

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

### 8202-020 & 520 Level 2 Electrical - Theory exam

#### March 2022 Mark Scheme

<b>1.</b>		
Which Regulations are non-statutory?		
<ul style="list-style-type: none"> <li>a) The Electricity at Work Regulations.</li> <li>b) Requirements for Electrical Installations BS 7671.</li> <li>c) Control of Substances Hazardous to Health (COSHH) Regulations.</li> <li>d) Control of Noise at Work Regulations.</li> </ul>		
<b>Test spec reference: 201.01.01</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 may become a land pollutant if not contained safely?		
<ul style="list-style-type: none"> <li>(A) Mercury.</li> <li>(B) Argon.</li> <li>(C) Neon.</li> <li>(D) Nitrogen.</li> </ul>		
<b>Test spec reference: 201.05.03</b> Understanding	<b>Total marks: 1</b> mark	<b>Key: A</b>
<b>LO: 201 Health and Safety and Industry Practices</b>		

**3.**

Which type of fire extinguisher would have a **red** band?

- a) CO2.
- b) Foam.
- c) Water.
- d) Powder.

**Test spec reference: 201.03.03**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

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

**4.**

Who is responsible for organising construction work on a building site?

- (A) Site Manager.
- (B) Clerk of Works.
- (C) Quality Inspector.
- (D) Principle Architect.

**Test spec reference: 201.06.01**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

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

**5.**

What colour sign would tell you a safety helmet must be worn on a construction site?

- (A) Yellow and black.
- (B) Green and white.
- (C) Red and black.
- (D) Blue and white.

**Test spec reference: 201.03.05**  
Applied knowledge

**Total marks: 1**  
mark

**Key: D**

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

**6.**

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

- (A) nA.
- (B)  $\mu$ A.
- (C) mA.
- (D) kA.

**Test spec reference: 202.01.01**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**7.**

What is the diameter of a conductor with a cross sectional area of  $6 \text{ mm}^2$ ?

- (A) 1.27 mm.
- (B) 1.38 mm.
- (C) 2.24 mm.
- (D) 2.76 mm.

**Test spec reference: 202.01.03**  
Applied knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**

**8.**

Which is the correct transposition of  $X_L = 2\pi fL$  ?

- (A)  $f = \frac{2\pi L}{X_L}$
- (B)  $f = \frac{X_L}{2\pi L}$
- (C)  $f = \frac{2\pi X_L}{L}$
- (D)  $f = \frac{\pi L}{2X_L}$

**Test spec reference: 202.01.02**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

**9.**

What is measured in m<sup>2</sup>?

- (A) Area.
- (B) Length.
- (C) Width.
- (D) Volume.

**Test spec reference: 202.01.01**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**10.**

How many degrees does a generator rotor rotate per cycle?

- (A) 45°.
- (B) 90°.
- (C) 180°.
- (D) 360°.

**Test spec reference: 202.01.03**  
Knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**

**11.**

What is the SI unit of measurement for resistance?

- A) Ohm.
- B) Watt.
- C) Henry.
- D) Farad.

**Test spec reference 202.02.02**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 202 Electrical Science**

**12.**

Which is a good conductor of electricity?

- (A) Mica.
- (B) Nylon.
- (C) Carbon.
- (D) Ceramic.

**Test spec reference: 202.02.02**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**13.**

Which instrument is used to **directly** measure electrical current?

- (A) Voltmeter.
- (B) Ammeter.
- (C) Ohmmeter.
- (D) Wattmeter.

**Test spec reference: 202.02.04**  
Knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

**14.**

What is the resistance of a 65 m  $1.5 \text{ mm}^2$  copper conductor where its resistivity is  $0.0172 \mu\Omega\text{m}$ ?

- (A)  $0.63 \Omega$
- (B)  $0.65 \Omega$
- (C)  $0.75 \Omega$
- (D)  $0.94 \Omega$

**Test spec reference: 202.02.02**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 202 Electrical Science**

**15.**

Three resistors of  $17\ \Omega$ ,  $44\ \Omega$  and  $66\ \Omega$  are connected in parallel.  
What is the total circuit resistance?

