

# open book exam 2011

**A**IRMAINTENANCE UPDATE is Transport Canada-approved for recurrent training. This is our ninth exam, published annually in our June/July anniversary issue, in accordance with our agreement with Transport Canada. The exam consists of questions based on articles appearing in all six issues from the past year: June/July 2010, August/September 2010, October/November 2010, December 2010/January 2011, February/March 2011, and April/May 2011. You will require all six issues in order to write the exam. If you are missing any issues, call us at (604) 214-9824, or email us at amu.magazine@telus.net, and we will mail them to you at a cost of \$6.95 per magazine postpaid.

A 75% pass rate is required in order to qualify for your 16 hours towards RT. The questions in the exam are arranged in order of their appearance in AirMaintenance Update according to issue and individual article. The exam can also be accessed and printed from our web site: [www.amumagazine.com](http://www.amumagazine.com). Answers should be printed in the spaces provided and must be drawn directly from the text of the articles in order to be considered correct. All questions requiring a longer answer than the space allowed must be type-written on a separate sheet of paper. Completed exams should be submitted to:

AIRMAINTENANCE UPDATE, Suite 2-203, 4360 Agar Drive, Richmond, BC, V7B 1A3. The exam must be postmarked no later than October 31, 2011. We will mark your test and return it along with documentation supporting your submission. We will keep a copy of your written test and results on file for future reference, and a copy will be forwarded to Transport Canada.

— Good luck again to all participants!



## YOUR CONTACT INFORMATION

**For a prompt and accurate response to your 2011 Exam answers, please fill in the following information (print clearly).**

Name:.....  
 Address:.....  
 .....  
 .....  
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## June–July 2010 (Volume 9/Issue 1)



### *AME Training and Licensing*

1) Name the three types of aircraft maintenance-related approved courses taught in community colleges across Canada.

1. ....  
 .....  
 2. ....  
 .....  
 3. ....  
 .....

2) What is the minimum number of course hours for the maintenance and avionics courses approved by Transport Canada or the Canadian Aviation Maintenance Council?

.....

3) What is the minimum number of hours for an approved structures course?

.....

4) How long must a college graduate work at an AMO before applying for an AME license (M & E)?

.....

5) How long is the time period for the above question if the candidate has graduated from a college with full Transport Canada accreditation?

.....

6) What is the minimum passing grade for exams connected with an AME license?

.....

7) What does an AME license qualify the holder to do?

.....  
 .....  
 .....

8) What, besides an appropriate license, is required for an AME to certify a repair to an aircraft?  
 .....  
 .....  
 .....  
 .....  
 .....

9) When an AME certifies a repair, what is he or she certifying?  
 .....  
 .....  
 .....  
 .....

*What's in a Battery? (Part 1)*

10) Name the two major categories of batteries.  
 .....  
 .....

11) Briefly, what is the difference between the two?  
 .....  
 .....  
 .....

12) What are the names of the two half-cells that make up a voltaic cell?  
 1. ....  
 2. ....

13) What is the direction of the flow of electricity in an electrical system?  
 .....

*Distraction*

14) Name four things that can cause a technician to be distracted.  
 1. ....  
 .....  
 2. ....  
 .....  
 3. ....  
 .....  
 4. ....

15) Name seven safety nets that can help prevent minor or major incidents.  
 1. ....  
 2. ....  
 3. ....  
 4. ....  
 5. ....  
 6. ....  
 7. ....

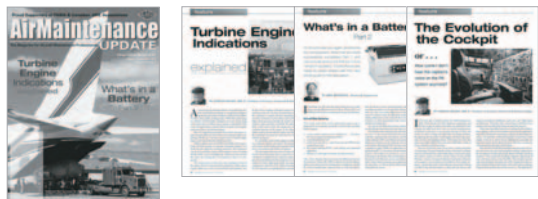
*Coatings That Boost the Bottom Line*

16) What purpose does the paint on an aircraft serve besides decoration?  
 .....  
 .....

17) Name three things that help determine how long paint will last.  
 1. ....  
 2. ....  
 3. ....

18) Name three advantages of a clearcoat paint system.  
 1. ....  
 2. ....  
 3. ....

**August–September 2010 (Volume 9/Issue 2)**



*Turbine Engine Indications*

1) In a single spool turbine, what is the rotational speed of the compressor referred to?  
 .....

2) What is the normal reference number for N1?  
 .....

- 3)** What are the two most common types of N1 sensors?  
 1. ....  
 2. ....
- 4)** In a two-spool turbine, what is rotational speed of the second spool of the compressor referred to?  
 ....  
 ....
- 5)** Name three types of maintenance problems associated with tach generators.  
 1. ....  
 2. ....  
 3. ....
- 6)** Why do speed sensors tend to have fewer maintenance problems than tach generators?  
 ....  
 ....  
 ....
- 7)** In turboprops that measure engine RPM by the speed of the gas producing turbine, what term is used for this RPM?  
 ....  
 ....
- 8)** What term is used for propellor RPM in these engines?  
 ....
- 9)** How is it determined how much thrust an engine is producing?  
 ....  
 ....  
 ....  
 ....
- 10)** What is the ratio PT7:PT2 known as?  
 ....  
 ....
- 11)** What indication is used for the primary thrust target setting in high bypass turbine engines?  
 ....

