

## 8202-20 Level 2 Technical Certificate in Electrical Installation

8202-020 & 520 Level 2 Electrical Installation – Theory exam

June 2022 Mark Scheme

<b>1.</b>		
What is the <b>first</b> action to take after discovering an accidental fire on a construction site?		
<p>(A) Ring the HSE.          (B) Raise the alarm.          (C) Smother the flames.          (D) Find an extinguisher.</p>		
<b>Test spec reference: 201.03.03</b> Knowledge	<b>Total marks: 1</b> mark	<b>Key: B</b>
<b>LO: 201 Health and Safety and Industry Practices</b>		

<b>2.</b>		
Which instrument is required to carry out Safe Isolation?		
<p>(A) Loop Impedance Tester.          (B) Low Resistance Ohmmeter.          (C) Approved Voltage Indicator.          (D) Insulation Resistance Tester.</p>		
<b>Test spec reference: 201.04.01</b> Understanding	<b>Total marks: 1</b> mark	<b>Key: C</b>
<b>LO: 201 Health and Safety and Industry Practices</b>		

**3.**

Which substance would require specialist licenced removal if found during a building demolition?

- (A) Cement.
- (B) Gypsum.
- (C) Plywood.
- (D) Asbestos.

**Test spec reference: 201.03.07**  
Applied knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 201 Health and Safety and Industry Practices**

**4.**

What is the **maximum** voltage to earth of a single-phase reduced low voltage supply used on a construction site?

- (A) 55 V
- (B) 110 V
- (C) 230 V
- (D) 400 V

**Test spec reference: 201.04.02**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 201 Health and Safety and Industry Practices**

**5.**

Who is responsible for working out estimates for materials using a building design?

- (A) Client.
- (B) Architect.
- (C) Clerk of works.
- (D) Quantity surveyor.

**Test spec reference: 201.06.02**  
Knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 201 Health and Safety and Industry Practices**

**6.**

What unit is equivalent to  $V \times 10^{-3}$ ?

- (A) MV
- (B) kV
- (C) mV
- (D)  $\mu V$

**Test spec reference: 202.01.01**  
Knowledge

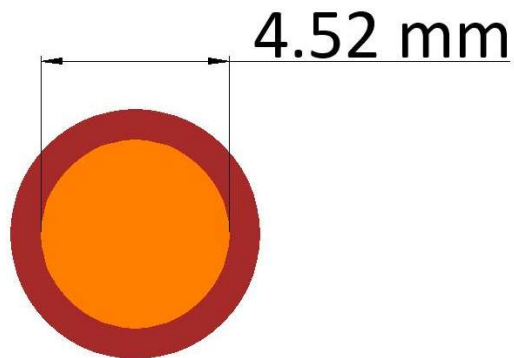
**Total marks: 1**  
mark

**Key: C**

**LO: 201 Health and Safety and Industry Practices**

### **7. Calculator required**

What is the cross-sectional area for the conductor shown in **Figure 1**?



**Figure 1**

- A)  $6 \text{ mm}^2$
- B)  $10 \text{ mm}^2$
- C)  $16 \text{ mm}^2$
- D)  $25 \text{ mm}^2$

**Test spec reference: 202.01.03**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**8.**

Transpose  $I_b = \frac{P}{\sqrt{3} \times V_L \times \cos\theta}$  to make  $V_L$  the subject.

- A)  $V_L = \frac{P}{\sqrt{3} \times \cos\theta \times I_b}$   
B)  $V_L = \frac{\sqrt{3} \times \cos\theta \times I_b}{P}$   
C)  $V_L = \frac{\sqrt{3} \times \cos\theta \times P}{I_b}$   
D)  $V_L = \frac{I_b}{\sqrt{3} \times \cos\theta \times P}$

**Test spec reference: 202.01.02**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**9.**

Which is a formula for calculating power?