- (A)  $0.09\ \Omega$
- (B)  $10.34\ \Omega$
- (C)  $42.33\ \Omega$
- (D)  $127.0\ \Omega$

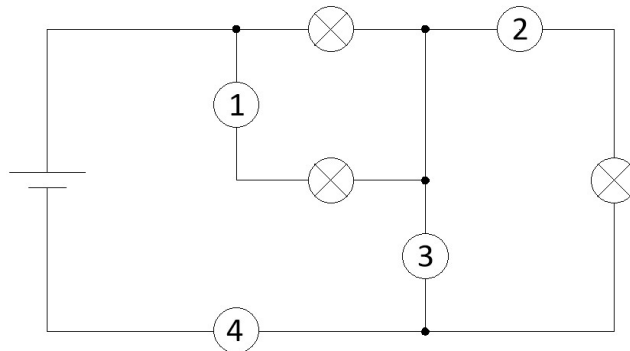
**Test spec reference: 202.02.03**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

**16.**



**Figure 1**

An ammeter is to be installed in the circuit shown in Figure 1.

At which point in the circuit must this be installed in order to measure the **total** load current?

- (A) 1.
- (B) 2.
- (C) 3.
- (D) 4.

**Test spec reference: 202.02.04**  
Understanding

**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**

17.

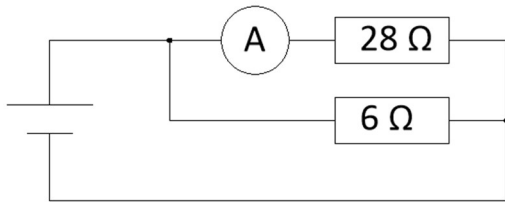


Figure 2

What is the total current in the circuit in Figure 2 if the ammeter reads 8 Amps?

- (A) 6.6 A
- (B) 10.2 A
- (C) 37.3 A
- (D) 45.3 A

**Test spec reference: 202.02.03**  
Applied knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 202 Electrical Science**

18.

What is the SI unit of measurement for capacitance?

- (A) Ampere.
- (B) Farad.
- (C) Henry.
- (D) Webber.

**Test spec reference: 202.02.02**  
Knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 202 Electrical Science**

19.

What is the unit of magnetic flux?

- (A) Watt.
- (B) Tesla.
- (C) Weber.
- (D) Coulomb.

**Test spec reference: 202.03.01**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

LO: 202 Electrical Science		
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**20.**

What electrical item would **most** commonly contain a permanent magnet?

- (A) Float switch in a water tank.
- (B) Dimmer switch on a lighting circuit.
- (C) Shower isolator in a bathroom.
- (D) Security contact on a door.

<b>Test spec reference: 202.03.01</b> Understanding	<b>Total marks: 1</b> mark	<b>Key: D</b>
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LO: 202 Electrical Science		
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**21.**

What does the thumb in Fleming's Right Hand Rule represent the direction of?

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

<b>Test spec reference: 202.03.02</b> Knowledge	<b>Total marks: 1</b> mark	<b>Key: B</b>
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LO: 202 Electrical Science		
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**22. Calculator required**

What force would be created by a current of 9.15 A flowing through 1800 mm of conductor with a flux density of 0.35 T?

- (A) 1.78 N.
- (B) 5.76 N.
- (C) 47.0 N.
- (D) 5764.5 N.

<b>Test spec reference: 202.03.02</b> Understanding	<b>Total marks: 1</b> mark	<b>Key: B</b>
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LO: 202 Electrical Science		
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**23.**

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



- (A)  $V = \frac{Peak}{2}$   
 (B)  $V = \frac{Peak}{\sqrt{2}}$   
 (C)  $V = \frac{1}{2 \times Peak}$   
 (D)  $V = \frac{1}{\sqrt{2} \times Peak}$

**Test spec reference: 202.03.03**  
**Knowledge**

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

**Key: B**

**LO: 202 Electrical Science**

**24.**



**Figure 3**

What is the **output** voltage of the transformer shown in Figure 3 which is commonly used on construction sites?

- (A) 12 V.  
 (B) 24 V.  
 (C) 110 V.  
 (D) 230 V.

