

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson BTEC
Level 1/Level 2
Tech Award**

Centre Number

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Learner Registration Number

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Friday 8 February 2019

Supervised hours: 1 hour 30 minutes (AM)

Paper Reference **21141K**

Engineering

**Component 3: Responding to an Engineering Brief
Set task: Part 2**

You do not need any other materials.

Total Marks

Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and learner registration number.
- Answer **all** questions.
- Answer the questions in the spaces provided
– *there may be more space than you need.*
- This is **Part 2** of the Set task.
- This task and answer booklet contains material for the completion of **Part 2** of the set task under supervised conditions.
- **Part 2** of the set task is out of 30 marks.
- This task and answer booklet is specific to each series and this material must be issued only to learners who have been entered to take the task in the specified series. This booklet should be kept securely until the start of the 1.5 hour supervised assessment period. This set task should be undertaken in the period timetabled by Pearson.

Information

- The total mark for this paper is 60.
- The marks for **each** question are shown in brackets
– *use this as a guide as to how much time to spend on each question.*

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ►

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Instructions for teachers

This assessment is made up of two parts. **Part 1** consists of a practical activity. **Part 1** must be taken before **Part 2**. **Part 2** consists of two written activities.

Both parts of the set task are completed during a one week period timetabled by Pearson. **Part 1** is to be completed in one session of two hours within the first four days of the timetabled period. **Part 2** is to be completed in one session on the Friday of the timetabled period.

This task and answer booklet contains **Part 2** of the set task. Learners do not need to take any notes from **Part 1** into **Part 2**.

Part 2 must be completed under supervised conditions within a 1.5 hour supervised session.

Learners must complete **Part 2** of the set task using this task and answer booklet. Learners should take calculators into the supervised session.

This is a formal external assessment and must be conducted with reference to the instructions in this task and answer booklet, and the *Information for Conducting External Assessments (ICEA)* document, to ensure that the supervised session is conducted correctly and that learners have the opportunity to carry out the required activities independently.

Teachers are responsible for maintaining security and for reporting issues to Pearson. In particular:

- only permitted materials can be brought into the supervised environment
- during any permitted break and at the end of the session, materials must be kept securely and no items removed from the supervised environment.

After the session, the teacher will confirm that all learner work has been completed independently as part of the authentication submitted to Pearson.

Outcomes for submission

Part 1 and **Part 2** task and answer booklets should be submitted to Pearson at the same time.

Each learner must complete an authentication sheet.

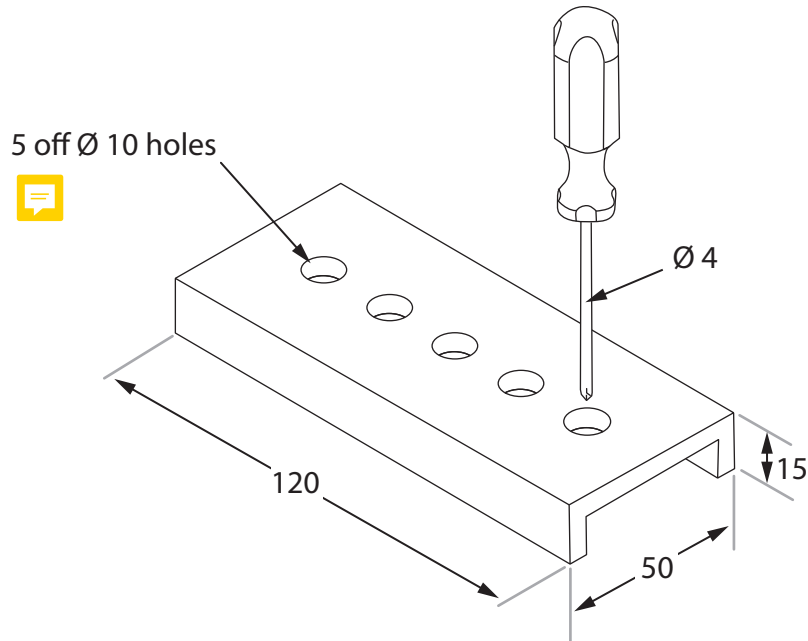
Practical activity notes from the demonstration will be retained securely by the centre after **Part 2** and may be requested by Pearson if there is suspected malpractice.