- (A)  $P = IR^2$   
(B)  $P = I^2R$   
(C)  $P = VR^2$   
(D)  $P = I^2V$

**Test spec reference: 202.01.02**  
Knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

### **10. Calculator required**

A hot water cylinder is 1.4 m high and 0.45 m in diameter.  
What is the **maximum** volume of water this cylinder can hold?

- (A) 0.11 m<sup>3</sup>  
(B) 0.22 m<sup>3</sup>  
(C) 0.44 m<sup>3</sup>  
(D) 0.89 m<sup>3</sup>

**Test spec reference: 202.01.03**  
Applied knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

**11.**

Which has the lowest resistivity?

- (A) Lead.
- (B) Steel.
- (C) Copper.
- (D) Aluminium.

**Test spec reference 202.02.02**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**12.**

Which electrical insulation material absorbs moisture if left exposed to the atmosphere?

- (A) Butyl rubber.
- (B) Polyvinyl chloride.
- (C) Magnesium oxide.
- (D) Linked polyethylene.

**Test spec reference: 202.02.02**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**13.**

What would the instrument shown in **Figure 2** be used to display the value of?



<https://www.hobut.co.uk/>

**Figure 2**

- (A) Current.
- (B) Voltage.
- (C) Wattage.
- (D) Resistance.

**Test spec reference: 202.02.04**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

#### **14. Calculator required**

What would be the nominal voltage of a battery made up of twenty-five 1.2 V cells when connected in series?

- (A) 1.2 V
- (B) 12 V
- (C) 30 V
- (D) 48 V

**Test spec reference: 202.02.03**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**15.**

Which formula is correct?

(A)  $I = \frac{V}{R}$

(B)  $R = \frac{I}{V}$

(C)  $V = \frac{I}{R}$

(D)  $V = \frac{R}{I}$

**Test spec reference: 202.02.03**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**16.**

Which type of cable would be **most** suitable for a circuit which must operate in fire conditions?

(A) MICC

(B) PILCS

(C) PVC SWA

(D) XLPE SWA

**Test spec reference: 202.02.02**  
Understanding

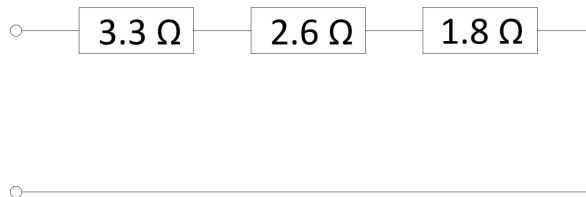
**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

### 17. Calculator required

What is the total resistance of the circuit shown in **Figure 3**?



**Figure 3**

- (A) 0.8 Ω
- (B) 1.24 Ω
- (C) 2.6 Ω
- (D) 7.7 Ω

**Test spec reference: 202.02.03**  
Understanding

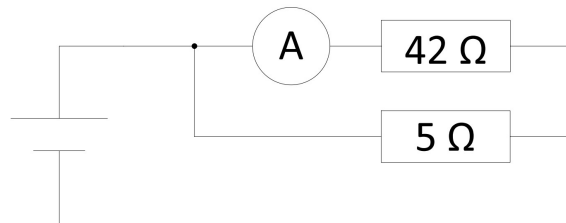
**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**

### 18. Calculator required

What is the total current in the circuit shown in **Figure 4** if the ammeter reads 8 Amps?



**Figure 4**

- (A) 7.1 A
- (B) 16.0 A
- (C) 67.2 A
- (D) 75.2 A

**Test spec reference: 202.02.04**  
Applied knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**



**19.**

What does the second finger represent in Fleming's Right Hand Rule?

- (A) Field.
- (B) Motion.
- (C) Current.
- (D) Resistance.

**Test spec reference: 202.03.02**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**20.**

**Figure 5** shows three magnets.

What magnetic effects would be expected?