- 12)** What devices are used to monitor and control turbine engine temperatures?  
 .....

*What's in a Battery? (Part 2)*

- 13)** Name the five main battery types, either in use or proposed for use in aircraft.  
 1. ....  
 2. ....  
 3. ....  
 4. ....  
 5. ....
- 14)** What two materials make up the electrolyte of a Ni-Cad battery, and what are the percentages of each?  
 1. ....  
 2. ....
- 15)** What is the potential voltage of one Ni-Cad cell?  
 .....
- 16)** In a NiCad battery, what keeps the positive and negative plates from physically contacting each other?  
 .....
- 17)** What is the maximum pressure the vent valve on a Ni-Cad battery allows?  
 .....
- 18)** What is the term used for the potential overheating phenomenon in a Ni-Cad battery?  
 .....
- 19)** What two materials make up the electrolyte of a lead-acid battery, and what are the percentages of each?  
 .....
- 20)** What is the potential cell voltage in a lead-acid battery?  
 .....
- 21)** Name the three types of lead-acid battery.  
 1. ....  
 2. ....  
 3. ....

22) What component of the lead-acid battery electrolyte is extremely corrosive?  
.....  
.....

23) What is the range of pressures in valve regulated lead-acid batteries?  
.....  
.....

*Managing Fatigue*

24) State four symptoms of fatigue.  
1. ....  
2. ....  
.....  
3. ....  
4. ....

25) State five causes of fatigue.  
1. ....  
2. ....  
3. ....  
4. ....  
5. ....

26) State the three most important ways to avoid fatigue.  
1. ....  
2. ....  
3. ....

27) What should NOT follow a physically demanding task?  
.....  
.....

2) In a turbine-powered aircraft, why can a weak battery be worse than a dead battery?  
.....  
.....

3) What is the legal minimum performance of an aircraft battery?  
.....  
.....  
.....  
.....

4) How is battery capacity defined?  
.....  
.....  
.....

5) How is battery capacity measured?  
.....  
.....

6) Name three “electrical parasites” that drain the life from a battery.  
1. ....  
2. ....  
3. ....

7) In a Ni-Cad battery, what causes an increase in the “rock content” or unusable part of the electricity stored in a battery?  
.....

**October–November 2010 (Volume 9/Issue 3)**



*What's in a Battery? (Part 3)*

1) Why do we do maintenance on an aircraft battery?  
.....  
.....

8) What causes diminishing capacity in a lead-acid battery?  
.....  
.....

9) What is the typical self-discharge rate of a Ni-Cad battery?  
.....  
.....  
.....

10) What is the self-discharge rate of a lead-acid battery?  
.....  
.....

- 11)** Name three things that will accelerate the self-discharge rate of a battery.
1. ....
  2. ....
  3. ....
- 12)** State the safety precautions listed in this article that should be put into practice when servicing a battery.
- .....
- .....
- .....

*Piston Engine Indications*

- 13)** What mechanical device operates a direct-reading oil pressure gauge?
- .....
- .....
- 14)** What is contained in the Bourdon tube of a direct-reading temperature gauge?
- .....
- .....
- 15)** What is a thermistor?
- .....
- .....
- 16)** Name two types of indicators where a thermocouple may be used.
- .....
- .....
- 17)** State three methods that may be used to operate a tachometer (RPM indicator).
1. ....
  2. ....
  3. ....
- 18)** What does a manifold pressure gauge measure?
- .....
- 19)** When the engine is not running, what is the manifold pressure gauge indicating?
- .....
- .....

*Corporate Aircraft Interiors*

- 20)** In Canada, what legal documents are required for a modification to a corporate aircraft interior?
- .....
- .....
- 21)** What document is required for the refurbishment of a corporate aircraft interior?
- .....
- 22)** Name one of the single most important aspects of a corporate interior modification or refurbishment.
- .....

*Accident Chains: Planned or Unplanned?*

- 23)** What is the minimum number of links in any accident chain according to Boeing research?
- .....
- 24)** How many links in the accident chain were identified in the AirOntario disaster at Dryden?
- .....
- 25)** Name two of the best safety nets you can have.
- .....

**December 2010–January 2011  
(Volume 9/Issue 4)**



*Propeller Governor Operations and Maintenance*

- 1)** To what pressure does a governor increase the oil pressure before sending it to the propeller hub?
- .....
- 2)** Name the three sections of a propeller governor.
1. ....
  2. ....
  3. ....

3) At what RPM is the engine turning when the governor is in an onspeed condition?  
.....  
.....

4) Into what condition will a governor go if the engine RPM increases during constant speed operation?  
.....  
.....

5) Name three situations that can cause an underspeed condition.  
1. ....  
2. ....  
3. ....