Set task information

Engineering Brief

A customer wants to place an order for 1000 stands to hold screwdrivers. The screwdrivers will be placed into the 10mm diameter holes. A technician at your company designs and makes the stand shown below as a possible solution. The stand is made from medium carbon steel which is supplied as a rectangular section that is 15mm thick.



To make the stand, the technician:

- marked out the length, the position of the holes and the slot at the bottom
- cut the steel to length
- cut the slot underneath using a milling machine
- drilled the 10mm holes using a pillar drill

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You must complete ALL activities in Part 2.

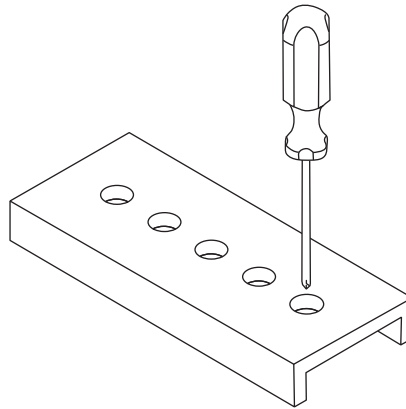
Activity 2a: Evaluation

Explain the issues with the design of the screwdriver stand.

Think about how the screwdriver stand is made and how it will be used. You should consider dimensions and tolerances, physical form, attributes, materials and processes.

Write your answer in the line space provided on the next page.

You may annotate the diagram to identify the issues with the design of the screwdriver stand.



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You should spend 20 minutes completing Activity 2a.

(Total for Activity 2a = 8 marks)



Activity 2b: Redesign

You have been asked to consider different ways to manufacture this screwdriver stand. You should consider different designs and processes to make it.

Sketch a design idea for the screwdriver stand that is an improvement on the existing design proposal. You may annotate the diagram to indicate design improvements.



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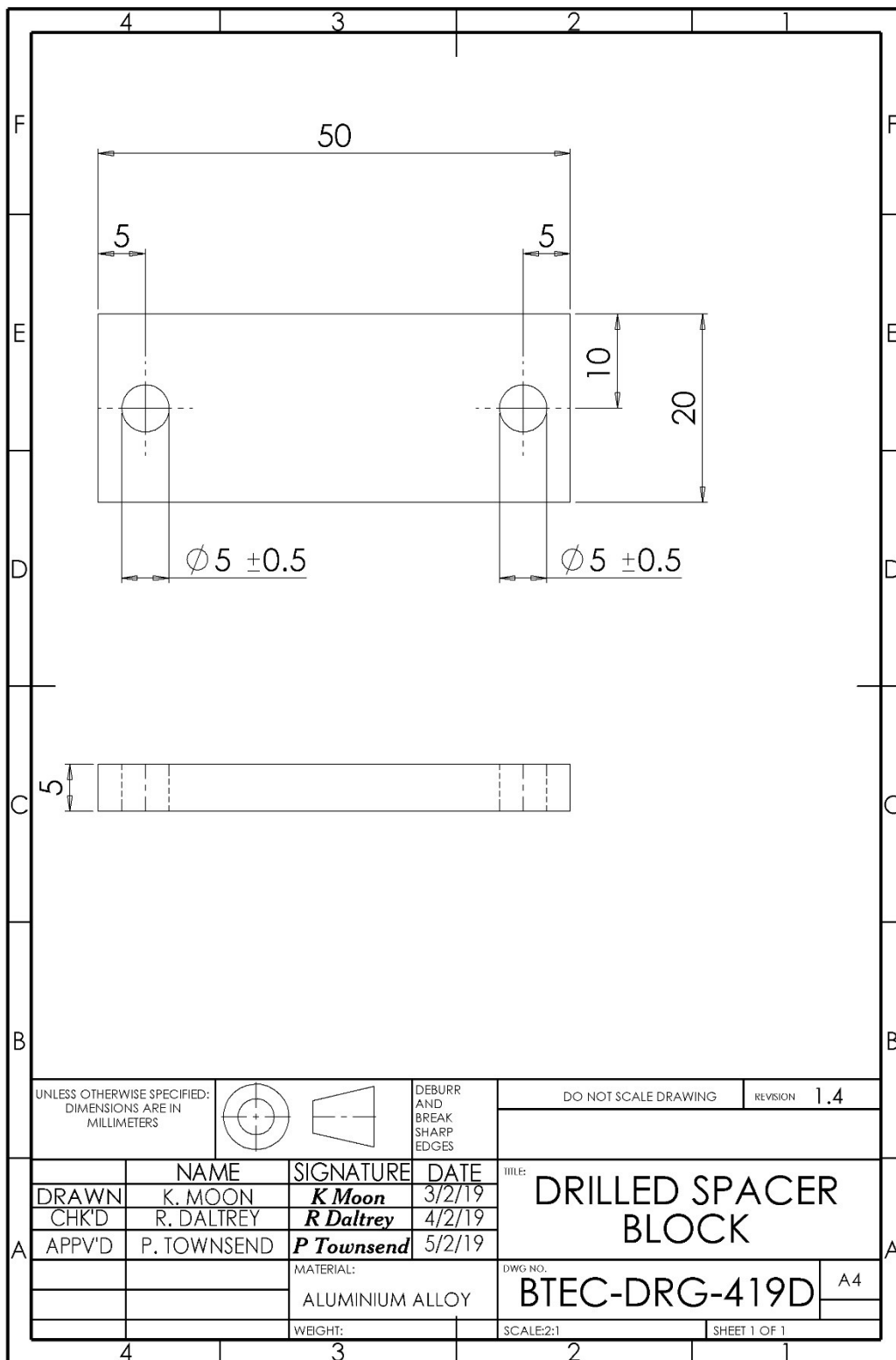
Set task information