**Figure 5**

- (A) 'A' will repel 'B' 'B' will repel 'C'.
- (B) 'A' will attract 'B' 'B' will repel 'C'.
- (C) 'A' will repel 'B' 'B' will attract 'C'.
- (D) 'A' will attract 'B' 'B' will attract 'C'.

**Test spec reference: 202.03.01**  
Knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

**21. Calculator required**

What force would be created by a current of 16.2 A flowing through 4800 mm of conductor with a flux density of 0.23 T?

- (A) 17.88 N
- (B) 68.15 N
- (C) 338.09 N
- (D) 17884.80 N

**Test spec reference: 202.03.01**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**22.**

What is the formula used to calculate the RMS voltage on a 50 Hz sine wave?

(A)  $V = \frac{Peak}{\sqrt{2}}$

(B)  $V = \frac{Peak}{2}$

(C)  $V = Peak \times 2$

(D)  $V = Peak \times \sqrt{2}$

**Test spec reference: 202.03.03**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**23. Calculator required**

A transformer has 495 primary and 18 secondary turns and has a secondary voltage of 400 V.

What value is the input voltage?

(A) 1100 V

(B) 3300 V

(C) 11000 V

(D) 33000 V

**Test spec reference: 202.03.04**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**24.**

What is the principle used by a current transformer?

(A) Induction.

(B) Radiation.

(C) Capacitance.

(D) Conductance.

**Test spec reference: 202.03.04**  
Knowledge

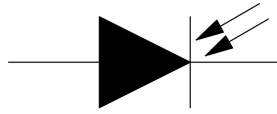
**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**25.**

Which component is represented by the symbol in **Figure 6**?



**Figure 6**

- (A) LED.
- (B) LDR.
- (C) Photo diode.
- (D) Zenner diode.

**Test spec reference: 202.04.01**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**26.**

Which component is used to directly amplify a signal within a piece of electronic equipment?

- (A) Resistor.
- (B) Thyristor.
- (C) Transistor.
- (D) Capacitor.

**Test spec reference: 202.04.02**  
Applied knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**27.**

What is the intended purpose of the tool shown in **Figure 7**?



**Figure 7**

- A) Cable cutting.
- B) Gripping fixings.
- C) Crimp terminations.
- D) Tighten connections.

**Test spec reference: 203.01.01**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

### **28. Calculator required**

A straight 2 m length of conduit is to be installed to house 18 stranded 2.5 mm<sup>2</sup> PVC insulated copper conductors.

What is the **minimum** conduit factor required?

- (A) 558
- (B) 702
- (C) 774
- (D) 1044

**Test spec reference: 203.02.01**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**29.**

What type of containment could include a running-coupler?

- (A) Tray.
- (B) Ladder.
- (C) Conduit.
- (D) Trunking.

**Test spec reference: 203.02.04**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**30.**

What type of circuit is **most** likely to include insulation displacement connectors?

- (A) 230 V ring final.
- (B) HV transmission.
- (C) 11,000 V distribution.
- (D) ELV telecommunication.

**Test spec reference: 203.04.03**  
Knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 203 Electrical Installation**

**31.**

Which type of cable is the clip shown in **Figure 8** intended to support?



**Figure 8**

- (A) PILC.
- (B) SWA.
- (C) MICC.
- (D) CAT 5.

**Test spec reference: 203.02.03**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**32.**

Which tool would be **most** suitable to cut a hole in a section of trunking to accept a 20 mm conduit coupler and bush?

- (A) Pad saw.
- (B) Hole saw.
- (C) Hack saw.
- (D) Panel saw.

**Test spec reference: 203.02.04**  
Applied knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 203 Electrical Installation**

**33.**

What is the **minimum** height that a socket-outlet can be mounted from the finished floor level of a new domestic premises, to comply with Building Regulations?

- (A) 350 mm
- (B) 400 mm
- (C) 450 mm
- (D) 500 mm

**Test spec reference: 203.04.02**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**34.**

What is the **minimum** internal bend radius for a multicore stranded copper non-armoured cable with a diameter of 15 mm?

