

# T Level Technical Qualification in Building Services Engineering for Construction

## Electrical and Electronic Equipment Engineering (8710 – 32) (352)

### Candidate pack

**Practical Assignment 2020 – Sample**

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Sample

## 1. Assessment

This assessment is for the Electrical and Electronic Equipment Engineering occupational specialism component of the Technical Qualification. This pack consists of a practical assignment that includes a project brief including drawing and diagrams as necessary along with several tasks for you to complete.

Sample

## 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

This is an assessment of your abilities, so the work must be all your own work 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 tutor 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.

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 project.

Where research is allowed, your tutor 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.

### Timings and planning

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

You should check with your tutor 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 tutor and agree a new deadline date. Changes to dates will be at the discretion of the tutor, and they may not mark work that is handed in after the agreed deadlines.

If you have a good reason for needing more time, you will need to explain the reasons to your tutor and this must be agreed by City & Guilds.

### 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 tutor 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 tutor 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 appropriate to the task.

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

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

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

All sketches and drawings should be neat and tidy, to scale 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 contained in this candidate pack.

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.

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

This assessment booklet contains:

- An assignment brief
- Task 1
- Task 2
- Task 3

## 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.

**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

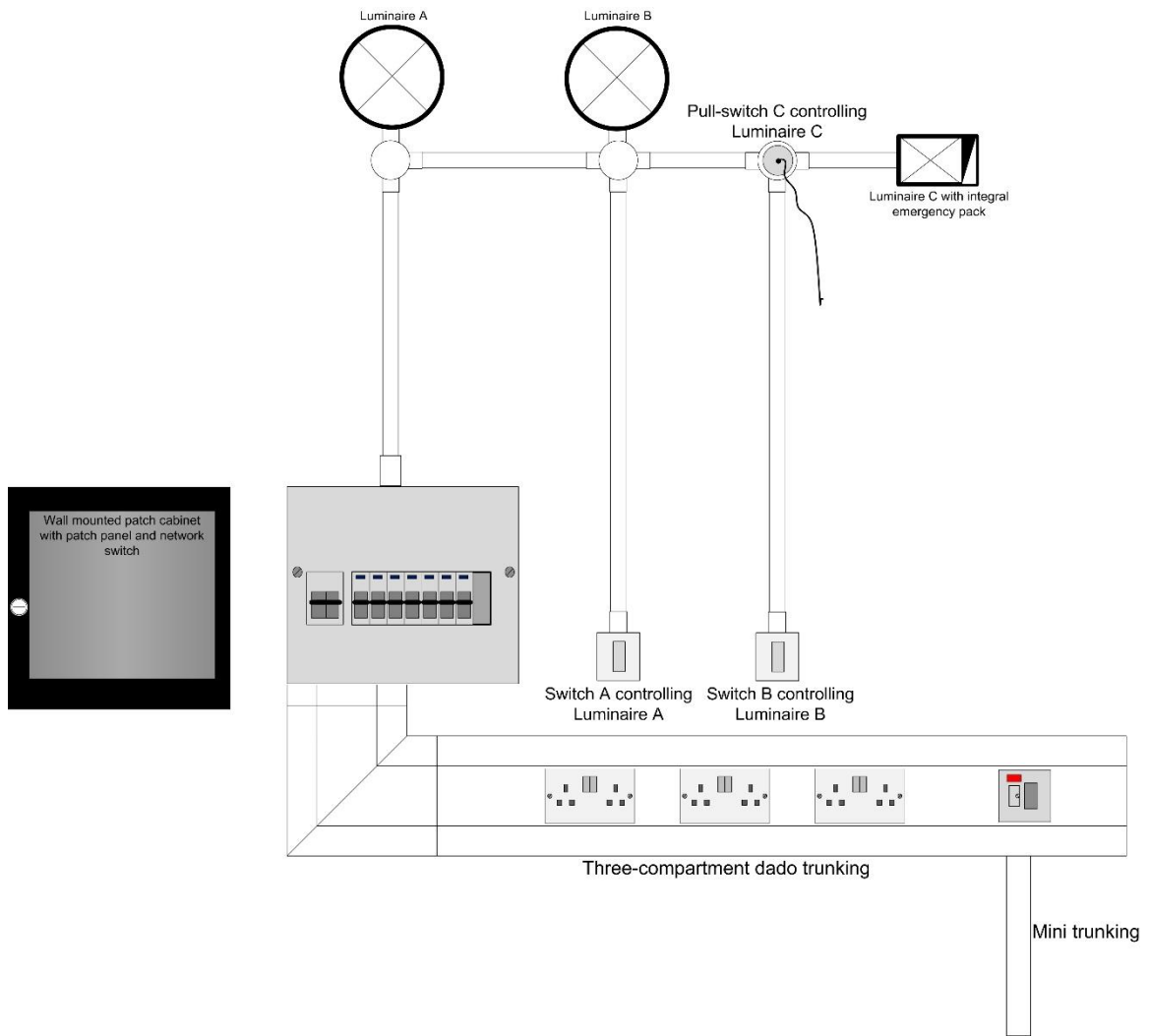
**Additional evidence for this task:** This describes other forms of evidence that will be collected by the assessor to support the marking of your performance. This will often include but not limited to photographic and video evidence.

