

**T Level Technical Qualification in
Design and Development for
Engineering and Manufacturing
(8714-32)**

Electrical and Electronic (322)

**Practical Assignment
Sample Candidate Pack**

First teaching from September 2022

Version 1.1

Version and date	Change detail	Section
1.1 January 2023	Alignment of wording with the assessor pack	Design criteria

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1. Assessment

This assessment is for the Electrical and Electronic Occupational Specialism component of the Technical Qualification. This pack consists of a practical assignment brief, including drawings and diagrams as necessary, that you will need to use to complete your assessment tasks.

2. Candidate Guidance

General guidance

This is a formal assessment that you will be marked and graded on. You will be marked on the quality and accuracy of the work you produce. It is therefore important that you carry your work out to the highest standard you can.

Plagiarism

Plagiarism is the failure to acknowledge sources properly and/or the submission of another person's work as if it were your own. Plagiarism is not allowed in this assignment.

This assignment is an assessment of your abilities, so the work submitted must be all your own and carried out under the conditions stated. You will be asked to sign a declaration that you have not had any help with the assignment. Your assessor is allowed to give you some help understanding the instructions if necessary, but they will record any other guidance you need, and this will be taken into account during marking.

Where research is allowed, your assessor must be able to identify which work you have done yourself, and what you have found from other sources. It is therefore important to make sure you acknowledge sources used and clearly reference any information taken from them (e.g. providing as a minimum a list of web addresses / books / articles etc used).

Timings and planning

You are advised to study the details of the assessment before starting.

You should check with your assessor that you have all the relevant materials, equipment and information/data sources that you need before starting the assessment.

You should take care when planning to make sure you have divided the time available between parts of the assignment tasks appropriately. Timings for tasks are provided within this pack to support with planning and time allocation.

If you have a good reason for needing more time, you will need to explain the reasons to your assessor and agree a new deadline date. Changes to dates will be at the discretion of the assessor, and they may not mark work that is handed in after the agreed deadlines.

Any requested changes to deadlines must be agreed by both your assessor and City & Guilds.

Word counts

Typical word counts are to be used as approximates for guidance to support the production of sufficient evidence. The marking will relate to the quality of the evidence produced and not whether the word count have been met.

Health and Safety

You must always work safely, in particular while you are carrying out practical tasks.

You must always follow any relevant Health and Safety regulations, Risk Assessments and codes of practice in line with centre requirements.

If your assessor sees you working in a way that is unsafe for yourself or others, they will highlight the issue and ask you to stop the task immediately. Your assessor will not be able to reassess you until they are sure you are ready for assessment and can work safely.

Presentation of work

Presentation of work must be neat, legible and appropriate to the task, and evidence required for submission.

You should make sure that each piece of evidence including any forms are clearly labelled with your name and the assignment reference.

All electronic files must be given a clear file name that allows your assessor to identify it as your work.

Written work may be word-processed or handwritten unless stated otherwise.

All sketches and drawings should be neat, tidy and annotated.

Calculations should be set out clearly, with all working shown, as well as any assumptions made. You should use appropriate units at all times, consistent with the requirements of the assignment.

Instructions for this assignment

Ensure you read all the provided assessment information issued by the assessor.

You must work independently and not share your work with any other candidates in these supervised assessment sessions.

Your work will be kept secure during any supervised breaks that are taken.

Internet access is **not** allowed, unless otherwise stated in the task.

You must complete all the tasks and present all evidence that is detailed in each task.

This assessment booklet contains the assignment brief.

The tasks have been separated into four individual documents which will be handed to you at the start of each task.

Within each task you will find the following:

- **Conditions of assessment:** This will tell you the duration and rules you must follow when completing a task.
- **Controlled conditions:** This will tell you the rules you must follow when completing each task e.g. You must not share or discuss your work with other candidates.
- **What must be produced for marking:** This describes the evidence you must submit when the task is completed. Be aware failure to submit any evidence requested can adversely affect your overall mark for the assessment.

- **Additional evidence for this task:** This describes other forms of evidence that will be collected by the assessor to support the marking of your performance. This will often include but not limited to photographic and video evidence.

Assessment themes

You will be assessed against a number of assessment themes. This assignment has a total of 90 marks. The table below shows the weighting of the marks for each of the assessment themes.

Assessment them	Weighting %
Health and safety	12%
Design and planning	33%
Manufacturing	27%
Reports	18%

3. Assignment brief

You are an electrical engineer employed by a company that sells a variety of products online. The company operates from large warehouses, each storing a range of products. When an order is received, human workers put the items in boxes and place the boxes on a conveyor belt to the despatch area. Depending upon the size of each box, it is then allocated to one of two couriers who will deliver it.

Due to a growth in sales, the company wants to automate the sorting activity in the despatch area. You have been asked to design, build and test a prototype for a circuit that will sort and allocate the boxes.

Figure 1 shows a plan view of the despatch area.