- (A) 75 mm
- (B) 60 mm
- (C) 45 mm
- (D) 30 mm

**Test spec reference: 203.03.04**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 203 Electrical Installation**

**35.**

What type of fixing is shown in **Figure 9**?



<https://www.toolstation.com>

**Figure 9**

- (A) Tie.
- (B) Cleat.
- (C) Saddle.
- (D) Crampet.

**Test spec reference: 203.02.03**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**36.**

What is the **minimum** degree of protection for the accessible top horizontal surface of a consumer unit?

- (A) IP2X
- (B) IP3X
- (C) IP4X
- (D) IP5X

**Test spec reference: 203.04.01**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**



**37.**

Which type of circuit would **most** likely use CAT 5 cable?

- (A) Socket-outlet.
- (B) Outside lighting.
- (C) Domestic cooker.
- (D) Computer ethernet.

**Test spec reference: 203.03.04**  
Knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 203 Electrical Installation**

**38. Calculator required**

What is the **maximum** permissible distance between supports on an accessible metal trunking system with a cross-sectional area of 400 mm<sup>2</sup> installed horizontally?

- (A) 0.75 m
- (B) 1.25 m
- (C) 1.00 m
- (D) 1.50 m

**Test spec reference: 203.03.02**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**39.**

Which substance reacts with PVC if installed in contact with one another?

- (A) Polypropylene.
- (B) Nylon polymer.
- (C) Expanded polystyrene.
- (D) Cross-linked polyethylene.

**Test spec reference: 203.03.01**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**40.**

Which method of electricity generation is classed as renewable energy?

- (A) Wind.
- (B) Coal.
- (C) Gas.
- (D) Oil.

**Test spec reference: 204.01.01**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 204 Electrical Technology**

**41.**

What is the **maximum** typically quoted external earth fault loop impedance value, for a 100 A domestic electrical installation, forming a TN-S system?

- (A) 0.20  $\Omega$
- (B) 0.35  $\Omega$
- (C) 0.55  $\Omega$
- (D) 0.80  $\Omega$

**Test spec reference: 204.01.04**  
Knowledge

**Total marks: 1 mark**

**Key: D**

**LO: 204 Electrical Technology**

**42.**

Which system relies on the general mass of earth as a conductor between the installation earth electrode and supply earth electrode?

- (A) TT
- (B) TN-C
- (C) TN-S
- (D) TN-C-S

**Test spec reference: 204.01.04**  
Understanding

**Total marks: 1 mark**

**Key: A**

**LO: 204 Electrical Technology**

**43.**

Which is used to support high voltage transmission bare conductors in the UK distribution network?

- (A) Pylons.
- (B) Ladders.
- (C) Platforms.
- (D) Catenaries.

**Test spec reference: 204.01.01**  
Understanding

**Total marks: 1 mark**

**Key: A**

**LO: 204 Electrical Technology**

**44.**

Who is responsible for the meter tails between a utility electricity meter and CU?

- (A) Supplier.
- (B) Consumer.
- (C) Licencing authority.
- (D) Network operator.

**Test spec reference: 204.01.02**  
Understanding

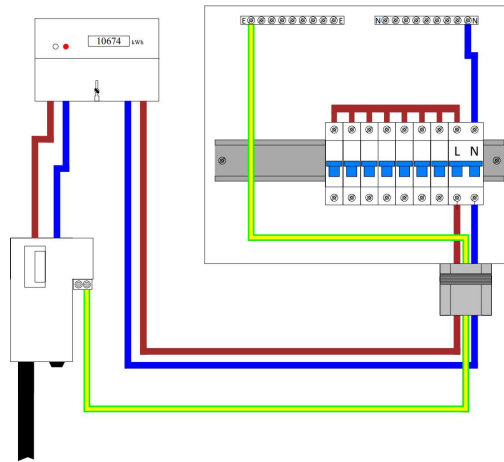
**Total marks: 1 mark**

**Key: B**

**LO: 204 Electrical Technology**

**45.**

Which earthing system is shown in **Figure 10**?



