

T Level Technical Qualification in Building Services Engineering for Construction

Electrotechnical Engineering (8710-33) (353)

Practical Assignment 2020 – Sample

Candidate pack

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1. Assessment

This assessment is for the Electrotechnical 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.

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 can 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 asked by your employer to be involved with the design, planning and installation of sections of the electrical installation for a client's building. One section is outlined in the drawing in Figure 1. Within the overall site there are also other new systems that need to be inspected and verified. The client has also reported some of the existing systems are faulty and in need of investigation and repair.

Figure 2 shows an incomplete design grid which is required for task 1.

Figure 3 shows an assessment form relating to an assessment of general characteristics which is required for task 1.

Figure 4 shows a blank schedule for the lighting design within task 1.

Figure 5 shows a blank Materials schedule required for task 1.

Figure 6 shows an outline of the installation required for task 2.

Figure 7 shows a fault report sheet.

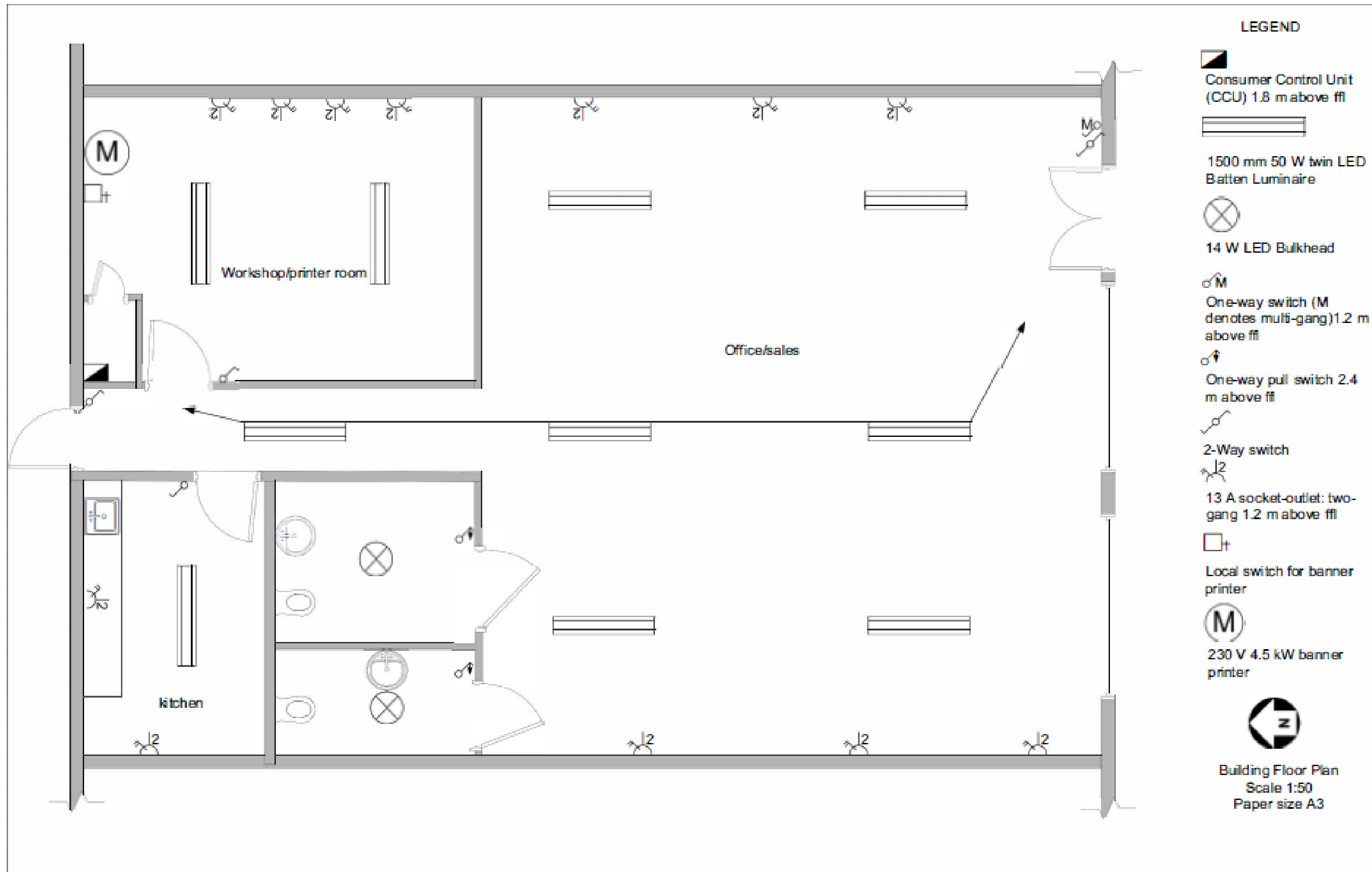


Figure 1

Consumer unit located in workshop VOLTAGE DROP TO COMPLY WITH BS 7671		Nominal Voltage (U) 230 V			Earthing Arrangement TN-C-S		External Earth Fault Loop Impedance (Z_e) 0.3 Ω		
Circuit	1	2	3	4	5	6	7	8	
Description	Ring-final office	Radial-final sockets workshop	Radial-sockets kitchen x2 twin	Boiler supply	Outbuilding DB	4.5 kW printing machine	Lighting office	Lighting workshop/kitchen/toilets	
No. outlets	6 x 2-gang	4 x 2-gang	2 x 2-gang	1	1	1	7	5	
