Level 3 Diploma/Extended Diploma in Advanced Manufacturing Engineering (4515)

May 2025 Version 1.0

Unit 322 Principles of Machining Processes

Knowledge Test - Version A – SAMPLE

Introduction

This document contains the external assessment for the 4515 - Unit 322 Principles of Machining Processes of the Level 3 Diploma/Extended Diploma in Advanced Manufacturing Engineering (4515).

The separate Mark Scheme should be used by employers/training providers/tutors to mark the completed paper.

Qualification Level 3 Diploma/Extended Diploma in Advanced Manufacturing Engineering (4515)	**Assessment title** 4515-322 Principles of Machining Processes **Version A**

Assessment conditions The allocated time for the completion of this assessment is 2 hours You must complete the test on your own under supervised conditions. This is a closed-book exam: no key texts are permitted during the test. **Location:**

Assessment Composition

Evidence	**Unit coverage (LO & AC references)**	**Grading**
Knowledge test	1.1, 1.2, 1.3, 1.4, 1.5, 1.6, 2.1, 2.2, 2.3, 2.4, 2.5, 3.1, 3.2, 3.3	Pass/Fail

Knowledge Test – Version A

Unit 322 Principles of Machining Processes

Test duration: 2 hours

You should have the following for this examination:

- A pen with black ink

This question paper is the property of City & Guilds

Read the following notes before you answer any questions:

- Attempt all questions.
- All parts of all questions must be answered.
- If you find a question difficult leave it and return to it later.
- A pen with black ink must be used to complete all questions.
- The exam will last 2 hours, excluding reading time.
- The short answers should be written in the spaces provided. If additional separate sheets of paper are required, please make sure each page is clearly labelled with your name.
- All questions do not carry equal marks. The maximum marks for each question are shown.
- Under no circumstances must answer papers be removed from the examination room by the candidate.

- Numerical answers should be written to 3 significant figures, unless otherwise stated in the question.

Centre Name:

Centre Number:

Candidate name:

Enrolment number:

Declaration of authenticity (to be completed by the candidate)

I confirm that all work submitted is my own Candidate signature: Date:

To be completed by Assessor:

Evidence	Mark	Grade
Knowledge test	/60	Pass/Fail

I confirm that all work was conducted under conditions designed to assure the authenticity of the candidate's work, and am satisfied that, to the best of my knowledge, the work produced is solely that of the candidate. I have judged the assessment against the assessment and marking criteria for this unit and award the candidate the unit grade as calculated above Assessor signature: Date:	
*IQA signature & date:	*EQA signature & date:
Moderator signature & date:	

(*if sampled)

1. Describe **two** characteristics of a horizontal milling machine.

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(4 marks)

2. Explain why a box column is used in the structure of a grinding machine.

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(4 marks)

3. Explain the stages required to secure machine equipment to a solid floor with rag bolts.

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(4 marks)

4. Explain why tool alignment is important.

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(2 marks)

5.

a). Explain **two** factors affecting the alignment of a spindle on a lathe.

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(4 marks)

b). Explain what is meant by the term stick-slip.

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(2 marks)

6. The squareness of planes to spindle on a pedestal drilling machine needs to be checked.

Describe the stages of alignment testing to be carried out.

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(4 marks)

7. Give two reasons why a toothed belt would be used instead of a flat belt in a belt driven machine.

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(2 marks)

8. Explain how a cam and follower operate.

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(4 marks)

9. Explain how a cone pulley system is used to change speed.

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(4 marks)

10.

a) Explain how hydraulic drives are used to control feeds and speeds of hydraulic components.

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(3 marks)

b) Other than hydraulic drives, explain **one** method used to control feeds and speeds of hydraulic components.

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(2 marks)

11.

a) Explain how variable output compressors are used to control feeds and speeds of pneumatic components.

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(3 marks)

b) Other than variable output compressors, explain **one** method used to control feeds and speeds of pneumatic components.

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(2 marks)

12. Explain **three** advantages and **one** limitation of using CNC machine tools, rather than non-CNC machine tools.

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(8 marks)

13.

a) Explain what is meant by an open loop control system.

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(2 marks)

b). Other than open and closed loop systems, explain **one** operating principle of CNC machine tools.

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(2 marks)

14. With reference to programs in CNC machining, describe **each** of the following.

a) Canned cycles

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(2 marks)

b) Sub routines

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(2 marks)