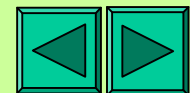


Question 1

State the necessary action that should be taken by an inspector on discovering a damaged socket outlet with exposed live parts during a periodic inspection and test

GN3 Page 9 - 1.2 (required competence)

Make an immediate recommendation to the client to isolate the defective part

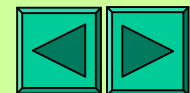


Question 2

State the documentation that should accompany an Installation Certificate or Periodic Inspection Report

GN3 Page 9 1.3.1 (Certificates and Reports)

- 1. Schedule of items inspected*
- 2. Schedule of test results*

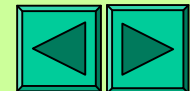


Question 3

Why is it necessary to undertake an initial verification?

GN3 Page 11 - 2.1 (Initial Verification)

- 1. Confirm that installation complies with designers intentions*
- 2. Constructed, inspected and tested to BS 7671*

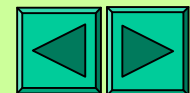


Question 4

State the requirements of Chapter 71 of BS 7671 with regard to initial verification

GN3 Page 11 - 2.1 (Initial Verification)

- 1. All fixed equipment and material complies with applicable British Standards or acceptable equivalents*
- 2. All parts of the fixed installation are correctly selected and erected*
- 3. Not visibly damaged or defective*

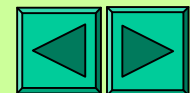


Question 5

Identify FIVE non-statutory documents that a person undertaking an inspection and test need to refer to

General Knowledge

- 1. BS 7671**
- 2. IEE On-Site Guide**
- 3. GS 38**
- 4. Guidance Note 3**
- 5. Memorandum of Guidance to The Electricity at Work Regulations**

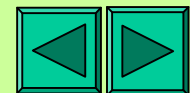


Question 6

Which non-statutory document recommends records of all maintenance including test results be kept throughout the life of an installation?

GN3 Page 11 - 2.1 (Initial Verification)

Memorandum of Guidance to The Electricity at Work Regulations (Regulation 4(2))

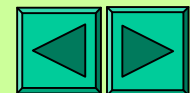


Question 7

Appendix 6 of BS 7671 allows the use of three forms for the initial certification of a new installation or for an alteration or an addition to an existing installation. State the title given each of these certificates

GN3 Page 12 - 2.1 (Initial Verification)

- 1. Multiple signature Electrical Installation Cert.*
- 2. Single signature Electrical Installation Cert*
- 3. Minor Electrical Installation Works Certificate*

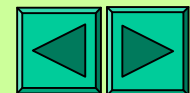


Question 8

Under what circumstances would it be appropriate to issue a single signature Electrical Installation Certificate?

GN3 Page 12 - 2.2 (Certificates)

Where design, construction inspection and testing is the responsibility of one person

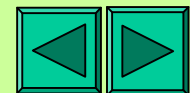


Question 9

State the information that should be made available to the inspector

GN3 Page 13 - 2.3 (Required information)

- 1. Maximum demand*
- 2. Number and type of live conductors at the origin*
- 3. Type of earthing arrangements*
- 4. Nominal voltage and supply frequency*
- 5. Prospective fault current (PFC)*
- 6. External Impedance Z_e*
- 7. Type and rating of overcurrent device at the origin*

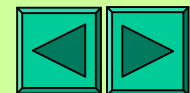


Question 9 (cont'd)

The following information should also be made available

GN3 Page 13 - 2.3 (Required information)

- 1 Type and composition of circuits, including points of utilisation, number and size of conductors and type of cable*
- 2. Methods of compliance for indirect shock protection*
- 3. Identification and location of devices used for protection, isolation and switching*
- 4. Circuits or equipment vulnerable to testing*

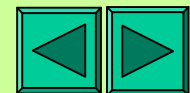


Question 10

Where should the proposed interval between periodic inspections should be noted

GN3 Page 14 - 2.5 (Frequency)

- 1. On the Electrical Installation Certificate*
- 2. On a notice fixed in a prominent position at or near the origin of an installation*

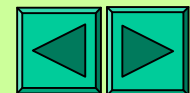


Question 11

State FIVE methods of protection against indirect shock

GN3 Page 16 (Protection against indirect contact)

- 1. EEBADOS*
- 2. Class II*
- 3. Non-conducting location*
- 4. Earth-free local equipotential bonding*
- 5. Electrical separation*

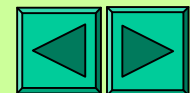


Question 12

State in the correct sequence the first FIVE tests that would need to be undertaken on an A1 ring circuit during an initial verification

GN3 Page 29 2.7.4

- 1. Continuity of protective conductors*
- 2. Continuity of ring final circuit conductors*
- 3. Insulation resistance*
- 4. Polarity*
- 5. Impedance Z_s*

