



8202-531 APRIL 2022

Level 3 Advanced Technical Diploma in Electrical Installation (450)

Level 3 Electrical Installation – Theory exam (1)

If provided, stick your candidate barcode label here.

Friday 1 April 2022
09:30 – 12:00

Candidate name (first, last)

First

Last

Candidate enrolment number


Date of birth (DDMMYYYY)

Gender (M/F)

Assessment date (DDMMYYYY)

Centre number

Candidate signature and declaration*

- If additional answer sheets are used, enter the additional number of pages in this box. 
- Before taking the examination, **all candidates** must check that their barcode label is in the appropriate box. Incorrectly placed barcodes may cause delays in the marking process.
- Please ensure that you staple additional answer sheets to the **back** of this answer booklet, clearly labelling these with your full name, enrolment number, centre number and qualification number in BLOCK CAPITALS.
- All candidates need to use a **black/blue** pen. **Do not** use a pencil or gel pen, unless otherwise instructed.
- If provided with source documents, these documents **will not** be returned to City & Guilds, and will be shredded. Do not write on the source documents.

***I declare that I had no prior knowledge of the questions in this examination and that I will not divulge to any person any information about the questions.**

You should have the following for this examination

- a pen with blue or black ink
- a non-programmable scientific calculator

Permitted reference material:

BS 7671;
IET On-site Guide;
IET guide to the building regulations

General instructions

This question paper is the property of City and Guilds of London and should be returned after the examination.

- The maximum marks for each question are shown in brackets.
- Answer all questions.



- 1 List **three** things that need to be checked regarding the materials, given on a material schedule, before they are obtained and installed. (3 marks)

- 2 List **three** methods of generating electricity using renewable energy. (3 marks)

- 3 Explain **one** reason why AC is used in preference to DC for most electrical distribution in the UK. (3 marks)

- 4 List **three** types of AC motor controller. (3 marks)

5 Determine the neutral current within a three-phase circuit where the current for each phase is $L_1 = 80 \text{ A}$, $L_2 = 60 \text{ A}$ and $L_3 = 40 \text{ A}$.

(4 marks)

6 A 0.28 H inductor has a resistance of 80Ω and is connected in series with a capacitor of $38 \mu\text{F}$. They are connected to an AC 230 V supply at 50 Hz .

Calculate the circuit current.

(5 marks)

7 Explain **why** electric immersion heaters in hot water cylinders must have a thermal cut-out within. (3 marks)

8 List **three** different devices that can provide overcurrent protection. (3 marks)

9 Explain why an IT earthing arrangement may be selected for an installation. (3 marks)

10 Explain why three-phase motor circuits do not usually include a neutral conductor. (3 marks)

- 11 List, in the correct order, the first three tests to be performed during the initial verification of a new radial final circuit in accordance with BS 7671. (3 marks)

- 12 Explain, giving an example, how the sense of touch could be used during an inspection of a metallic conduit system. (3 marks)

- 13 Explain what is verified during the functional test of a passive infra-red movement detector controlling a number of outdoor luminaires. (3 marks)

14 State the missing values by completing Table 1. (3 marks)

Minimum values of insulation resistance		
Circuit nominal voltage (V)	Test voltage DC (V)	Minimum insulation resistance (MΩ)
SELV AND PELV	250	
Up to and including 500 V		1.0
Above 500 V	1000	

Table 1

15 State **three** GS38 requirements for an approved voltage indicator used to safely isolate a circuit prior to fault diagnosis. (3 marks)

16 State **two** sources for safety services as given in BS 7671. (2 marks)

17 State the **minimum** degree of IP protection for **each** zone in a location containing a bath.

(3 marks)

18 Explain where, within an installation, surge protective devices may be required.

(3 marks)

19 State **four** methods of supporting an SWA cable, installed above a suspended ceiling, in order to comply with Regulation 521.10.202

(4 marks)