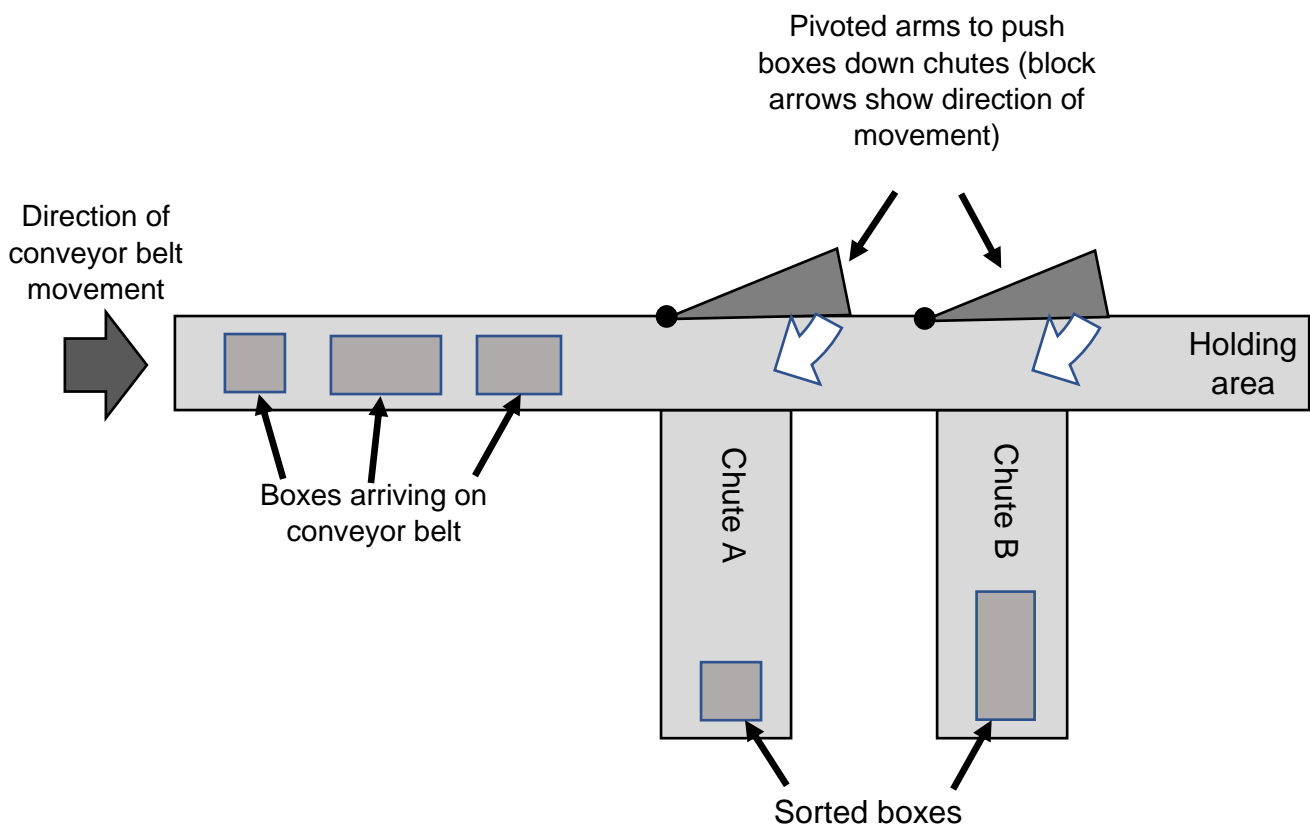


Figure 1

The boxes will arrive on a conveyor belt that travels at a constant speed.

All boxes are cuboid in shape, with a standard width of 250 mm.

If the box is less than 200 mm high and 300 mm long, it must be directed down chute A. If it is larger than these sizes, it must be directed down chute B. The required accuracy of the device must be within a tolerance of 10% of the parameters stated here.

The boxes are directed down the chutes by pivoted arms. These are powered by servo motors.

If, for some reason, a box passes the chutes and arrives in the holding area a warning light and buzzer must activate, to alert human operators that attention is needed.

Design Criteria

The design criteria for this application are:

- the circuitry must detect when the height of a box is less than 200 mm
- the circuitry must detect when the length of a box is more than 300 mm
- the required accuracy of detection is within 10% tolerance of the parameters stated
- the maximum weight of the box is 2 kg
- if the box is less than 200 mm high and 300 mm long, it must be directed down chute A. If it is larger than these sizes, it must be directed down chute B
- the inputs to the circuitry must include:
 - a method to turn the system on and off
 - appropriate sensors to detect the required dimensions
 - a sensor to detect when a product reaches the holding area
- the outputs from the circuitry must include:
 - a visual indicator (light) to indicate when a product should be directed down chute A
 - a visual indicator (light) to indicate when a product should be directed down chute B
 - appropriate output signals to operate the servo motors for the pivot arms, to both direct the boxes down the chute and to return to the start position as appropriate for the next box
 - a visual indicator (light) and audible output to indicate when a product is in the holding area
- the input and output devices should be connected to the circuitry.

This assignment has a time allocation of **34 hours**.

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