Type of wiring	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic multi-core flat profile	70 °C thermoplastic 3-core PVC SWA	70 °C thermoplastic 3-core PVC SWA	70 °C thermoplastic single-core non-sheathed	70 °C thermoplastic single-core non-sheathed	
Design Current (I_b)	22 A	15 A	9 A	4 A	16 A		1.6 A	0.7 A	
Type and Nominal rating (I_n)	32 A B	20 A B	20 A B	16 A B	16 A C		6 A C	6 A C	
Length (metres)	50 m loop		10 m	8 m	27 m			20 m	
Installation method		B	B	B	C	C			
Ambient temperature °C	25 °C	25 °C	25 °C	30 °C	30 °C	30 °C	30 °C	30 °C	
Rating Factor Ambient air temp. C_a				1	1	1	1	1	
Total circuits in group	2	2	2	1	1	1	2	2	
Rating factor grouping C_g				1	1	1			
Minimum current capacity ($<I_t$)				16	16		7.5	7.5	
mV/A/m				29	18				
Actual Voltage drop									
Minimum conductor csa mm ²	2.5		4	1.5	2.5		1.5	1.5	

Figure 2

Assessment of general characteristics form

Chapter/regulation from BS 7671	What needs assessing specific to this installation	How this impact the installation
e.g. Chapter 31 313.1	Supply Z_e	Impacts on design earth loop impedance values as it dictates maximum R_1+R_2 values
e.g. Chapter 32	Splashes of water (AD4) in kitchen	Ensure all accessories are adequately spaced from sink

Figure 3 – Assessment of General Characteristics form- *this form may be reproduced as many times as necessary*

Lighting design schedule

Area	Utilisation factor	Light loss factor	spacing	height	Required lux level	Calculation	Lumens required per luminaire
Workshop/print room	0.7	0.65			500 lux		
Office sales area	0.75	0.8			300 lux		

Figure 4 lighting design schedule

Materials take off sheet (relating to Figure 1)

Symbol	Description	Quantity

Figure 5 Take-off sheet- *this sheet may be reproduced as many times as necessary*

