higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

AIRCRAFT MAINTENANCE THEORY N3

(11041113)

10 August 2021 (X-paper)
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This question paper consists of 7 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. Start each question on a new page.
5. Use only black or blue pen.
6. Write neatly and legibly.

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QUESTION 1

1.1 After an overhaul of a light single engine aircraft its engine is installed. The fixed pitch propeller is fitted to the engine and a blade tracking check it is required.

Explain the procedure that needs to be followed. (6)

1.2 A light aircraft illustrated in FIGURE 1 should be weighed as part of the requirements specified in the maintenance manual following an annual inspection.

How would you prepare this aircraft for weighing?

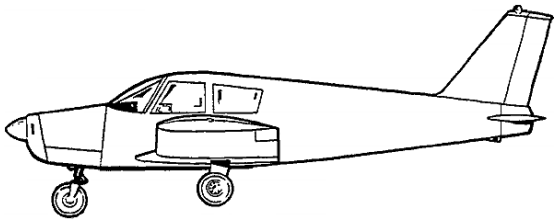


FIGURE 1 (8)

1.3 During an annual inspection of a twin-engine business aircraft illustrated in FIGURE 2, the rudder and elevator has to be inspected for condition.

Describe what such an inspection would consist of.

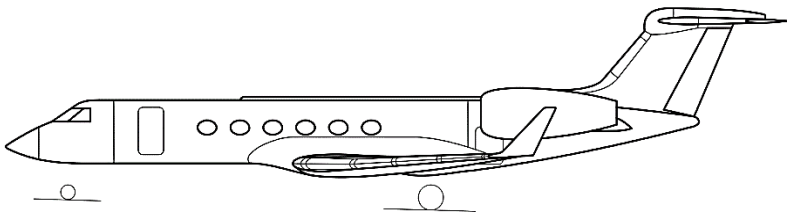
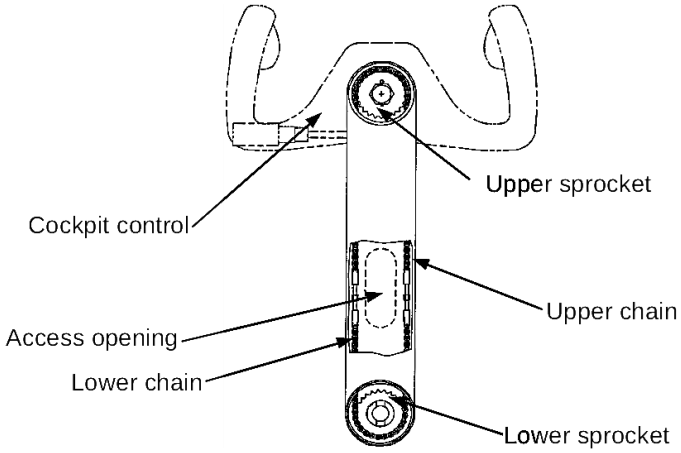


FIGURE 2 (4)

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1.4 Illustrated in FIGURE 3 below is a sprocket and chain system located in the cockpit of a light aircraft. An annual inspection is carried out on the system and the sprocket and chain should be examined.

What would the sprocket be examined for during this inspection?



Chain and sprocket controls

FIGURE 3

(6)
[24]

QUESTION 2

2.1 An artificial horizon indicator like the one illustrated in FIGURE 4 below has been reported as functioning erratically. A test needs to be carried out to see if it requires replacement.

Describe what this test procedure will consist of.

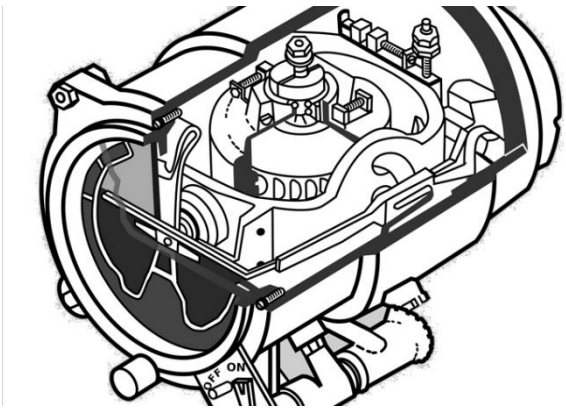


FIGURE 4

(4)

2.2 During a routine inspection on a light aircraft an operational test must be carried out on the electrically driven equipment.