**Test spec reference: 202.03.04**  
**Knowledge**

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

**Key: C**

**LO: 202 Electrical Science**

**25.**

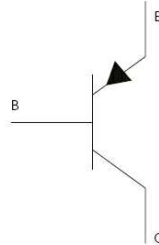
A transformer has 239 primary and 29 secondary turns and has a secondary voltage of 400 V.

What value is the input voltage?

- (A) 1100 V.  
 (B) 3300 V.  
 (C) 11000 V.  
 (D) 33000 V.

<b>Test spec reference: 202.03.04</b> Applied knowledge	<b>Total marks: 1</b> mark	<b>Key: B</b>
<b>LO: 202 Electrical Science</b>		

**26.**



**Figure 4**

Which electronic component is shown in Figure 4?

- (A) Transistor.
- (B) Thermistor.
- (C) Triac.
- (D) Diac.

<b>Test spec reference: 202.04.01</b> Knowledge	<b>Total marks: 1</b> mark	<b>Key: A</b>
<b>LO: 202 Electrical Science</b>		

**27.**

Which component can be made by connecting four diodes?

- (A) Amplifier.
- (B) Capacitor.
- (C) Bridge rectifier.
- (D) Autotransformer.

<b>Test spec reference: 202.04.02</b> Applied knowledge	<b>Total marks: 1</b> mark	<b>Key: C</b>
<b>LO: 202 Electrical Science</b>		

**28.**

Which is the **most** appropriate tool to cut into a plasterboard wall to insert a socket-outlet backbox?

- (A) Pad saw.
- (B) Panel saw.
- (C) Tenon saw.
- (D) Junior hacksaw.

**Test spec reference: 203.01.01**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**29.**

Which type of conduit may be affected by UV rays from direct sunlight?

- (A) White rigid PVC.
- (B) Black rigid PVC.
- (C) Stainless steel.
- (D) Galvanised steel.

**Test spec reference: 203.02.01**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**30.**

Which risk may be caused by leaving burrs within metallic conduit?

- (A) Increase of corrosion.
- (B) Increase of eddy currents.
- (C) Damage to cable insulation.
- (D) Reduced mechanical strength.

**Test spec reference: 203.02.04**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**31.**

What type of cable support system would a crampet be used to secure in place?

- (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**

**32.**

What is the **minimum** distance between cleats supporting an accessible horizontal steel wire armoured cable with an overall diameter of 12 mm?

- (A) 350 mm.
- (B) 400 mm.
- (C) 450 mm.
- (D) 550 mm.

**Test spec reference: 203.03.02**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**33.**

What is the **minimum** number of bends required to be made to produce a bubble-set in straight conduit?

- (A) 1.
- (B) 2.
- (C) 3.
- (D) 4.

**Test spec reference: 203.02.02**  
Knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**34.**

Which cable insulation material must not be used in direct contact with expanded polystyrene?

- (A) PVC.
- (B) XLPE.
- (C) Glass.
- (D) Rubber.

**Test spec reference: 203.03.04**  
Knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**35.**

Which type of circuit would be **most** likely to contain an intermediate switch?

- (A) Shower.
- (B) Lighting.
- (C) Cooker.
- (D) Alarm.

**Test spec reference: 203.04.02**  
Knowledge

**Total marks: 1**  
mark

**Key: B**

**LO: 203 Electrical Installation**

**36.**

What is the **maximum** number of 4 mm<sup>2</sup> single-core conductors that can be installed in one straight 3 m length of 20 mm galvanised conduit?

- (A) 6.
- (B) 7.
- (C) 8.
- (D) 9.

**Test spec reference: 203.03.04**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 203 Electrical Installation**

**37.**

Which of the following would be the **best** PVC conduit temperature to assist the process of making a 90 ° bend?

- (A) 0 °C
- (B) 10 °C
- (C) 60 °C
- (D) 200 °C

**Test spec reference: 203.02.02**  
Understanding

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**38.**



**Figure 5**

What type of fixing is shown in Figure 5?

- (A) Anchor bolt.
- (B) Channel nut.
- (C) Masonry bolt.
- (D) Spring toggle.