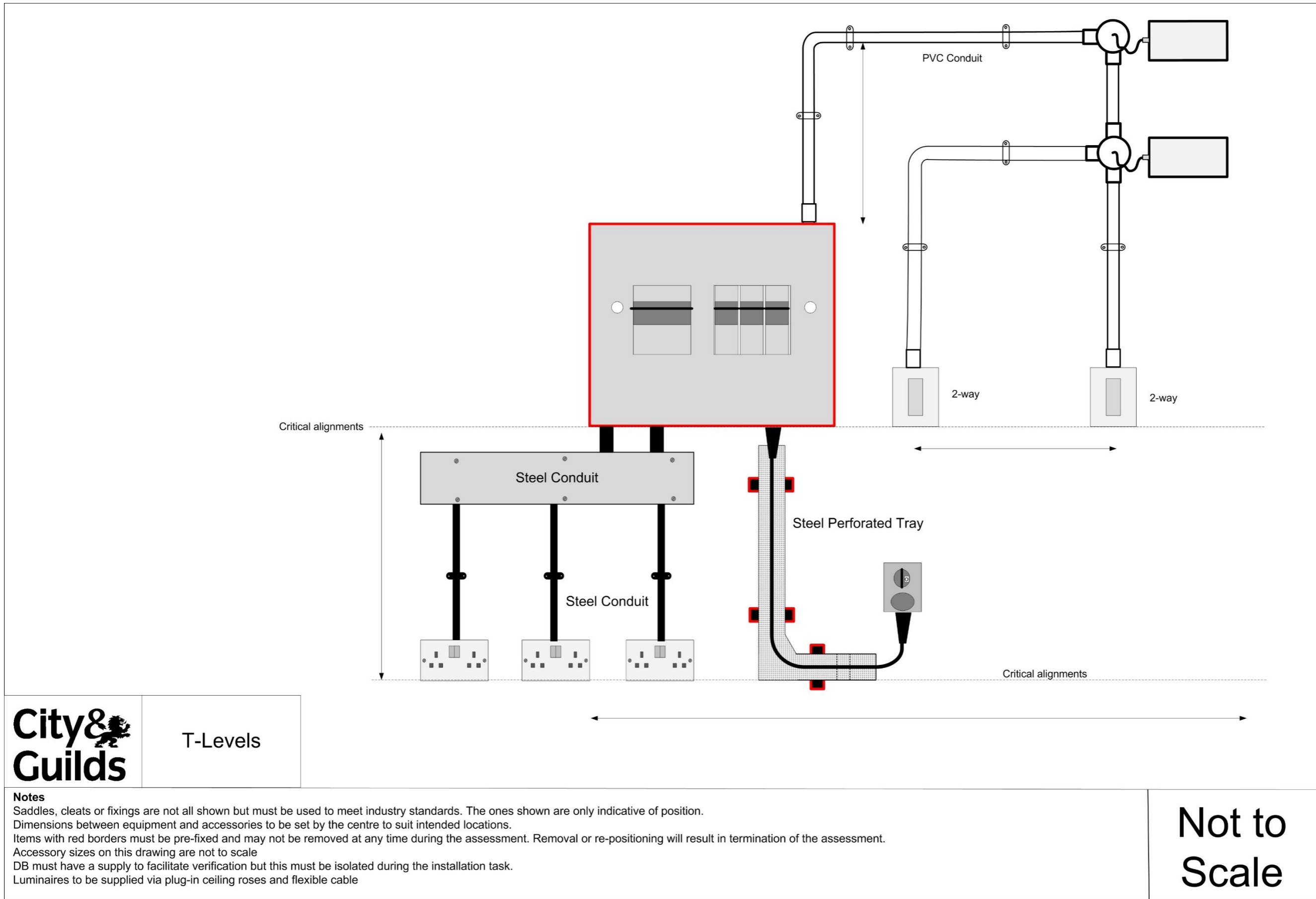


Figure 6 Installation outline Task 2

Task 3 Report sheet	
Job card reference number:	
Candidate name:	Date of assessment:
Description of work done/ tests carried out to locate fault (if any)	
The nature of the fault	
Brief description including materials required to fix the fault.	
Actions required to ensure rectification is suitable.	

