

# Initial Verification of Electrical Installations: Sample Test (2391-050)

**Version 1.2 June 2022**

| Version and date         | Change detail   | Section |
|--------------------------|---|---------|
| <b>1.2<br/>June 2022</b> | <ul style="list-style-type: none"> <li><b>Modified questions/answers to suit BS 7671:2018 (2022)A2</b></li> </ul> | All     |
| <b>1.1<br/>July 2018</b> | <ul style="list-style-type: none"> <li><b>Modified questions/answers to suit BS 7671:2018</b></li> </ul>          | All     |

| Candidate | Name | Date | DD/MM/YY |
|-----------|------|------|----------|
|           |      |      |          |

- 1 What is the **main** purpose of an Initial Verification?
- A. To complete the testing and issue an Electrical Installation Certificate.
  - B. To make a judgement that the installation is safe for continued use.
  - C. To confirm an installation is safe to be put into service.
  - D. To ensure all testing has been carried out.

**Response:** \_\_\_\_\_

- 2 What situation requires the issuing of a Minor Electrical Installation Works Certificate?
- A. An additional lighting circuit has been installed.
  - B. Changing a consumer unit and protective devices.
  - C. Upgrading the cable and circuit breaker for a shower circuit.
  - D. Additional socket-outlets added to an existing ring final circuit.

**Response:** \_\_\_\_\_

- 3 Which statutory document contains specific information relevant to Initial Verification?
- A. The Electricity at Work Regulations.
  - B. Health and Safety guidance GS38.
  - C. The Health and Safety at Work Act.
  - D. BS 7671, Requirements for Electrical Installations.

**Response:** \_\_\_\_\_

- 4 What is the **minimum** voltage which requires the test leads and probes to comply with GS38?
- A. 25 V AC.
  - B. 50 V AC.
  - C. 120 V AC.
  - D. 150 V AC.

**Response:** \_\_\_\_\_

- 5 How many voltage measurements are required to confirm that a three-phase four-wire installation is safely isolated?
- A. 3
  - B. 6

- C. 9
- D. 10

**Response:** \_\_\_\_\_

6 What precaution is required before carrying out a test of external earth fault loop impedance ( $Z_e$ ) so as to avoid danger to users of an installation?

- A. Lock off the supply.
- B. Use insulated screwdrivers.
- C. Warn the occupier of the premises.
- D. Disconnect the main protective bonding conductors.

**Response:** \_\_\_\_\_

7 Why does BS 7671 require inspection to be carried out before testing?

- A. To confirm the installers have installed as per the job specification.
- B. To confirm all the equipment is connected to the installation will work.
- C. To confirm the installation is complete and it is safe to commence testing.
- D. To confirm the Earthing Conductor is connected and it is safe to commence testing.

**Response:** \_\_\_\_\_

8 Which situation **will not** require a label stating 'Safety Electrical Connection – Do Not remove'?

- A. Connecting a bonding conductor to a metallic installation gas pipe.
- B. An Earthing conductor connected to an installation earth electrode.
- C. A supplementary bonding conductor connected to a metallic water pipe.
- D. The connection to a Main Earthing Terminal within a consumer unit.

**Response:** \_\_\_\_\_

9 What **must** be checked when inspecting a consumer unit for compliance with Basic Protection requirements?

- A. All cable terminations are tight.
- B. Enclosures meet the IP requirements.
- C. Live conductors are correctly identified.
- D. Protective devices are the correct rating.

**Response:** \_\_\_\_\_

10 Which **two** senses are used when inspecting the terminations at a newly installed motor?

- A. Sight and hearing.
- B. Sight and smell.
- C. Touch and smell.
- D. Touch and sight.

**Response:** \_\_\_\_\_

11 What action **must** be taken when a loose connection is found to a pipe during the inspection of a main protective bonding conductor termination?

- A. The defect must be made good and inspected before certification.
- B. A defect report must accompany the Electrical Installation Certificate.
- C. The continuity test between the MET and the pipe should be carried out.
- D. A note is made on the Electrical Installation Certificate under 'Departures'.

**Response:** \_\_\_\_\_

12 What **best** describes the protection offered by IPXXB?

- A. Protection against access to live parts.
- B. Protection against the ingress of solids.
- C. Protection against the ingress of water.
- D. Protection against impact.

**Response:** \_\_\_\_\_

13 What is the **minimum** IP rating for electrical equipment installed in Zone 2 of a bathroom?

- A. IP 2X
- B. IP X2
- C. IP 4X
- D. IP X4

**Response:** \_\_\_\_\_

14 The calibration of an Earth Fault Loop Impedance tester reveals that the instrument is outside of specification. Regular accuracy checks on the instrument have not been carried out for six months.

What immediate action **must** be taken by the contractor?

- A. The last installation tested should be retested.
- B. The test leads for this instrument must be replaced.

- C. All installations tested in the last three months should be retested.
- D. All installations tested since the last calibration should be checked.

