12 Propulsion systems - Theory and application
1.13 Hydraulic systems - Theory and application
1.14 Pneumatic systems - Theory and application
1.15 Landing gear systems - Theory and application
1.16 Environmental systems - Theory and application
1.17 Fire protection systems - Theory and application
1.18 Safety wiring (lockwiring) procedures
1.19 Welding techniques - Theory and application
1.20 ATA Specification 100 - Chapters relevant to maintenance aviation maintenance

2.0 AERODYNANICS

2.1 Aircraft structures and theory of flight - Fixed wing aircraft
2.2 Aircraft structures and theory of flight - Rotary wing aircraft

3.0 MATHEMATICS / PHYSICS

3.1 Shop mathematics, graphs and charts - Theory and application
3.2 Measurement systems and conversion - Calculation and application
3.3 Chemical and physical nature of matter - Theory and application
3.4 Stress and strain - Theory and application

4.0 AIRCRAFT HARDWARE

4.1 Specifications and standards - Basic theory and application
4.2 Rivets - Identification and use
4.3 Threaded fasteners - Identification and use
4.4 Special fasteners - Theory and application
4.5 Control cables, terminals and turnbuckles - Identification and use
4.6 Rigid lines, flexible lines and fittings - characteristics, fabrication, material and size designation
4.7 Sealant - Theory and application

5.0 AIRCRAFT DRAWING

5.1 Types of drawings - Application
5.2 Interpretation of drawings, diagrams and charts - Theory and application
5.3 Station diagrams - Theory and application

6.0 WEIGHT AND BALANCE

6.1 *C of G* design limits and range - knowledge and application
6.2 Weighing procedures and calculations - knowledge and application

7.0 METALURGY AND CORROSION PREVENTION

7.1 Types of corrosion - Identification
7.2 Inspection processes - Theory and application
7.3 Removal and treatment of corrosion - Theory and application
7.4 Heat treatment, annealing and temper designation - Theory and application
7.5 Ferrous and non ferrous metals – Types and properties

8.0 NONDESTRUCTIVE TESTING

8.1 Inspection techniques - Theory, types and application

9.0 GENERAL HANDLING AND SERVICING

9.1 Shop safety - Theory and application
9.2 Fire protection - Types, prevention and extinguishing
9.3 Safety on the flight line - FOD and hazardous areas
9.4 Ground servicing equipment - Theory and application

10.0 TOOLS AND MEASURING DEVICES

10.1 Hand tools – Identification and use
12.5 Power tools - Identification and use
10.2 Measuring devices - Identification and use
10.3 Test equipment - Identification and application

11.0 AIRCRAFT SHEET METAL, TUBULAR, WOOD AND COMPOSITE STRUCTURES

11.1 Sheet metal materials
11.2 Aircraft fabrics
11.3 Wood
11.4 Plastics, fiberglass and composite materials

12.0 MAINTENANCE PROCEDURES

12.1 Inspection and maintenance requirements - Theory and application
12.2 Inspections (periodic, annual, progressive, approved maintenance schedules)
12.3 Jacking, hoisting and leveling - Theory and application
12.4 Basic welding - Theory and application
12.5 Rivet layout pattern designs and installation - Theory and application

STRUCTURES

The topics contained in this section of the guide are applicable to the ST - Structures examination for the S rating.

13.0 SHEET METAL

13.1 Repairs and fabrication
13.2 Assessment methods, techniques and practices - Theory, application and inspection
13.3 Repair materials - identification and application

14.0 TUBULAR

14.1 Repairs and fabrication
14.2 Assessment methods, techniques and practices - Theory, application and inspection
14.3 Repair materials - Identification and application

15.0 WOOD AND FABRIC

15.1 Repairs and fabrication
15.2 Assessment methods, techniques and practices - Theory, application and inspection
15.3 Repair materials - Identification and application

16.0 COMPOSITE

16.1 Repairs and fabrication
16.2 Assessment methods, techniques and practices - Theory, application and inspection
16.3 Repair materials - Identification and application

17.0 METALURGY AND CORROSION PREVENTION

17.1 Types of corrosion - Identification
17.2 Inspection processes - Theory and application
17.3 Removal and treatment of corrosion - Theory and application
17.4 Heat treatment, annealing and temper designation - Theory and application
17.5 Ferrous and non ferrous metals – Types and properties

18.0 NONDESTRUCTIVE TESTING

18.1 Inspection techniques - Theory, types and application

19.0 FLUID LINES AND CONDUITS

19.1 Rigid lines, flexible lines and fittings - Characteristics, fabrication, material and size designation

20.0 THERMOPLASTICS

20.1 Material – Inspection and installation
20.2 Storage and surface protection – Theory and application

Appendix A

Applicant Feedback

After each examination is written, it will be marked and the candidate will be provided with a “feedback” letter outlining knowledge areas where a candidate is deficient. For example, the letter would state one of the following:

Note: You will need a copy of this publication to decode the numbers shown in example A and B.

EXAMPLE A: WRITTEN EXAMINATION RESULTS:

Your recently written SPE 001 Examination has been assessed as Pass, 78% and recorded as follows:

Exam Title: AIRCRAFT MAINTENANCE ENGINEER LICENCE - STANDARD PRACTICES - E (SPE)
Date Written: 2002-05-21
Exam Region: ONTARIO
Attempt Number: 1

Examination questions 12.2, 15.1, 15.3, 17.8 & 18.6 which are related to subject areas in TP 14038-E - STUDY AND REFERENCE GUIDE - AIRCRAFT MAINTENANCE ENGINEER LICENCE were answered incorrectly
You will need a copy of this publication to decode the number shown above.

