City& Guilds

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

If provided, stick your candidate barcode label here.

Friday 22 June 2018
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 any additional answer sheets are used, enter the additional number of pages in this box. ➡ 0 0
- 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)

_____

_____

_____

19   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 Ω.

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)

End of examination