

# Bursting with energy?

## SkilleLECTRIC 2010 In-House Skills Competition

### General Information

#### Competition requirements:

- Each potential competitor should complete the competition task.
- The college tutor should mark the work of each competitor according to the marking scheme overleaf.
- The competitor with the highest score should be entered into SkilleLECTRIC.

We recommend that this test should take approximately 4–6 hours to complete

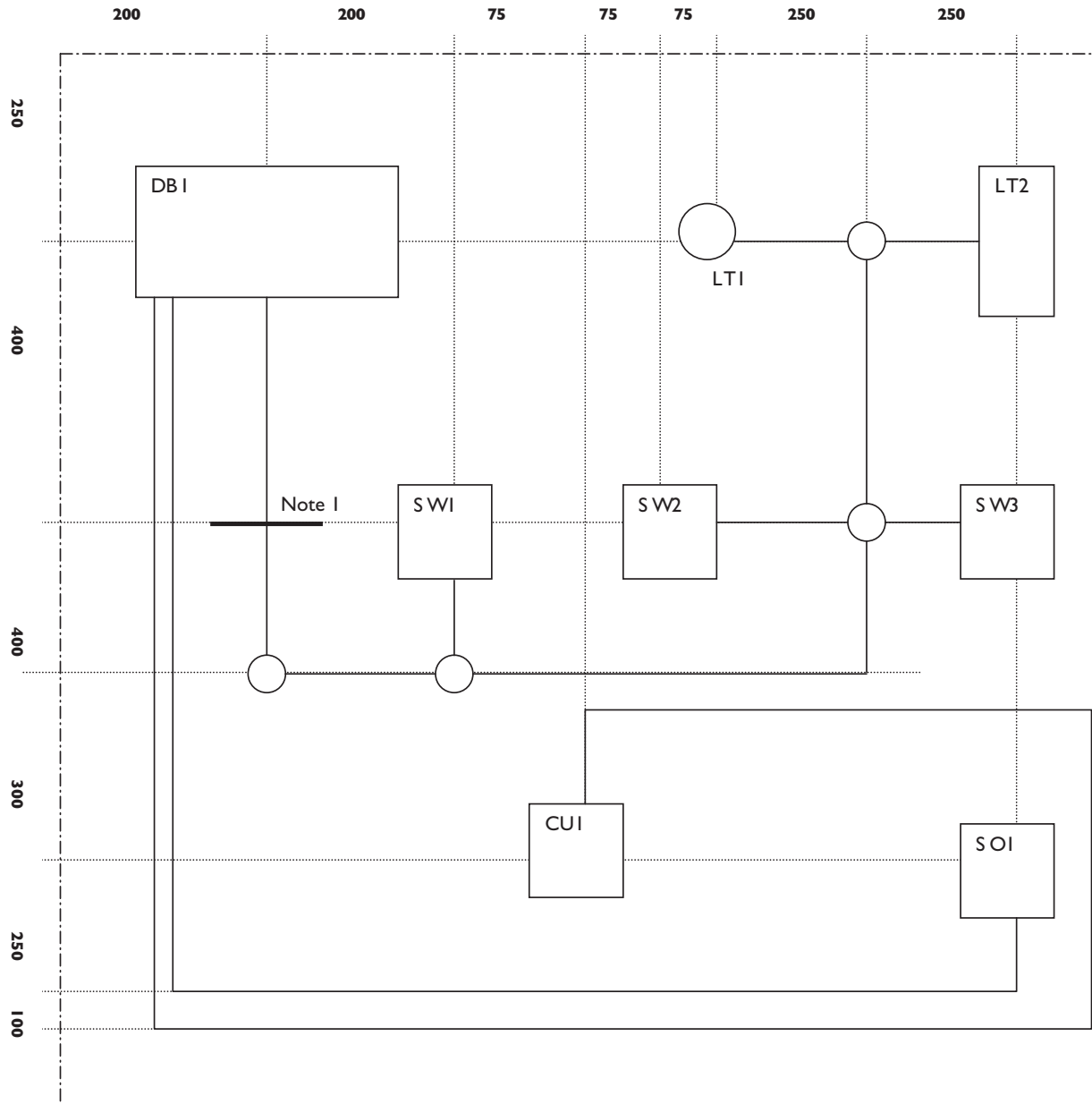
#### Safe Working

- Candidates must work safely at all times and take the appropriate precautions when working with any tools that have a potential safety hazard.
- Eye and foot protection to be worn at all times.
- No power tools to be used with the exception of a battery powered drill.

#### The exercise consists of 3 circuits.

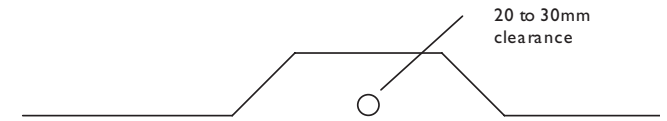
- Circuit 1. A lighting circuit wired in single insulated cable enclosed in PVC conduit.
- The circuit is to control 2 light points via two-way intermediate switching (SW 1, 2 and 3).
- Circuit 2. A 13A metal clad switched socket outlet wired in 2core SWA cable.
- Circuit 3. A switch fused connection unit wired in PVC/PVC insulated cable.

This competition specification was devised by the WorldSkills UK expert electrical installation training manager.