In addition to the topics identified, a thorough review of all subject areas is recommended. This will ensure that you have covered the required material prior to rewriting, as subsequent examinations may or may not test on the same topics.

You will be eligible to rewrite this examination on or after the following date:

EXAMPLE B: WRITTEN EXAMINATION RESULTS

Your recently written AF 001 examination has been assessed as Fail, 60% and recorded as follows:

Exam Title: AIRCRAFT MAINTENANCE ENGINEER LICENCE - AIRFRAME
Date Written: 2002-03-04
Exam Region: QUEBEC
Attempt Number: 1
Examination questions 1.6, 1.8, 2.17, 3.7, 4.12, 5.06, 7.08, 7.09, 11.3, 11.7 which are related to subject areas in TP 14038-E STUDY AND REFERENCE GUIDE - AIRCRAFT MAINTENANCE ENGINEER LICENCE were answered incorrectly.
You will need a copy of this publication to decode the number shown above.

In addition to the topics identified, a thorough review of all subject areas is recommended. This will ensure that you have covered the required material prior to rewriting, as subsequent examinations may or may not test on the same topics.

You will be eligible to rewrite this examination on or after the following date:

1.1.1.1.1.1.1.1.1 **List of suggested reference publications**

The following is a list of suggested reference study material which will assist a candidate in the successful completion of all Transport Canada AME technical examinations. However, this reference list should not be interpreted as an absolute list of all reference study material used by Transport Canada.

The latest revision of the following manuals:

A&P Mechanics - General Handbook	AC65-9A
A&P Mechanics - Powerplant Handbook	AC65-12
A&P Mechanics - Airframe Handbook	AC65-15A
Jeppesen	A&P Technician General Textbook
Jeppesen	A&P Technician Powerplant Textbook
Jeppesen	A&P Technician Airframe Textbook
ASA Aviation Maintenance Technician Series	-Dale Crane - General
ASA Aviation Maintenance Technician Series	-Dale Crane - Powerplant
ASA Aviation Maintenance Technician Series	-Dale Crane - Airframe
Aircraft Basic Science	- Kroes /Rardon /Bent/McKinley
Aircraft Maintenance and Repair	- Delp/Bent/McKinley
Aircraft Electricity and Electronics	- Eismin/Bent/McKinley
Aircraft Inspection and Repair	EA-AC 43.13- 1B & 2A
Fundamental of Helicopter Maintenance	EA-HF-2
DC Circuits	EA-DCC
Avionics Fundamentals	EA-AV
Aviation Electronics	EA-352
Electronic Circuit Devices	EA-192-1
Aircraft Radio Systems	EA-356
Basic Electronics and Radio Installation	EA-BEM
Aircraft Electrical Systems - Light & Twin Engine	EA-357
Aircraft Instrument Systems	EA-AIS
Automatic Flight Control - E.H.J. Pallett	
Aircraft Sheet Metal	EA-SM
Aircraft Corrosion Control	EA-CC-1
Aircraft Painting and Finishing	EA-AP-2
Aircraft Bonded Structures	EA-NMR
Aircraft Fabric Covering	EA-ADF
Synthetic Fabric Covering	EA-307
NDT Testing in Aircraft	EA-AP-2
Advanced Composites	EA-358
Standard Aviation Maintenance Handbook	EA-282-0
Aircraft Technical Dictionary	EA-ATD-3
A&P Technician General Textbook	*EA-ITP-G2*
A&P Technician Powerplant Textbook	*EA-ITP-P2*
A&P Technician AirframeTextbook	*EA-ITP-A2*
Aircraft Systems and Components	*EA-393*
Transport Category Aircraft Systems	*EA-363*
Aircraft Hydraulic Systems	*EA-AH-1*
Aircraft Air Conditioning	*EA-AAC-1*

Aircraft Tires and Tubes	*EA-ATT-2*
Aircraft Wheels, Brakes&Antiskid Systems	*EA-AWB*
Aircraft Gas Turbine Powerplants	*EA-TEP*
Aircraft Reciprocating Engines	*EA-ARE*
Aircraft Governors	*EA-AGV*
Aircraft Propeller and Controls	*EA-APC*
Aircraft Fuel Metering Systems	*EA-FMS*
Aircraft Ignition and Electrical Power	*EA-IGS*
The Jet Engine	*Rolls-Royce*
Aircraft Powerplants	*Brent/McKinley*
Aircraft Batteries	*EA-AB-1*
Electrical Systems for A&P	*EA-412*
Fundementals of Aircraft Material Factors	*EA-340*
Intorduction to Flight Test Engineering	*EA-225-1*
Aircraft Weight and Balance	*EA-BAL*
Applied Science for the Aircraft Technician	*EA-AS*
The Best of AMJ Maintenance Tips	*EA-341*
Aircraft Mechanics Shop Manual	*Larry Reighmaier*
Aircraft Mechanics Specifications Handbook	*Pittsburgh Institute of Technology*

Candidates are encouraged to stay abreast of the latest regulatory and technical developments in aviation by learning from as wide a range of aviation publications as possible.