Figure 7 Fault report sheet

4. Tasks

Task 1 – Planning the installation

Resources

- Figures 1 to 5
 - BS 7671
 - IET On-site Guide
 - Manufacturer's literature for selection of luminaires. This may involve access to the internet.
- a) Complete the assessment of general characteristics form as figure 3 whilst referencing Part 3 of BS 7671. Indicate what must be assessed in relation to the installation shown in Figure 1 and how the assessment impact on the design of the installation.
- b) Complete the lighting design schedule as figure 4 and select suitable luminaires for the areas shown on the drawing.
- c) Complete the material take off sheet as figure 5 based on the installation drawing in figure 1.
- d) Complete the design grid as figure 2. Any assumptions made in order to complete the design must be listed on a separate sheet with justifications.

Conditions of assessment:

- The time allocated for this task is 6 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:

- Completed design grid (figure 2)
- Completed assessment of general characteristics form (figure 3)
- Completed lighting design form (figure 4)
- Completed materials take-off sheet (figure 5)

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

- Tutor's notes of the candidates referencing and research describing the methods used to reference or research information and how information was used or processed.

Task 2 – Installation, commissioning and decommissioning

Resources

- Installation outline as figure 6
- Tools, plant and materials required for the installation as figure 6 - test meters (including PAT), network tester and isolation kits
- Manufacturers' documentation where appropriate
- BS 7671
- IET On-site Guide
- IET guidance note 3

a) Installation

Candidates must

- Carry out safe isolation to the distribution board prior to commencement of the installation. Complete the installation in accordance with the drawing (Figure 6) and to the dimensions agreed with your assessor.

All cables and wiring systems **must** be terminated and installed in accordance with BS 7671. All terminations, joints and couplings must be mechanically secure and electrically continuous where applicable. Wastage must be minimised as far as possible.

The assessor must be satisfied that the work complies with BS 7671 and is electrically safe prior to the circuits being energised and tested for function.

b) Inspection, testing and commissioning

Candidates must

- Carry out an inspection and complete the inspection schedule for initial verification document.
- Carry out the full range of applicable tests, in the correct sequence, to the completed installation. NB You must obtain permission from the assessor before proceeding with any tests involving switching on the supply.
- Use instruments safely and in accordance with manufacturer's information and HSE GS38.
- Complete a schedule of test results for the results obtained.
- Compare results with BS7671 and design criteria
- Complete the Electrical Installation Certificate for this installation.
- Carry out a handover of the installation assuming your assessor to be your client.

All work must be to current standards and carried out in accordance with all health and safety requirements. Any unsafe actions will result in termination of this assessment.

c) Decommissioning

Once the installation has been completed, checked and verified by the customer (assessor) candidates must

- Decommission in a safe manner ensuring safe isolation
- Ensure the workspace is made good, including filling, sanding and painting any holes or damage to the building fabric.

Following dismantling, consideration must be given to sustainability and recycling.

Conditions of assessment:

- The time allocated for this task is 15 hours (installation 10 hours, commissioning 3 hours, decommissioning 2 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:

- Completed Electrical Installation Certificate
- Schedule of inspections
- Schedule of test results
- Guidance note for recipients

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

- Assessor observation of installation:
 - Safe isolation
 - Installation of cables and wiring systems
 - Inspection and testing

Task 3 – Carrying out maintenance

Resources

- Hand and power tools - test meters (including PAT), network tester and isolation kits

Candidates must carry out the following for a minimum of six faults. **All work must be undertaken with the installation fully isolated.**

For each fault candidates must:

- Select a job card from the range offered by the assessor
- Copy the job card reference number onto the blank report sheet as figure 7
- Identify from the range of equipment given, necessary items that will be required in order to prepare and diagnose the fault description provided
- Carry out checks to test equipment prior to using it
- Locate the fault, using a logical process
- Complete the report sheet identifying:
 - description of work done to find fault.
 - tests carried out to locate fault (if any)
 - the nature of the fault
 - brief description of actions required, including materials and time required to rectify the fault
 - Further actions required to ensure rectification is suitable.

All work **must** be to current standards and carried out in accordance with **all** health and safety requirements. Any unsafe actions will result in termination of assessment.

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:

- Six completed report cards

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

- Assessor observations:
 - Fault diagnosis
 - Fault rectification

End of Assessment

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