Note 1:

The PVC conduit must bridge a fixed obstruction (20mm PVC conduit illustrated in the diagram by a bold black line) using a double set with a minimum clearance of 20mm and a maximum clearance of 30mm.



**Key**

- DBI Distribution board/ Consumer unit
- LT1 BC Baton Holder with lamp
- LT2 Bulkhead light fitting with ES lamp holder and lamp
- SW1 1 Gang 2 Way light switch
- SW2 1 Gang intermediate light switch
- SW3 1 Gang 2 Way light switch
- CUI Switch fused connection unit
- SOI Metal clad switch socket outlet
- - - Datum line

# Marking Schedule

College / Training Provider:

Assessor's Name and Signature:

Competitor's Name:

Final Score (100 max):

| Safety   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>  |      |
| Personal protective equipment used at all times when cutting materials, using power tools and working overhead (3) |      |
| Work area kept free from hazards at all times (3)  |      |
| Safe working practiced used when livening up work after inspection and test (2)                                    |      |
| No faults or dangers found when work tested (2)  |      |
| <b>Total (Max 10)</b>  |      |

| Inspection and testing   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>  |      |
| Each circuit inspected and tested and the results recorded:<br>Continuity of cpc (1 mark for each circuit) |      |
| Insulation resistance (greater than 1 M ohm) (1 mark for each circuit)                                     |      |
| Polarity (1 mark for each circuit)   |      |
| Single pole switches in Line conductor only for lighting circuit (1)                                       |      |
| <b>Total (Max 10)</b>  |      |

| Function   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>  |      |
| Two way intermediate switching operates correctly<br>(first attempt 6 marks or second attempt 2 marks) |      |
| Both light fittings operate together<br>(first attempt 3 marks or second attempt 1 mark)               |      |
| Switch fuse connection unit functions correctly<br>(first attempt 3 marks or second attempt 1 mark)    |      |
| Socket outlet functions correctly<br>(first attempt 3 marks or second attempt 1 mark)                  |      |
| Circuit protective device operates correct circuit<br>(1 mark for each circuit)                        |      |
| No fault on full installation (2)  |      |
| <b>Total (Max 20)</b>  |      |

| Installation quality   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>              |      |
| PVC conduit installation complete with all lids correctly in place (2) |      |
| PVC conduit from DB1 vertical (1)                                      |      |
| PVC conduit bridge over obstruction between 20 and 30mm clearance (2)  |      |
| PVC conduit under SW2 horizontal (1)                                   |      |
| PVC conduit to LT1 vertically (1)                                      |      |
| PVC conduit to SW3 horizontal (1)                                      |      |
| PVC conduit bend radius at least 6 times external conduit diameter (2) |      |
| PVC/PVC cable from DB1 securely clipped vertically (1)                 |      |
| PVC/PVC cable above SO1 securely clipped vertically (1)                |      |
| PVC/PVC cable installed without damage to insulation (1)               |      |
| PVC/PVC cable bend radius at least 3 times cable diameter (2)          |      |
| SWA cable at bottom of board clipped horizontally (1)                  |      |
| SWA cable from DB1 clipped evenly adjacent to PVC/PVC cable (1)        |      |
| SWA cable bend radius at least 3 times cable diameter (2)              |      |
| SWA and PVC cable at bottom of board clipped at 100mm centres (1)      |      |
| <b>Total (Max 20)</b>  |      |

| Positioning of equipment   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>          |      |
| All measurements taken from datum line with a tolerance of +/- 2mm |      |
| DB1 level and centred horizontally (1)                             |      |
| DB1 level and centred vertically (1)                               |      |
| LT1 level and centred horizontally (1)                             |      |
| LT1 level and centred vertically (1)                               |      |
| LT2 level and centred horizontally (1)                             |      |
| LT2 level and centred vertically (1)                               |      |
| SW1 level and centred horizontally (1)                             |      |
| SW1 level and centred vertically (1)                               |      |
| SW2 level and centred horizontally (1)                             |      |
| SW2 level and centred vertically (1)                               |      |
| SW3 level and centred horizontally (1)                             |      |
| SW3 level and centred vertically (1)                               |      |
| CUI level and centred horizontally (1)                             |      |
| CUI level and centred vertically (1)                               |      |
| SO1 level and centred horizontally (1)                             |      |
| SO1 level and centred vertically (1)                               |      |
| SW1, SW2 and SW3 all centred horizontally in line (2)              |      |
| LT2, SW3 and SO1 all centred vertically in line (2)                |      |
| <b>Total (Max 20)</b>  |      |

| Wiring and termination   | Mark |
|--|------|
| <b>Marking criteria (possible mark shown in brackets)</b>  |      |
| Conductors securely terminated with no bare conductor showing at all terminations when viewed at 90 degrees: |      |
| DB1 (1)  |      |
| SW1 (1)  |      |
| SW2 (1)  |      |
| SW3 (1)  |      |
| LT1 (1)  |      |
| LT2 (1)  |      |
| CUI (1)  |      |
| SO1 (1)  |      |
| SWA Gland terminated correctly with protective conductor continuity assured (2 marks for each termination)   |      |
| Correct cable identification on all conductors for lighting circuit (3)                                      |      |
| Correct cable identification on all conductors for CUI (1)   |      |
| Correct cable identification on all conductors for SO1 (1)   |      |
| Correct circuit identification at DB1 for each circuit protective device (1 mark for each circuit)           |      |
| <b>Total (Max 20)</b>  |      |