### 3. Assignment Brief

You have been called to a small office where the client wishes to modify their electrical system to accommodate smart technologies as well as new data systems.

The existing electrical installation, represented in Figure 1, has the following circuits installed: -

Circuit No	Rating	Cable csa Live/cpc	Designation	Represented by
1	32 A	4/1.5	Office sockets	X3 Socket-outlets
2	16 A	2.5/1.5	Heating system	X1 FCU
3	6 A	1.5/1.5	Main lights	Luminaire A
4	6 A	1.5/1.5	Display lights	Luminaire B
5	6 A	1.5/1.5	Toilet lights	Luminaire C

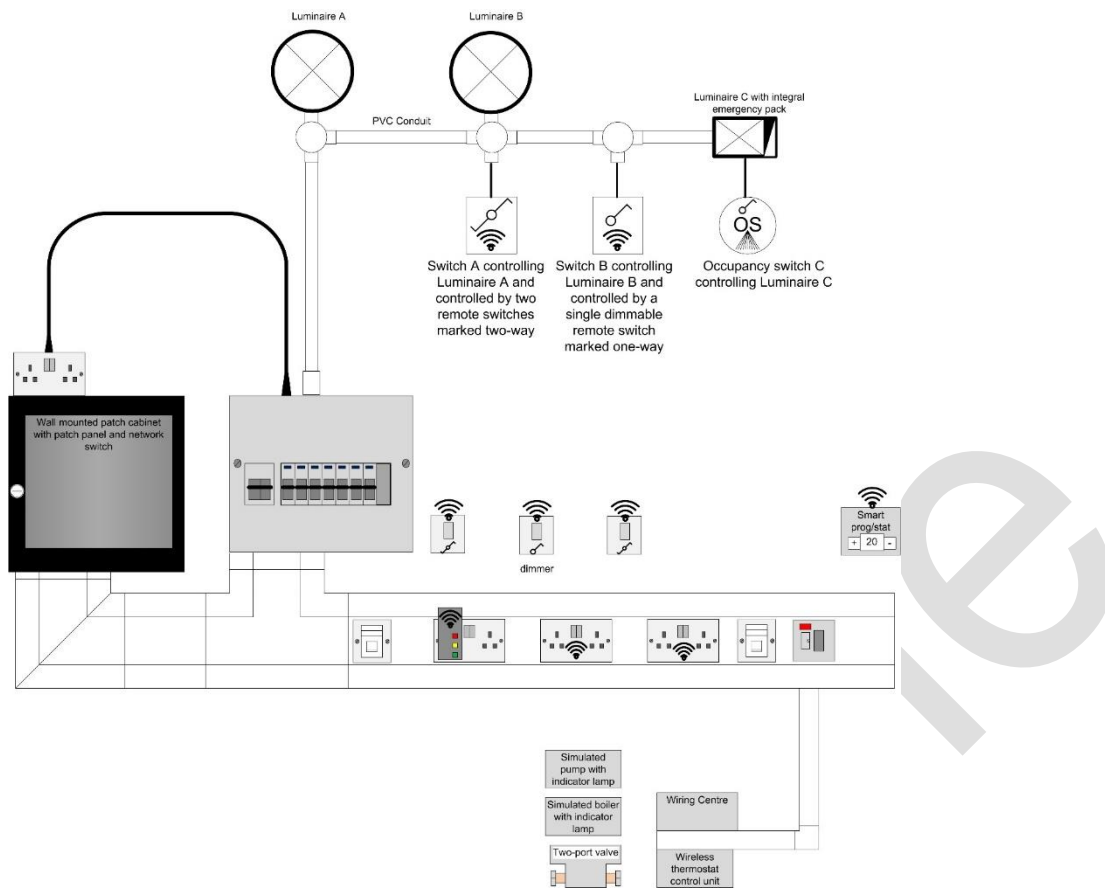


**Figure 1**

The client requests the following to be undertaken, and is also detailed in Figure 2,

- Two socket-outlets to be smart capable allowing app-based control. Circuit shall not have any RCD protection to minimise potential nuisance tripping
- Smart heating controls for a new gas central heating system. The gas boiler, pump and valve have been installed by others, but the heating controls and associated wiring is required as part of these works. System must allow for app-based control
- Office lighting to be controlled by a smart wireless two-way switching system as well as app-based control
- Display lighting to be a dimmable wireless control system as well as app-based control
- Removal of any redundant existing switching arrangements. Disposal of materials to current waste regulations or consideration to sustainability and recycling
- Toilet lighting, which incorporates an emergency pack, to be controlled by a new occupancy switch
- Extension of existing dado trunking to allow data wiring from wall mounted patch cabinet
