Level 7 Materials Process Engineer (Degree) Apprenticeship (ST0659)

AM3: Knowledge and Skills Test Guidance

Version 2

Updated 03 November 2022

INTRODUCTION

Apprentices must undertake a Knowledge and Skills Test as their first assessment on passing Gateway. This will demonstrate the Apprentices knowledge and skills to this point and allow them to progress to the next assessment stages. Sample test and marking schemes will be made available before the date of the test so the Apprentice knows what to expect on the day.

KNOWLEDGE AND SKILLS (KSs)

The Level 7 Material Process Engineer apprenticeship standard states that all Apprentices will need to develop specialist KSs. These KSs will be generic and/or technology specific, but the subject areas indicated below will provide a foundation for an apprentice development in materials process engineering.

The KSs of the of the Level 7 Material Process Engineer apprenticeship standard are set out below for AM3:

Knowledge
A Material Process Engineer will require a thorough understanding of the industry in which they are employed. They will be able to understand and apply the following areas:

K7 Importance of design for manufacture and assembly
K8 Principles and practices of engineering standards
K9 Principles of process risk management including Process Failure Modes and Effects Analysis. (PFMEA)
K10 Principles of Stakeholder management
K11 Importance of working within a regulatory framework
K12 Importance of Intellectual Property, Patents & Export Control
K13 The function of Quality Techniques Systems and Standards
K14 The principles of statistical process control and application techniques (e.g. PFMEA)
K15 Change management principles
K16 Principles and practices of knowledge-based systems

Skills
A Material Process Engineer will be asked to demonstrate skills in the following:

S6 Use Process Failure Mode Effect Analysis tool kit appropriately
S10 Make appropriate use of statistical tools e.g. Minitab, excel, DMAIC
S14 Demonstrate correct application of Value Stream Mapping tools

FORMAT

The Knowledge and Skills test will be a maximum of 60 minutes. It will be a closed book test which means that no reference books or materials can be referred to during the exam.

The test must be taken in a suitably controlled environment that is a quiet space, free from distractions and influence and in the presence of an invigilator. The Invigilator may be the independent assessor, or another external person employed by PIABC Limited. PIABC Limited is responsible for ensuring the security of test materials and that the test remains valid and reliable. PIABC Limited is responsible for verifying the validity of the identity of the person taking the test.

The test consists of 25 questions in total. There are 5 open questions requiring short, structured answers. These enable the Apprentice to demonstrate knowledge more fully and holistically. There will be 5 questions based on a case study. These questions will ensure the Apprentice can demonstrate the ability to assess the case study and identify the most appropriate answers drawing on their knowledge. The final 15 questions are multiple-choice questions.

The 15 multiple-choice questions will be worth 1 mark each, the open response and case study questions will be worth 5 marks each. Marks will be awarded for partial responses too so don't leave a question unanswered.

SAMPLE TEST

A sample test and marking scheme will be made available before the date of the test so the Apprentice knows what to expect on the day.

ASSESSMENT CRITERIA

AREA OF ASSESSMENT	METHOD	PASS CRITERIA
Deliver material process engineering/operational solutions effectively	**K7** Importance of design for manufacture and assembly **K10 Principles** of Stakeholder management **K11** Importance of working within a regulatory framework	Describe the key design processes which underpin engineering/operational performance ensuring effective identification, delivery, implementation and management of all stakeholders and adherence to regulation.
Use of six-sigma methodologies, data analysis, problem solving and continuous improvement	**K9** Principles of process risk management including Process Failure Modes and Effects Analysis (PFMEA) **K14** The principles of statistical process control and application techniques (e.g. PFMEA) **K15** Change management principles **S8** Use of process failure mode effect analysis tool kit. **S10** Use of statistical tools.	Selects and applies appropriate PFMEA, statistical tools and techniques to make recommendations suitable for identification of operational improvements in a materials process engineer environment.

Management of Intellectual Property	**K12** Importance of Intellectual Property, Patents and Export Control.	Demonstrates an understanding of the major ideas related to the control of intellectual property and the importance of compliance
Safe and professional working practices	**K8** Principles and practices of engineering standards **K13** The function of Quality Techniques Systems and standards	Demonstrate the key processes which underpin safe and professional working practices and describes the function of Quality Techniques Systems and standards.
Manage the delivery of a stable manufacturing/operational solutions optimised for whole life costing	**K16** Principles and practices of knowledge-based systems **S14** Demonstrate correct application of Value Stream Mapping tools	Able to demonstrate how to manage and evaluate value engineering, whole life costing as applying to their discipline

GRADING

The Knowledge and Skills test will be assessed Pass or Fail; it will not be given a grade.

SUCCESSFUL COMPLETION OF THE END POINT ASSESSMENT

For an apprentice to pass the end point assessment (EPA) as a whole and be deemed to be competent, the apprentice must pass all assessment methods. The AM1: Work-Based Project and Presentation, AM2: Professional Review/Discussion and the AM3: Knowledge and Skills Test. The apprentice will be considered to have failed if they do not meet the criteria outlined in the pass descriptor.

Should the apprentice fail either AM1, AM2 or AM3 they are required to re-sit/re-take that component. The number of times an apprentice is permitted to re-sit/re-take the end point assessment and the date at which they do so is determined by the employer.