**Figure 10**

- (A) IT
- (B) TT
- (C) TN-S
- (D) TN-C-S

**Test spec reference: 204.01.02**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: D**

**LO: 204 Electrical Technology**

**46.**

Which is the operating principle of an RCD in a single-phase consumer unit?

- (A) Measures overload current.
- (B) Heats up a bi-metallic strip.
- (C) Measures the earth fault current.
- (D) Detects imbalance between L and N.

**Test spec reference: 204.02.01**  
**Understanding**

**Total marks: 1**  
**mark**

**Key: D**

**LO: 204 Electrical Technology**

**47.**

A new protective device, as shown in **Figure 11**, is to be fitted within an existing consumer unit.



**Figure 11**

What is the British Standard this device **must** conform to?

- (A) BS EN 60898.
- (B) BS EN 61009.
- (C) BS EN 60309.
- (D) BS EN 60947.

**Test spec reference: 204.02.01**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**

**48.**

Which is an exposed-conductive-part?

- A) Metallic water pipe.
- B) Galvanized trunking.
- C) Gas installation pipe.
- D) Structural steel girder.

**Test spec reference: 204.03.04**  
**Understanding**

**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**

**49.**

Which is a method of providing Basic Protection as prescribed in BS 7671?

- (A) Installation of an RCD.
- (B) Insulation of live parts.
- (C) Equipotential bonding.
- (D) Earthing of exposed parts.

**Test spec reference: 204.03.01**  
**Knowledge**

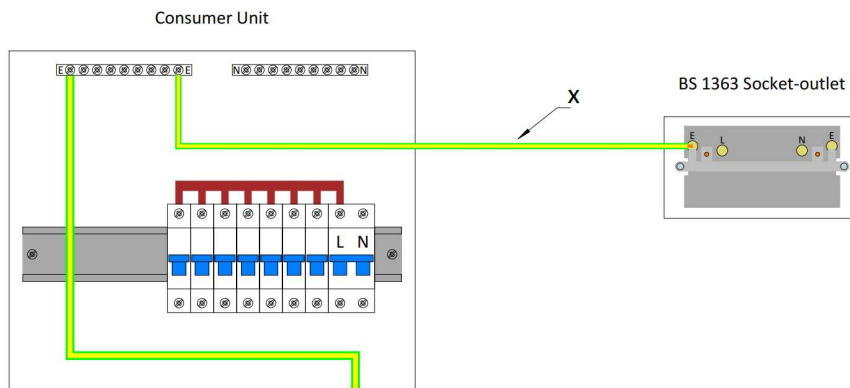
**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**

**50.**

Which conductor is labelled X in **Figure 12**?



**Figure 12**

- (A) Earthing conductor.
- (B) Circuit protective conductor.
- (C) Supplementary bonding conductor.
- (D) Main protective bonding conductor.

**Test spec reference: 204.03.03a**  
**Knowledge**

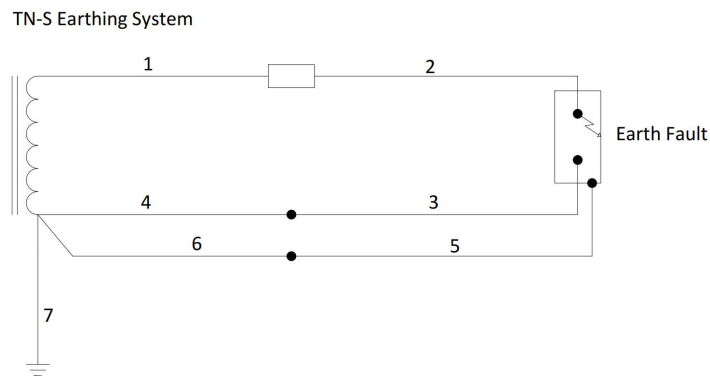
**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**

**51.**

Which conductors shown in **Figure 13** would carry the earth fault current?