- X2 new data outlets linked to patch cabinet and network switch
- X1 new socket-outlet on a new circuit to supply equipment within patch cabinet and supplied using PVC SWA cable. Circuit shall not have any RCD protection to minimise potential nuisance tripping
- Installation and commissioning of new broadband router within patch cabinet
- Installation and commissioning of a Wi-Fi extender supplied from existing standard 13 A socket-outlet. The Wireless password key is to be set as that used by the router and may utilise the adjacent data outlet if required by the extender.





**Figure 2**

Whilst undertaking the installation and commissioning work, the client has some further maintenance work that needs attention. These are detailed in the task instructions.

The office is occupied by three employees and in use whilst all work is undertaken.

All work must be compliant with BS 7671 and other relevant regulations. All necessary certification must be completed and handed to the client on completion of the installation and commissioning work.

This assignment has a time allocation of 16 hours.

## 4. Tasks

### Task 1 - Planning the installation

#### Resources

- Materials as detailed within the task specification above
- Hand and power tools - test meters (including PAT), network tester and isolation kits

The purpose of this task is for the candidate to research and select the correct materials and products necessary to fulfil the client's specification. The candidate must also demonstrate the ability to undertake the full design procedure for a circuit to include the necessary calculations to select conductor csa for current carrying capacity and voltage drop.