**Response:** \_\_\_\_\_

15 What instrument would give the **most** accurate results when carrying out an earth electrode resistance test?

- A. A low-resistance ohmmeter.
- B. An earth fault loop impedance tester.
- C. A three or four-terminal earth electrode tester.
- D. A stakeless or probe type earth electrode tester.

**Response:** \_\_\_\_\_

16 Why does BS 7671 give a defined sequence of tests when carrying out Initial Verification?

- A. To ensure all tests are carried out.
- B. To ensure the Schedule of Test Results is complete.
- C. To ensure live tests are carried out in the correct order.
- D. To ensure the safety of the person carrying out the tests.

**Response:** \_\_\_\_\_

17 Which test method is used to verify that extraneous conductive parts of an installation are effectively connected to the MET?

- A. Long lead test.
- B.  $R_1+R_n$  linked test.
- C. Applied voltage test.
- D. Applied current test.

**Response:** \_\_\_\_\_

18 What is the **main** purpose of verifying that extraneous conductive parts of an installation are effectively connected to the MET?

- A. To confirm that they provide a reliable path for fault currents to flow to earth.
- B. To confirm that there is a reliable connection between the MET and the means of earthing.

- C. To confirm that they will reduce values of earth fault loop impedance to comply with BS7671.
- D. To confirm that only a low potential will exist between exposed and extraneous conductive parts under fault conditions.

**Response:** \_\_\_\_\_

19 Where on a lighting circuit would a test of continuity of protective conductors be carried out?

- A. At the distribution board.
- B. At every light and switch point.
- C. At the furthest point in the circuit.
- D. At every light and each switch with a metallic plate.

**Response:** \_\_\_\_\_

20 What would cause the value of  $r_2$  to be higher than  $r_1$  and  $r_n$  when carrying out step 1 of a continuity of ring-final circuit test?

- A. A spur in the ring.
- B. A connected load.
- C. Parallel earth paths.
- D. Smaller sized cpc.

**Response:** \_\_\_\_\_

21 What is the test voltage for an insulation resistance test carried out on a 230 V circuit, between live conductors and earth, following the connection of socket-outlets incorporating surge protection devices which cannot be removed?

- A. 100 V DC.
- B. 250 V DC.
- C. 500 V DC.
- D. 1000 V DC.

**Response:** \_\_\_\_\_

- 22 During the construction of an installation, insulation resistance tests have been carried out between live conductors and earth on the individual circuits and the L to E results are shown below.

| Circuit No | L-E in MΩ |
|------------|-----------|
| 1          | 120       |
| 2          | 120       |
| 3          | 130       |
| 4          | 150       |

What is the expected value of insulation resistance L to E when the whole installation is tested?

- A. 0.03 MΩ
- B. 32.2 MΩ
- C. 136.7 MΩ
- D. 520 MΩ

**Response:** \_\_\_\_\_

Questions 23 to 26 relate to the following scenario:

The conductors of a newly installed ring final circuit are to be tested for continuity. The circuit is wired in PVC single core cables contained in PVC conduit.

All circuit conductors are 2.5 mm<sup>2</sup> and the end to end length of each loop is 75 m.

- 23 What action is required regarding the instrument test leads?

- A. They are nulled or zeroed.
- B. They must be GS 38 compliant.
- C. They must be auto-ranging.
- D. They must be 13 A rated.

**Response:** \_\_\_\_\_

- 24 What is the expected resistance of each of the loops tested in step 1 as shown in GN3?

- A. 0.14 Ω
- B. 0.56 Ω
- C. 0.68 Ω
- D. 1.01 Ω

**Response:** \_\_\_\_\_

- 25 Whilst testing the ring final circuit the reading at one of the socket-outlets for step 2, as shown in GN3, was found to be  $0.42 \Omega$  but an over range reading was obtained for step 3.

What condition would cause these results?

- A. The line conductor is not connected.
- B. The neutral conductor is not connected.
- C. Line and cpc conductor connections are reversed.
- D. Line and neutral conductor connections are reversed.

**Response:** \_\_\_\_\_

- 26 What is the **most likely** cause of significantly different readings at each socket-outlet when carrying out step 3, as shown in GN3, during testing of a newly installed ring final circuit?

- A. Incorrect polarity at one of the sockets on the circuit.
- B. Reduced size circuit protective conductor in the cable.
- C. Incorrect cross connection of conductors at the consumer unit.
- D. Interference from other circuits connected to the consumer unit.

**Response:** \_\_\_\_\_

- 27 What is the **most** appropriate method of verifying the polarity of the ring final circuit?

- A. Using a long lead and testing from the MET to each socket in turn.
- B. Testing at each socket using an earth fault loop impedance tester.
- C. Linking line and cpc and testing at each socket between line and cpc.
- D. Comparing the test results from stage 2 and stage 3 as identified in GN3.

**Response:** \_\_\_\_\_

Questions 28 to 31 relate to the following scenario:

Tests are to be carried out on a newly installed installation forming part of 230 V single-phase TT system. The whole installation is protected by a 100 mA S-Type RCD. 30mA BS EN 61009 RCBOs are installed protecting each outgoing circuit.

