higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE

AIRCRAFT MAINTENANCE THEORY N1

(11041091)

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
AIRCRAFT MAINTENANCE THEORY N1
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. Write neatly and legibly.

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QUESTION 1

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'True' or 'False' next to the question number (1.1–1.15) in the ANSWER BOOK.

1.1 A before-flight inspection must be done within eight hours before the aircraft's next flight.

1.2 The illustrated parts catalogue provides instructions on how to repair structures on an aircraft.

1.3 The air pressure at high altitudes is less dense than the air pressure at lower altitude thus aircraft can fly more economical at high altitudes.

1.4 The empennage is a cone found on the front of the fuselage to which the horizontal stabilisers are attached.

1.5 Parasite drag is caused by any exposed object which offers resistance to airflow.

1.6 Surface corrosion is identified by powdery deposits on the surface of the components.

1.7 In the semi-monocoque fuselage construction the skin carries all the primary stresses.

1.8 The colour of synthetic hydraulic oil is red.

1.9 The purpose of the standpipe in hydraulic reservoirs is to allow sufficient quantities of fluid for emergency purposes.

1.10 The function of accumulators is to supply fluid under pressure to compensate for small external leaks.

1.11 The purpose of the fuel system is to supply dirty fuel to the fuel-control unit.

1.12 The purpose of the cyclic pitch control on helicopters is to tilt the tip-path plane of the rotor blade.

1.13 Inlet valve stems contain a salt that serves as a cooling agent.

1.14 The centrifugal flow compressor of a gas turbine engine consists of an impeller and a diffuser.

1.15 Magnetos are fitted to all gas turbine engines.

(15 × 1) **[15]**

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QUESTION 2

2.1 Describe the following aircraft maintenance schedules:

2.1.1 Bulletins

2.1.2 Maintenance manuals

2.1.3 Overhaul manuals

(3 × 2) (6)

2.2 Explain when, how and why a duplicate inspection is carried out. (6)

2.3 Make neat, labelled sketches to explain each of the following aircraft terms:

2.3.1 Angle of attack

2.3.2 Angle of incidence

2.3.3 Fineness ratio

2.3.4 Aspect ratio

(4 × 2) (8)
[20]

QUESTION 3

3.1 Define the following terms, with the aid of sketches:

3.1.1 Boundary layer

3.1.2 Wing-tip vortices

(2 × 2) (4)

3.2 Name any THREE corrosion-prone areas on aircraft. (3)

3.3 Name THREE stresses that structural members are subjected to during flight. (3)
[10]

QUESTION 4

Make neat, labelled sketches of the following components found in hydraulic systems:

4.1 Piston-type accumulator (5)

4.2 Double-acting hand pump (5)
[10]

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QUESTION 5

5.1 Name FIVE basic components of an airframe fuel system. (5)

5.2 Make neat, labelled sketches of the following functions of helicopters:

5.2.1 Angle of attack

5.2.2 Axis of rotation

5.2.3 Disk area

5.2.4 Disk loading

5.2.5 Solidity ratio

(5 × 2) (10)
[15]

QUESTION 6

Make neat, labelled sketches of the following components of a reciprocating petrol engine:

6.1 Exhaust valve (indicate the cooling element) (3)

6.2 Recessed type piston head (3)

6.3 Single-throw radial engine crankshaft (5)

6.4 Opposed or flat-type cylinder arrangement (2)

6.5 Single row, radial type cylinder arrangement (2)
[15]

QUESTION 7

7.1 Describe the FIVE sections of a single spool gas-turbine engine. (5 × 2) (10)

7.2 Make neat, labelled sketches of THREE types of combustion chambers used on gas-turbine engines. (5)
[15]

TOTAL: 100

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