**Figure 13**

- (A) 1, 2 and 7
- (B) 2, 3 and 4
- (C) 1, 5 and 6
- (D) 2, 5 and 7

**Test spec reference: 204.03.05**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: C**

**LO: 204 Electrical Technology**

**52.**

What is the **maximum** disconnection time for a 230 V final circuit within a TN-S installation protected by a 20 A BS EN 60898 circuit breaker as prescribed in BS 7671?

- (A) 0.2 s
- (B) 0.4 s
- (C) 1 s
- (D) 5 s

**Test spec reference: 204.03.03a**  
**Understanding**

**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**

**53.**

What is the symbol for the line conductor of a radial circuit?

- (A)  $r_1$
- (B)  $r_2$
- (C)  $R_1$
- (D)  $R_2$

**Test spec reference: 204.03.05**  
**Knowledge**

**Total marks: 1**  
**mark**

**Key: C**

**LO: 204 Electrical Technology**

**54.**

Conductors are being selected for a domestic premises which is supplied via a 100 A supplier cut-out fuse. The installation forms part of a TN-C-S system.

What is the **minimum** cross-sectional area for main protective bonding conductors within this installation?

- (A) 4 mm<sup>2</sup>
- (B) 6 mm<sup>2</sup>
- (C) 10 mm<sup>2</sup>
- (D) 16 mm<sup>2</sup>

**Test spec reference: 204.03.03b**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: C**

**LO: 204 Electrical Technology**

**55. Calculator required**

What is the design current for a 230 V electric shower rated at 9.5 kW?

- (A) 4.1 A
- (B) 24.2 A
- (C) 39.6 A
- (D) 41.3 A

**Test spec reference: 204.04.02**  
**Understanding**

**Total marks: 1**  
**mark**

**Key: D**

**LO: 204 Electrical Technology**



**56.**

Which publication contains a table giving percentages to be used when applying diversity to installation design current figures?

- (A) Guidance Note 3.
- (B) IET On-Site Guide.
- (C) Approved Document P.
- (D) BS 7671 Wiring Regulations.

**Test spec reference: 201.05.01**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 201 Health and Safety and Industry Practices**

**57.**

Which information **must** be supplied to the client on handover of an electrical installation in a domestic premises?

- (A) Materials used list.
- (B) Product user instructions.
- (C) Electrical personnel register.
- (D) Manufacturers' installation instructions.

**Test spec reference: 201.06.02**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 201 Health and Safety and Industry Practices**

**58.**

A 6 mm<sup>2</sup> 70°C PVC thermoplastic flat cable is to be installed in trunking within a factory.

What is the **maximum** current-carrying capacity for this cable?

- (A) 27 A
- (B) 32 A
- (C) 38 A
- (D) 52 A

**Test spec reference: 204.04.02**  
Applied knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 204 Electrical Technology**

**59. Calculator required**

What is the **maximum** current-carrying capacity for a 2.5 mm<sup>2</sup> flat profile 70°C thermoplastic cable, installed in an ambient temperature of 35°C installed as method C?

- (A) 19.74 A
- (B) 23.49 A
- (C) 25.38 A
- (D) 28.72 A

**Test spec reference: 204.04.02**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: C**

**LO: 204 Electrical Technology**

**60.**

A 19 m circuit is to be installed to supply a load of 14 A, using 70°C thermoplastic flat profile cable with protective conductor.

What would the voltage drop for this circuit be if installed using 1.5 mm<sup>2</sup> live conductors?

- (A) 6.9 V
- (B) 7.7 V
- (C) 11.5 V
- (D) 11.7 V

**Test spec reference: 204.04.03**  
**Applied knowledge**

**Total marks: 1**  
**mark**

**Key: B**

**LO: 204 Electrical Technology**