6) What is the additional part in a feathering governor?  
.....  
.....

7) What extra parts are there if the governor has an unfeathering capability?  
1. ....  
2. ....

8) On a PT6 engine, to what pressure does the governor pump increase the oil pressure?  
.....  
.....

9) What is the pressure increased to on a Garrett engine governor?  
.....  
.....

10) On a turbine engine governor, what can the pilot manually adjust that he can't with a piston engine governor?  
.....  
.....

11) What does a synchrophasing system do that a synchronizing system doesn't?  
.....  
.....  
.....

12) What is the advantage of a synchrophasing system?  
.....  
.....

13) When there are a lot of hours on a governor, what can be a common problem?  
.....  
.....

14) In a twin engine aircraft, what problem can arise if the governor speeder spring is replaced in only one governor?  
.....  
.....

*Pressurization and Air Conditioning Systems Explained*

15) What provided the air to pressurize the cabins on many earlier transport category aircraft?  
.....  
.....

16) When turbine engines became popular, what became a more common way to pressurize a cabin?  
.....  
.....

17) What component regulates the pressure in the cabin and also allows pressurized air to leave the cabin so it can be replaced by fresh air?  
.....  
.....

18) What device automatically controls the outflow valves?  
.....  
.....

19) What safety precaution should a maintenance technician take before working in or around the outflow valves?  
.....  
.....

20) What is the approximate pressure difference between the inside of a pressurized cabin and the ambient pressure outside a transport category aircraft at altitude?  
.....  
.....

*What's in a Battery? (Part 4)*

21) Why should Ni-Cad and vented lead acid battery maintenance not be attempted in the same room?  
.....  
.....

**22)** Name six things that should be checked in a periodical check of a Ni-Cad battery.

1. ....
2. ....
3. ....
4. ....
5. ....
6. ....

**23)** If, during a regular check of a Ni-Cad battery, cell voltages peak and then slowly start to drop, what is the possible cause?

.....

**24)** During maintenance charging, what should be done with the vent caps of a Ni-Cad battery?

.....

**25)** What five things should be checked during a visual inspection of a lead acid battery?

1. ....
2. ....
3. ....
4. ....
5. ....

**26)** What measurement can determine the remaining life and overall condition of a lead-acid battery?

.....

**2)** What is the name given to the collection of components used to cool bleed air for use in pressurization?

.....

**3)** From where does the cooling air come for the heat exchangers that cool ram air before it goes into a cabin for pressurization? 1. In flight? 2. On the ground?

1. ....
2. ....

**4)** What system removes condensed moisture from the pressurization system before the air enters the cabin?

.....

**5)** Above what temperature must the temperature in the water separator system remain?

.....

**6)** Name the two most common types of cabin heaters used in smaller, general aviation aircraft.

1. ....
2. ....

**7)** What does the Boeing 787 use for pressurization air instead of engine bleed air?

.....

*The New Kid on the Block . . . or the 3 Rs*

**8)** How many points of attachment are there for the RR300 engine as installed in the Robinson R66 helicopter?

.....

.....

**February–March 2011 (Volume 9/Issue 5)**



*Pressurization and Air Conditioning Systems Explained (Part 2)*

**1)** Name two facts that we must be aware of when dealing with compressed gas (air).

1. ....
2. ....

**9)** How are N1 and N2 RPM information transmitted in the RR300?

.....

.....

**10)** What type of compressor does the RR300 use?

.....

.....



*The New Kid on the Block . . . or the 3 Rs (Part 2)*

- 1) What is the compression ratio of the RR300 compressor?  
.....
- 2) What part that is normally in the compressor section of a turbine engine is absent in the RR300?  
.....
- 3) How does the RR300 manage compressor surge/stall?  
.....  
.....  
.....  
.....  
.....
- 4) What component reduces the likelihood of surge from vane erosion?  
.....
- 5) What provides the heat for the compressor anti-icing system in the RR300?  
.....  
.....
- 6) To what oil pressure is the RR300 set at production test or post overhaul test?  
.....
- 7) After the initial adjustment on newly installed engines, is it allowable to adjust the RR300 oil pressure to correct for high oil pressure?  
.....
- 8) Can the transducers for the oil pressure and torque meter pressure be interchanged?  
.....

- 9) Where is the starter button located in the R66?  
.....  
.....
- 10) What does the engine monitoring unit record?  
.....  
.....
- 11) What four components does the RR300 fuel management consist of?
  - 1. ....
  - 2. ....
  - 3. ....
  - 4. ....
- 12) What method is used for fuel cutoff in the RR300/R66 combination?  
.....  
.....

*Ice and Rain Protection Systems Explained*

- 13) What two categories are aircraft ice protection systems divided into?
  - 1. ....
  - 2. ....
- 14) Describe the difference between the two types of systems in the question immediately above.  
.....  
.....  
.....  
.....
- 15) Describe the operation of pneumatic de-icer boots.  
.....  
.....  
.....
- 16) What method is normally used for ice protection on modern propeller blades?  
.....  
.....