**Test spec reference: 203.02.03**  
knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 203 Electrical Installation**

**39.**

What is the purpose of a catenary wire?

- (A) Drawing in cables into conduit.
- (B) Providing an earth connection.
- (C) Supporting overhead conductors.
- (D) Connecting a computer system.

**Test spec reference: 203.03.02**  
knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 203 Electrical Installation**

**40.**



**Figure 6**

Which type of cable would **commonly** use the type of connector shown in Figure 6?

- (A) CAT 5.
- (B) Coaxial.
- (C) Single-core.
- (D) Twin and cpc.

**Test spec reference: 203.04.01**  
Applied knowledge

**Total marks: 1**  
mark

**Key: A**

**LO: 203 Electrical Installation**

**41.**

What is the **maximum** transmission voltage used on the UK super-grid?

- (E) 132 000 V.
- (F) 275 000 V.
- (G) 400 000 V.
- (H) 660 000 V.

**Test spec reference: 204.01.01**  
knowledge

**Total marks: 1**  
mark

**Key: C**

**LO: 204 Electrical Technology**

**42.**

Who is responsible for the meter tails prior to the electricity meter?

- (A) Local authority.
- (B) Installation owner.
- (C) Licencing authority.
- (D) Network operator.

**Test spec reference: 204.01.02**  
Knowledge

**Total marks: 1**  
mark

**Key: D**

**LO: 204 Electrical Technology**

**43.**

What **must** as a **minimum** be provided at the origin of all single-phase installations?

- (A) Single-pole main switch.
- (B) Double-pole main switch.
- (C) Triple-pole main switch.
- (D) Quadruple-pole main switch.

**Test spec reference: 204.01.03**  
Understanding

**Total marks: 1**  
mark

**Key: B**

**LO: 204 Electrical Technology**



**44.**

What is the typically quoted **maximum** value of  $Z_e$  for a TN-S earthing arrangement?

- (A) 0.20  $\Omega$
- (B) 0.35  $\Omega$
- (C) 0.65  $\Omega$
- (D) 0.80  $\Omega$

**Test spec reference: 204.01.04**  
Understanding

**Total marks: 1**  
mark

**Key: D**

**LO: 204 Electrical Technology**

**45.**

What is the earthing conductor connected to, at the origin of an installation forming part of a TN-C-S system?

- (A) An incoming water pipe.
- (B) The general mass of earth.
- (C) Lead sheath of the supply cable.
- (D) The incoming supply neutral point.

**Test spec reference: 204.01.02**  
Understanding

**Total marks: 1**  
mark

**Key: D**

**LO: 204 Electrical Technology**

**46.**

What type of protection is provided by an RCD?

- (A) Earth fault protection.
- (B) Overload protection.
- (C) Short circuit protection.
- (D) Basic protection.

**Test spec reference: 204.02.02**  
Understanding

**Total marks: 1**  
mark

**Key: A**

**LO: 204 Electrical Technology**

**47.**

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

- (A) Bonding.
- (B) Earthing.
- (C) Barriers.
- (D) Fuses.

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

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

**Key: C**

**LO: 204 Electrical Technology**

**48.**

What is the purpose of **main** protective bonding?

- (A) To reduce the circuit  $Z_s$ .
- (B) To provide equipotential.
- (C) To reduce the installation  $Z_e$ .
- (D) To provide a fault path to earth.

**Test spec reference: 204.03.03b**  
**Understanding**

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

**Key: B**

**LO: 204 Electrical Technology**

**49.**

What is the maximum disconnection time for a 32 A 230 V final circuit within a TN-S installation as given in BS 7671?

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

**Test spec reference: 204.03.02**  
**Understanding**

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

**Key: B**

**LO: 204 Electrical Technology**

**50.**

Which is an extraneous-conductive-part?

- (A) Metallic conduit system.
- (B) Metallic trunking system.
- (C) Metallic gas installation pipe.
- (D) Metallic case of a consumer unit.

**Test spec reference: 204.03.04**  
**Knowledge**

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

**Key: C**

**LO: 204 Electrical Technology**

**51.**

What is the symbol for the total earth fault loop impedance path of a circuit?