Candidates must

- produce a materials and product list giving reasons for their choices. Product relates to the specialist technologies required for this installation.
- produce a circuit design schedule for the new socket-outlet circuit. Candidates should assume the actual length of circuit to be 27 m, clipped directly to a masonry surface in an ambient temperature of 25 °C.
- produce a risk assessment in relation to the removal of RCD protection as Regulation 411.3.3 in BS 7671

#### Conditions of assessment:

- The time allocated for this task is 5 hours
- Candidates must carry out the task on their own, under controlled conditions

#### What must be produced for marking that marks will be awarded for:

- Materials and product list with notes next to each item giving detailed reasons why this equipment is suitable
- Circuit design schedule showing all calculations
- Risk assessment in accordance with regulation 411.3.3 of BS 7671. To include assessment of Client's equipment, users, user training, use restrictions

#### Additional evidence of candidate performance that must be captured for marking that will get marks awarded for:

- Assessors notes of the quality, consistency and accuracy of the research work, including details of any assistance provided.

## Task 2 – Installation and commissioning

### Resources

- Materials as detailed within the task specification above
- Hand and power tools - test meters (including PAT), network tester and isolation kits

Evidence for this task must support the installation and commissioning of the installation including handover. Photographic evidence must show clear progression of the candidate's work and must therefore be taken at one-hour stages of the work throughout this task. The focus of the photo should be on the quality of the installed product and not the candidate. Adjacent to the work and shown in any photograph should be a notice displaying the candidates name and the time of the photo, i.e. 1 hour, 2 hours etc.

### Candidates must

- Decommission the existing switching arrangements including a statement of how these items will be disposed of
- Carry out the installation work as detailed in the client's schedule and figure 2
- Carry out all necessary inspection, testing and commissioning as required by BS 7671 and manufacturer's documentation
- Install and configure all necessary software, firmware and hardware in accordance with manufacturer's information.
- Produce a basic Operation and Maintenance (O&M) manual for the installed electrical equipment
- Handover installation to the client, demonstrating how all the equipment functions

Candidates must seek permission from the client (the assessor) to securely isolate each discreet section of the installation to be worked on during this task. As the building is occupied by the client and their employees during this work, disruption to power supplies must be kept to a minimum. A time can be agreed to isolate the whole installation to facilitate commissioning.

### Conditions of assessment:

- The time allocated for this task is 8 hours
- Candidates must carry out the task on their own, under controlled conditions
- Candidate must demonstrate safe isolation procedures on discreet sections of the installation being worked on during task 2 as if the simulated building was occupied. Assessors should ensure the entire installation is securely isolated for reasons of safety, but the candidate must work on the assumption the installation is Live.

### What must be produced for marking that marks will be awarded for:

- Certification and schedules
- Basic O&M Manual to include all manufacturer's information and basic instructions that the client would find useful not included in manufacturer's data
- Statement relating to the safe, sustainable and legal disposal of equipment

**Additional evidence of candidate performance that must be captured for marking that candidate will be awarded marks for:**

- Assessor feedback on performance
- Assessor photographs at various stages of the installation detailing candidate progress against the installation task

To support the comments made within the Practical Observation form the following photographs should be uploaded as a minimum for each candidate:

- evidence of the installation at one-hour stages showing progression. (photographs should only show the installation wall/board and not the candidate)
- photograph of the completed installation and equipment
- photograph showing the inside of the distribution board and SWA termination

Sample

## Task 3 – Carrying out maintenance

### Resources

- Materials as detailed within the task specification above
- Hand and power tools - test meters (including PAT), network tester and isolation kits

Candidates must:

- Carry out in-service inspection and testing on a range of 5 items of electrical and electronic equipment belonging to the client and provided by the assessor.  
NB - No previous records exist for the equipment; therefore, all documentation requires completion for the equipment as detailed in the IET Code of Practice for In-service Inspection and Testing of Electrical Equipment (IET CoP ISITEE).

### Conditions of assessment:

- The time allocated for this task is 3 hours
- Candidates must carry out the task on their own, under controlled conditions.

### What must be produced for marking and marks will be awarded for:

- Documentation as required by IET CoP ISITEE

### Additional evidence of candidate performance that must be captured for marking:

- Photograph of each item of equipment under test (any test within the range). This is to record the equipment under test and must align with the equipment register.
- Assessor feedback on performance

**End of Assessment**

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