Engineering brief

Your engineering organisation is interested in quality control. You have been asked to review a drawing and the production data to try to understand why issues have been occurring during the production of a spacer block.

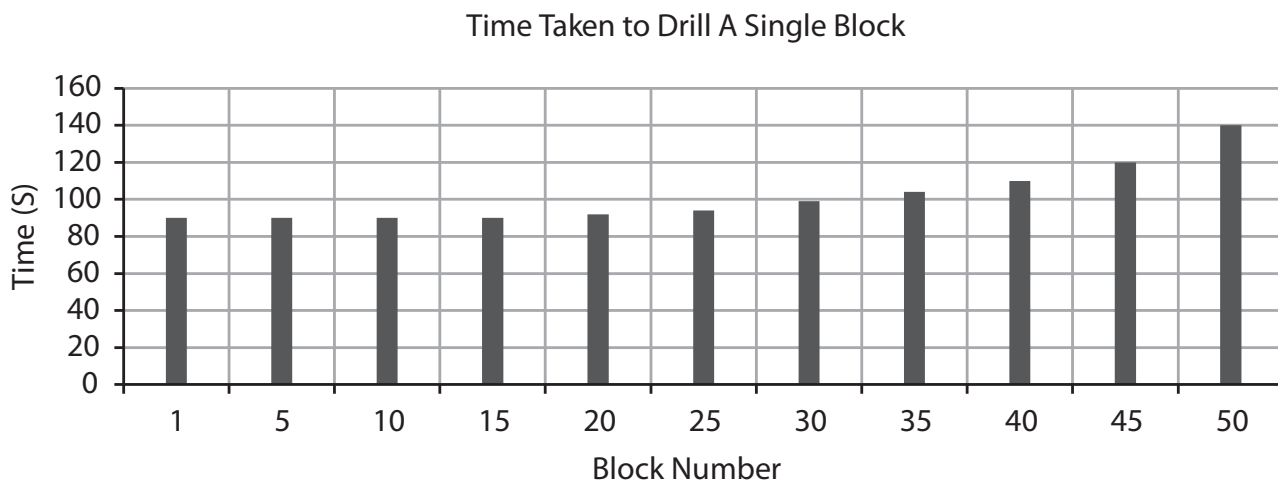
The component will be manufactured in batches of 50 and is made of aluminum alloy.

The drawing for the component is shown below.



The first batch of 50 components has been produced by an engineer.

The line graph gives details of how long each component took to drill.



The diameter of the holes was measured at regular intervals.

The table below gives data for the diameter of the holes.

Block Number	Measured Diameter
5	5.00
10	5.00
15	5.00
20	4.98
25	4.96
30	4.96
35	3.94
40	4.92
45	4.90
50	4.80

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Activity 3: Drawing conclusions

Analyse the information in the line graph and table to explain the issues that have occurred during the production of the component.

What should the quality control inspector suggest to resolve the issues?

Dotted lines for writing.

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You should spend 40 minutes completing Activity 3.

(Total for Activity 3 = 12 marks)

TOTAL PAPER = 60 MARKS

