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Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

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NATIONAL CERTIFICATE

AIRCRAFT MAINTENANCE THEORY N3

(11041113)

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09:00–12:00

This question paper consists of 6 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
AIRCRAFT MAINTENANCE THEORY N3
TIME: 3 HOURS
MARKS: 100

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. Read ALL the questions carefully.
3. Number the answers according to the numbering system used in this question paper.
4. Sketches must be large, neat and labelled.
5. Write neatly and legibly.

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QUESTION 1

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–C) next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 The only effective and sure way that intergranular corrosion can be detected is by ...

A tapping on the suspected metal surface with a 250 gram aluminium hammer or large coin that can produce a clear metallic ring if there is no corrosion present.
B using x-ray or ultrasonic testing equipment.
C using the dye penetrant detection process.

1.2 When tinning a soldering iron it is important to ...

A clean the face at the end of the copper bit with a file to remove all dirt and roughness.
B remove the burrs from the edges of the copper bit before it is used.
C use the correct type of flame and nozzle when heating the copper bit.

1.3 The pitot-static system pressure are used to operate the following three flight instruments …

A vertical speed indicator, air speed indicator and altimeter
B altimeter, air speed indicator and directional indicator
C air speed indicator, turn-and-bank indicator and artificial horizon

1.4 A tensiometer checkout will require ... to be used to test the tensiometer for accuracy.

A a test bar and a correction chart
B turnbuckles and a correction chart
C rigging pins and a correction chart

1.5 The two general methods of bleeding brake systems are the ... methods.

A furthest point and closest point
B filling and suction
C bleeding from the top downward and bleeding from the bottom upward

(5 × 1) **[5]**

QUESTION 2

2.1 Explain the purpose of inspections on aircraft. (4)

2.2 A hard landing can have severe consequences on an aircraft if it is ignored.

If a hard landing occurred but has not been reported by the pilot, suspecting it happened for what would you look to ensure that the aircraft has not been damaged during the event? (4)

2.3 Visual detection is the oldest method of searching for cracks but it is very difficult to see minute cracks with the naked eye. Therefore specialised tools and equipment have been developed for this by the industry.

Explain the radiography crack detection process developed to aid the finding of cracks. (10)

2.4 Divine the purpose of tempering as it is applied to steel. (1)

2.5 Explain the process of tempering steel. (3)

[22]

QUESTION 3

3.1 Corrosion may be very destructive on metals if it is not prevented.

Explain what effect corrosion may have on an aircraft structure. (3)

3.2 For what welding affects should a welded aircraft part be inspected after welding has been completed? (6)

3.3 FIGURE 1 illustrates two airframe rigging checks.

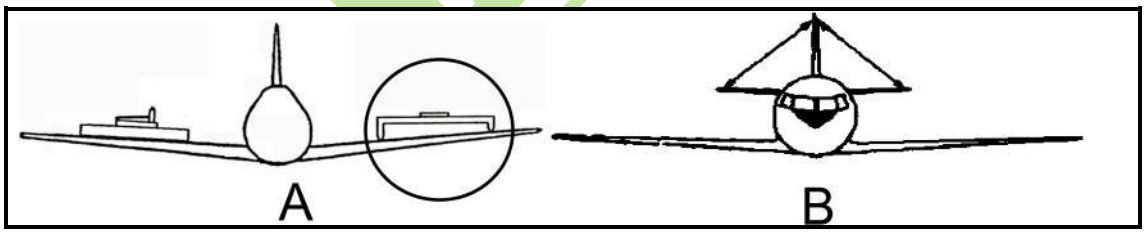


FIGURE 1

3.3.1 Identify the two checks by writing the answer next to the letter (A–B) in the ANSWER BOOK. (2)

3.3.2 Name the instrument indicated by a circle in test A. (1)

3.3.3 Explain the check that is marked A in FIGURE 1. (4)

3.4 List any SIX effects of adverse forward loading on an aircraft. (6)

[22]

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QUESTION 4

4.1 FIGURE 2 below shows one of the instruments that is connected to the pitot-static system.



FIGURE 2

4.1.1 Name the instrument. (1)

4.1.2 Explain how this instrument is tested for leaks during a leak test of the pitot-static system. (5)

4.2 Explain the operational test of an electrical system during routine maintenance of the electrical system. (4)

4.3 After an inspection and/or rigging of the flying control system an operational check of the system must be completed.

Summarise this operational check. (5)

4.4 After inspection, a removable fuel tank needs to be pressure tested in the workshop.

List FOUR precautions to be taken during this test. (4)

4.5 Define the engineering term *limit* as applied to aircraft engines. (2)

4.6 During engine overhaul the first step is dismantling the engine. However before an engine is disassembled a preliminary inspection is carried out.

Explain what is looked for during this inspection. (4)
[25]

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QUESTION 5

5.1 Summarise the inspection that will be carried out on the casing (housing) of a carburettor during a routine inspection on the condition of the carburettor. (2)

5.2 Explain the inspection of the condition of lubrication system filters during routine maintenance. (3)

5.3 Summarise the inspection that is required on the braiding or rigid conduit of the harness of an ignition system. (3)

5.4 Summarise the inspection of the dome of the pitch-changing mechanism during propeller overhaul. (3)

5.5 Explain when it will be necessary to test run an engine in a test cell to check for correct functioning, measurement of the power developed and of the fuel and oil consumption. (4)

5.6 After returning from a flight the pilot reports that the engine is vibrating above certain engine revolutions. During a ground test run the engine is found to vibrate as reported. The engine is shut down so that the cause can be investigated and rectified.

Give TWO possible causes and rectifications of this problem. Indicate whether the causes and rectifications are for a piston engine or gas turbine engine. (6)

5.7 During the overhauling of engines the ball and roller bearings are cleaned, inspected and lubricated.

List FIVE defects for which the bearings has to be examined. (5)

[26]

TOTAL: 100

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