- (A)  $Z_s$
- (B)  $R_1$
- (C)  $R_2$
- (D)  $Z_e$

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

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

**Key: A**

**LO: 204 Electrical Technology**

**52.**

Which item of metalwork would be **earthed** within an electrical installation in a factory?

- (A) Gas installation pipe.
- (B) Water installation pipe.
- (C) Metallic trunking system.
- (D) Lightning protection system.

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

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

**Key: C**

**LO: 204 Electrical Technology**

**53.**

What is the mV/A/m value for a 2.5 mm<sup>2</sup> multicore 70 °C thermoplastic cable forming a single-phase circuit?

- (A) 11
- (B) 18
- (C) 29
- (D) 44

**Test spec reference: 204.04.03**  
**Understanding**

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

**Key: B**

**LO: 204 Electrical Technology**

**54.**

What is the actual length of a wall if it measures 200 mm on a drawing with a scale of 1:50?

- (A) 0.1 m.
- (B) 1.0 m.
- (C) 10 m.
- (D) 100 m.

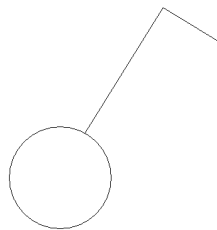
**Test spec reference: 204.05.05**  
**Understanding**

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

**Key: C**

**LO: 204 Electrical Technology**

**55.**



**Figure 7**

Which accessory would be represented by the symbol in Figure 7?

- (A) Single-pole switch.
- (B) Double-pole switch.
- (C) Three-pole switch.
- (D) Four-pole switch.

<b>Test spec reference: 204.05.05</b> Understanding	<b>Total marks: 1</b> <b>mark</b>	<b>Key: A</b>
<b>LO: 204 Electrical Technology</b>		

**56.**

What **must** be provided adjacent to a lathe in a machining workshop?

- (A) 30 mA RCD.
- (B) Main switch.
- (C) Circuit breaker.
- (D) Emergency switch.

<b>Test spec reference: 204.02.03</b> Applied knowledge	<b>Total marks: 1</b> <b>mark</b>	<b>Key: D</b>
<b>LO: 204 Electrical Technology</b>		

**57.**

Which would be the **most** appropriate rating for a circuit breaker protecting a lighting circuit in a three-bedroom dwelling?

- (A) 1 A
- (B) 6 A
- (C) 20 A
- (D) 32 A

<b>Test spec reference: 204.03.02</b> Applied knowledge	<b>Total marks: 1</b> <b>mark</b>	<b>Key: B</b>
<b>LO: 204 Electrical Technology</b>		

**58.**

A 4 mm<sup>2</sup> 70 °C thermoplastic insulated and sheathed flat cable with protective conductor is to be installed Reference Method C.

What would be the **maximum** rating of a BS 3036 fuse providing overload protection for this cable?

- (A) 5 A
- (B) 15 A
- (C) 20 A
- (D) 30 A

<b>Test spec reference: 204.04.02</b> <b>Applied knowledge</b>	<b>Total marks: 1</b> <b>mark</b>	<b>Key: C</b>
<b>LO: 204 Electrical Technology</b>		

**59.**

What must be supplied to the client following the installation of a new circuit and an electric shower?

- (A) Electrical Installation Certificate.
- (B) Minor Works Certificate.
- (C) Electrical Installation Condition Report.
- (D) Periodic Inspection Report.

<b>Test spec reference: 204.06.02</b> <b>Applied knowledge</b>	<b>Total marks: 1</b> <b>mark</b>	<b>Key: A</b>
<b>LO: 204 Electrical Technology</b>		

**60.**

What would be the voltage drop for a 28 m 1.5 mm<sup>2</sup> single-phase circuit supplying a load of 13 A using 70 °C thermoplastic insulated and sheathed flat cable with protective conductor?

- (A) 16.0 V
- (B) 11.5 V
- (C) 10.6 V
- (D) 6.9 V

<b>Test spec reference: 204.04.03</b> <b>Applied knowledge</b>	<b>Total marks: 1</b> <b>mark</b>	<b>Key: C</b>
<b>LO: 204 Electrical Technology</b>		