Identify the components that will be tested.

(4)

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2.3 A crack is found in a landing gear member as illustrated in FIGURE 5 below.

What action should be taken to rectify the problem?

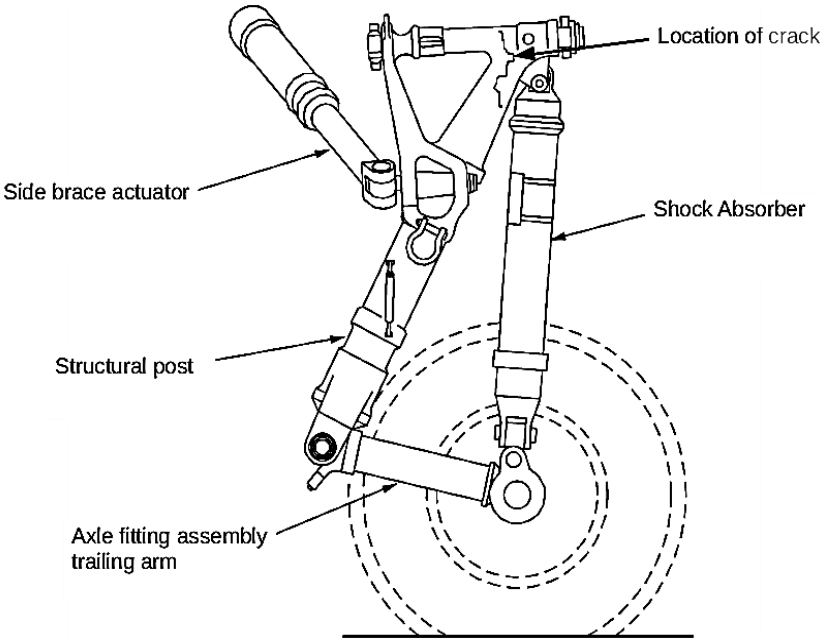


FIGURE 5 (1)

2.4 Explain the operation of an electrically operated landing gear system as used on some light aircraft (like the one illustrated in FIGURE 1). (5)

2.5 A commercial airliner's empennage structure was damaged as illustrated in FIGURE 6 below during servicing and needs to be repaired. The part (skin) of the structure is made of composite material. The damage has penetrated more than one ply of the cloth in the sandwich-type laminate and a scarfed repair is required.

Explain how this repair can be accomplished.

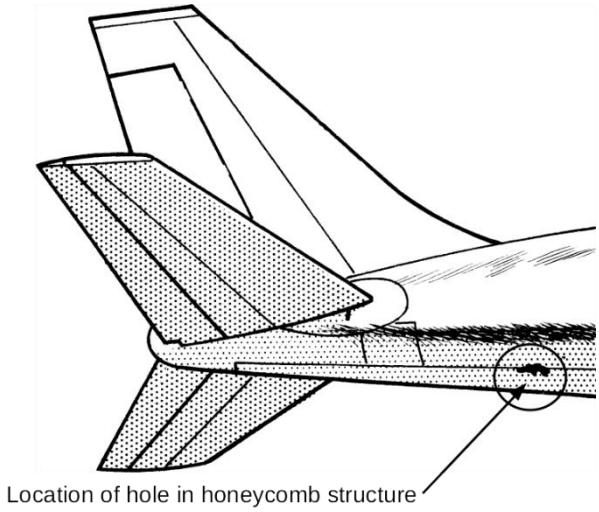


FIGURE 6 (8)

[22]

QUESTION 3

3.1 A routine inspection is required on a light aircraft piston engine.

Explain what the following will be inspected for during this inspection relating to the engine:

3.1.1 The fuel lines. (5)

3.1.2 The ignition harness. (6)

3.2 An overhaul is done on the piston engine of a light aircraft.

Relating to this engine describe how the following is done during the overhauling of the components mentioned:

3.2.1 The inspection of the carburettor that has been disassembled. (6)

3.2.2 An oil cooler leak test. (5)
[22]

QUESTION 4

4.1 During the service life of gas turbine engines, their components may be subject to failures from various conditions. This can be the result from the various processes.