- 28 How is the **maximum** resistance for the installation earth electrode determined?

- A.  $50 \text{ V} \div I_{\Delta n}$
- B.  $230 \text{ V} \div I_{\Delta n}$



- C.  $50 \text{ V} \times I_{\Delta n}$
- D.  $230 \text{ V} \times I_{\Delta n}$

**Response:** \_\_\_\_\_

29 What is verified by carrying out a  $1 \times I_{\Delta n}$  test on a 30 mA RCD?

- A. The disconnection time will be exceeded.
- B. The RCD is not subject to nuisance tripping.
- C. The RCD will operate when a short circuit occurs.
- D. The requirements for additional protection will be met.

**Response:** \_\_\_\_\_

30 What is the **main** purpose for carrying out a  $\frac{1}{2} \times I_{\Delta n}$  test on a 30 mA RCD protecting 13 A socket-outlets in a dwelling?

- A. To ensure the RCD mechanism works correctly.
- B. To verify it meets the requirements of BS EN 61008.
- C. To verify it meets the requirements for additional protection.
- D. To verify that the device does not cause any unwanted tripping.

**Response:** \_\_\_\_\_

31 What is the purpose of a time delay on an upstream RCD when there are other downstream RCD's present?

- A. To ensure no device operates inside its required time.
- B. So that diversity is achieved.
- C. To provide earth fault protection.
- D. So that selectivity can be achieved.

**Response:** \_\_\_\_\_

32 What would be the x1 test current for an RCD having the **maximum** rating when providing fire protection?

- A. 30 mA
- B. 100 mA
- C. 300 mA
- D. 500 mA

**Response:** \_\_\_\_\_

Questions 33 to 40 relate to the following scenario:

A commercial storage unit has been rewired and the installation forms part of 400/230 V three-phase TN-S system. All 'dead' tests have been completed. 'Live' testing is about to commence.

33 Why is a live polarity check carried out at the origin of the installation?

- A. To verify that double-pole switches will automatically operate.
- B. To replace the need for a dead polarity test on the installation.
- C. To ensure the DNO's incoming supply has the correct polarity.
- D. To verify that the polarity throughout the installation is correct.

**Response:** \_\_\_\_\_

34 What is the reason for verifying the prospective fault current at the origin of the installation?

- A. To verify that the protective devices operate in the disconnection time given in BS 7671.
- B. To verify that the protective conductors of the installation can withstand the prospective fault current.
- C. To verify that the prospective fault current exceeds the breaking capacities of the protective devices.
- D. To verify that the short circuit breaking capacity of the protective devices exceed the value of prospective fault current.

**Response:** \_\_\_\_\_

35 What is the purpose of verifying the earth fault loop impedance at the furthest point on each final circuit?

- A. To verify the impedance is high enough to ensure RCDs are tripped.
- B. To verify the impedance is low enough to cause a high fault current to flow.
- C. To verify the impedance is high enough to cause a low fault current to flow.
- D. To verify that the fault current exceeds the breaking capacity of the protective device.

**Response:** \_\_\_\_\_

36 What action should be taken to allow for the effect of transient voltages when carrying out earth fault loop impedance tests?

- A. Turn on the anti-trip function on the instrument.
- B. Turn off the anti-trip function on the instrument.

- C. The instrument is on the lowest measuring range.
- D. The test is repeated to confirm consistent readings.

**Response:** \_\_\_\_\_

37 What factor can significantly reduce the values of measured earth fault loop impedance, compared to a calculated figure obtained using measured  $Z_e$  and measured  $R_1 + R_2$  values?

- A. Leakage currents.
- B. Harmonic currents.
- C. Parallel earth paths.
- D. A change in temperature.

**Response:** \_\_\_\_\_

38 What value requires the application of a multiplier correction factor when confirming an earth fault loop impedance test result complies with the IET Wiring Regulations?

- A. The tabulated values in BS 7671.
- B. The values in Guidance Note 3.
- C. The measured  $R_1+R_2$  value.
- D. The measured  $Z_s$  values.

**Response:** \_\_\_\_\_

39 The water heater circuit is wired in  $6 \text{ mm}^2 / 2.5 \text{ mm}^2$  copper conductors and is protected by a 32 A BS 88-2 fuse.

What is the maximum permitted measured earth fault loop impedance value for compliance with BS 7671?

- A.  $0.79 \Omega$
- B.  $0.99 \Omega$
- C.  $1.36 \Omega$
- D.  $1.70 \Omega$

**Response:** \_\_\_\_\_

40 What is the purpose of the phase-sequence test?

- A. To ensure harmonic currents are not created on the system.
- B. To ensure that three-phase motors turn in the correct direction.
- C. To ensure balanced loads on the three-phase distribution board.
- D. To ensure single-pole protective devices are in the line conductor.

**Response:** \_\_\_\_\_

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**1 Giltspur Street**  
**London**  
**EC1A 9DD**  
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