higher education & training

Department:
Higher Education and Training
REPUBLIC OF SOUTH AFRICA

T30**(E)**(A8)T

NATIONAL CERTIFICATE

AIRCRAFT METALWORK THEORY N2

(11021102)

8 August 2018 (X-Paper)
09:00–12:00

This question paper consists of 5 pages.

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DEPARTMENT OF HIGHER EDUCATION AND TRAINING
REPUBLIC OF SOUTH AFRICA

NATIONAL CERTIFICATE
AIRCRAFT METALWORK THEORY N2
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. ALL sketches must be neat and drawn using drawing instruments.
6. Write neatly and legibly.

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QUESTION 1: GENERAL

Indicate whether the following statements are TRUE or FALSE. Choose the answer and write only 'true' or 'false' next to the question number (1.1–1.5) in the ANSWER BOOK.

1.1 When using a Huck rivet machine to install rivets with different diameters, the shift operating pressure should also be adjusted.

1.2 If zinc is added to pure aluminium, it lowers the melting point.

1.3 The letter 'T' in an aluminium alloy temper designation indicates that the rivets were strain hardened.

1.4 Taper-Lok fasteners are used on big, stressed, primary structures.

1.5 *Limit* means the difference between the upper deviation and lower deviation of a specific size

(5 × 1) **[5]**

QUESTION 2: DEVELOPMENT

FIGURE 1 below shows a metal article in the shape of a cut-off pyramid. Copy the article in the ANSWER BOOK and develop the full surface. Show ALL the projection lines on the development.

ALL dimensions are in millimetre and the cut-off angle is 30°. **[15]**

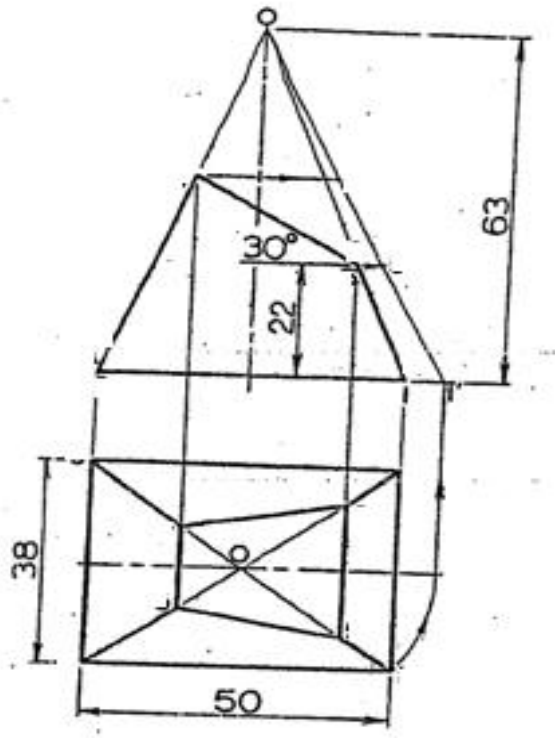

FIGURE 1

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QUESTION 3: MATERIAL

3.1 Describe the following properties of metals used in the aircraft industry:

3.1.1 Elasticity

3.1.2 Density

3.1.3 Hardness

(3 × 2) (6)

3.2 List FOUR advantages of using pure aluminium for the manufacturing of aircraft structures. (4)

3.3 Indicate THREE reasons why titanium is heat-treated before it is used in the aircraft industry. (3)

3.4 Explain the reason for the chemical spot test. (2)

[15]

QUESTION 4: CORROSION

4.1 Aluminium surfaces that were subsequently painted can be exposed to more severe cleaning procedures and can also be given more thorough corrective treatment prior to painting.

Describe FOUR steps that are generally used in the correct sequence. (4 × 2) (8)

4.2 Explain the following on dissimilar corrosion.

4.2.1 Identification (2)

4.2. Treatment (3)

4.3 Define *stress corrosion*. (4)

[17]

QUESTION 5: FASTENERS

5.1 Make sketches of the following rivet joints:

5.1.1 Single riveted lap joint

5.1.2 Double riveted lap joint

5.1.3 Single splice plate

5.1.4 Double splice plate

(4 × 2) (8)

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5.2 An improper made countersink reduces the strength of a flush riveted joint and may cause failure. With THREE sketches explain the following rivet countersinking:

5.2.1 Preferred countersinking

5.3.2 Permissible countersinking

5.3.3 Unacceptable countersinking

(3 × 2) (6)

5.3 Complete the following table on Cleco fasteners. Write only the answers next to the question numbers (5.3.1–5.3.6) in the ANSWER BOOK.

RIVET (INCHES)	DRILL	CLECO COLOUR
3/32	5.3.1	5.3.2
5.3.3	#30	Copper
5/32	5.3.4	Black
5.3.5	#12	5.3.6

(6 × 1) (6)

[20]

QUESTION 6: CONSTRUCTION

6.1 Name TWO types of drill bush holders. (2)

6.2 Describe the procedure for a flush patch repair on a stressed-skin construction. (10)

6.3 During the shrinking process, metal is forced or compressed into a smaller area. This process is used when the length of a piece of metal, especially on the inside of a bend, is to be reduced during the manufacturing of cabinets, galleys, racks and boxes. Sheet metal can be shrunk by hammering.

6.3.1 Name the tools used for shrinking metal.

6.3.2 Describe the process of shrinking metal.

(2 + 4) (6)

[18]

QUESTION 7: FUEL TANKS

Explain how you would do a test on small fuel tanks after repairs. **[5]**

QUESTION 8: AIRCRAFT DRAWINGS

With a neat sketch, explain *interference fit*. **[5]**

TOTAL: 100

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