8202-531 JUNE 2018
Level 3 Advanced Technical Diploma in Electrical Installation (450)
Level 3 Electrical Installation – Theory exam

Friday 22 June 2018
09:30 – 12:00

If provided, stick your candidate barcode label here.

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 any additional answer sheets are used, enter the additional number of pages in this box.
• Please ensure that you staple additional answer sheets to the back of this answer booklet, clearly labelling them 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.
• 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 assessment 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
• non-programmable scientific calculator

Permitted reference material:
BS 7671 (2015)
IET On-site Guide

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 is shown in brackets.
• Answer all questions.
1. State three documents that should be available to a site electrician during the construction phase of an electrical installation. (3 marks)

2. State three types of inductive transformer. (3 marks)

3. Explain why pumped storage electricity generation is used, in preference to traditional fuel sources, to provide supply flexibility when demand fluctuates. (3 marks)

4. A single-phase electric motor has a rating of 2.55 kW and the current lags the voltage by 32°. Calculate the apparent power and reactive power for this motor. (5 marks)
5 Explain why all Live conductors of the same A.C. circuit **must** enter a steel-cased consumer unit through one single hole. (4 marks)

6 State **three** gases or metallic vapours commonly used in discharge lamps. (3 marks)

7 Explain why star-delta motor control equipment is used in preference to direct-on-line. (3 marks)
8 Explain the drawbacks of BS 3036 fuses. (6 marks)

9 State three factors, given in BS 7671, to be taken into account when calculating the maximum demand of an installation. (3 marks)

10 A new passive infra-red occupancy sensor has been installed to control the lighting in a hotel corridor. Describe the process of carrying out functional testing of these sensors. (3 marks)
11 Describe three practical measures that can be taken to ensure the safety of other people, when carrying out inspection and testing. (3 marks)

12 Explain why a newly installed gas central heating boiler must be disconnected from a circuit before an insulation resistance test can be carried out. (3 marks)

13 State three hazardous materials that may require specialist disposal when undertaking fault rectification work. (3 marks)

14 Identify three pieces of verbal information an electrician should seek from a user when undertaking diagnosis of an intermittent electrical fault. (3 marks)

15 State the upper voltage limits for Extra-Low Voltage. (2 marks)
16. Explain the effect of running a cable through 200 mm of thermal insulation. (3 marks)

17. Explain why Low Voltage circuits with surge protective devices may have the insulation resistance test voltage reduced. (4 marks)

18. State three special installations or locations other than those divided into zones. (3 marks)
A new circuit is to be installed to an existing electrical installation within a motor vehicle repair workshop. The repair workshop undertakes a range of mechanical and body repairs to vehicles and the ambient temperature can be 35 °C during certain processes.

The supply and installation form a 400 V, three-phase, TN-C-S system. The DNO has quoted the $Z_e$ to be $0.35 \, \Omega$.

The new circuit is to supply a 7.4 kW three-phase paint-baking oven heater, 30 m from the origin of the installation, but must be contained in existing, galvanised trunking for 3 m of the run. Within this existing trunking are three other circuits.

The circuit is to be wired in 70 °C thermoplastic single-core cable and protected by a type C circuit breaker to BS EN 60898.

Determine a suitable cost-effective installation design that complies with BS 7671. (15 marks)