State FOUR of these resulting processes. (4)

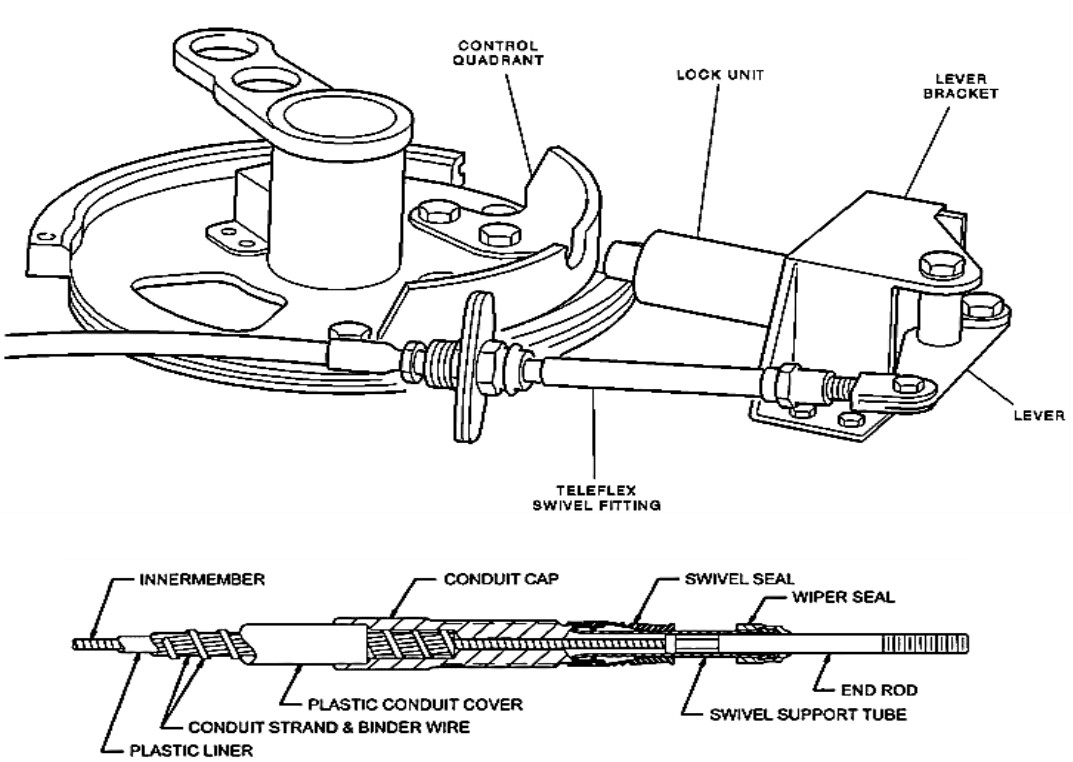
4.2 A cylinder borescope inspection has to be carried out on the cylinders of a piston engine after a fault was reported.

Explain the procedure of this inspection and what is looked for. (6)

4.3 Illustrated in FIGURE 7 below is a Teleflex type cable system as used on some aircraft engines to control engine and propeller power settings.

Make up a list of what is expected to be checked on this type of cable assembly (cable only).

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Teleflex cable control

FIGURE 7 (6)

4.4 When an engine overhaul is completed, a test run is done in a test cell to run the engine in, make necessary adjustments and check fuel and oil consumption checks.

Explain how the fuel consumption will be checked. (3)
[19]

QUESTION 5

5.1 An engine is being reassembled and certain preparations and precautions need to be taken during the process to ensure that there are no delays in the process.

Name FOUR of these preparations and precautions. (4)

5.2 During a ground run test of the piston engine an incorrect oil pressure reading is obtained, and an oil pressure adjustment is required.

Explain how this adjustment is done. (5)

5.3 A fault on the left-hand turbo fan engine of the business aircraft illustrated in FIGURE 2 is reported and need to be corrected. The report states that the engine fails to start.

What could cause failure of the engine to start? (4)
[13]

TOTAL 100

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