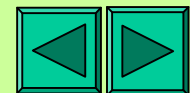


Question 12

State TWO disadvantages of using Method 2 in order to verify the continuity of c.p.c.'s

GN3 Page 32 Fig. 1b (Test method 2)

- 1. Long wander lead*
- 2. Gives R_2 value only (does not provide R_1)*

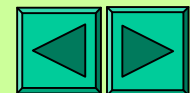


Question 14

State the British Standard number for a transformer used to provide electrical separation

GN3 Page 18v (Electrical separation)

*Transformer complies with BS 3535
Note: Transformer double-wound type*

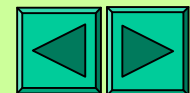


Question 15

List FOUR types of external influence that affect the safety/operation of an electrical installation

GN3 Page 19xiv (Electrical separation)

- 1. Ambient temperature*
- 2. Heat*
- 3. Water*
- 4. Corrosion*

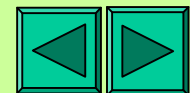


Question 16

Identify the TWO procedures required when verifying the continuity of a ferrous enclosure used as a c.p.c. for a circuit

GN3 Page 33 (Test method 2)

- 1. Inspect the enclosure throughout its length*
- 2. Carry out low resistance ohmmeter test*

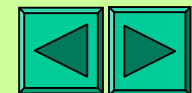


Question 17

State in the correct sequence the tests required to verify the continuity of a ring final circuit

GN3 Page 33 (Continuity of ring final circuit)

- 1. Identify and measure the resistance of each ring (end to end) r_1 r_2 r_n*
- 2. Apply figure of 8 (cross connection) between phase and neutral conductors at distribution board and then measure resistance between phase/neutral at each socket outlet*

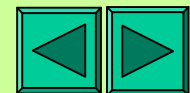


Question 17 cont'd

GN3 Page 33 (Continuity of ring final circuit)

***3. Apply figure of 8 (cross connection)
between phase and cpc at origin and
measure resistance between phase and
cpc at each socket outlet***

***Note: where dead tests are made the supply
must be isolated before any work commences***



Question 18

The following measurements were taken at the origin of an A_1 ring circuit.

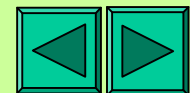
$$r_1 = 0.4\Omega \quad r_2 = 0.67\Omega \quad r_n = 0.4\Omega$$

Determine the measured value of resistance at each socket outlet when the ends of the circuit are cross-connected to form a figure 8

GN3 Page 34 (Continuity of ring final circuit)

$$1. \quad r_1 + r_n = 0.4 + 0.4 = 0.8/4 = 0.2\Omega$$

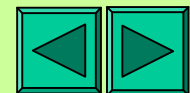
$$2. \quad r_1 + r_2 = 0.4 + 0.67 = 1.07/4 = 0.267\Omega$$



Question 19

Identify ONE other test that is automatically performed when undertaking a ring final circuit test

*GN3 Page 34 (Continuity of ring final circuit)
Polarity*

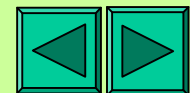


Question 20

State FOUR items of equipment/components that may need to be removed prior to carrying out a test for insulation resistance on a circuit

GN3 Page 35 (Insulation resistance)

- 1. Pilot or indicator lamps*
- 2. Dimmer switches*
- 3. Touch switches*
- 4. Electronic r.c.d.'s etc*



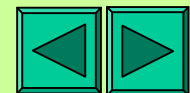
Question 21

State the test voltage and minimum acceptable value of insulation resistance for the following circuits

- 1. 400V 3 phase motor*
- 2. 760V discharge lighting circuit*
- 3. 45V FELV circuit*

GN3 Page 36 (Table 2.2)

- 1. 500V d.c. 0.5 M Ω*
- 2. 1000V d.c. 1.0 M Ω*
- 3. 500V d.c. 0.5 M Ω*

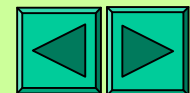


Question 22

State the correct sequence for undertaking an insulation resistance test on a filament lamp circuit containing two-way switching

GN3 Page 36 (Insulation resistance testing)

- 1. Supply must be isolated*
- 2. All lamps removed*
- 3. Insulation test between live conductor*
- 4. Insulation resistance test between live conductors and c.p.c.*
- 5. Two-way switches operated during test*

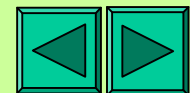


Question 23

State the type of test that should be applied where protection against direct contact is by site-applied insulation

GN3 Page 40 (Site applied insulation)

- 1. Test at 3750V a.c.*
- 2. Apply test voltage for 60 seconds during which time insulation failure or flashover should not occur*
- 3. Instrument used: Site applied insulation tester*

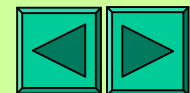


Question 24

State the THREE specific requirements for verification of polarity with regard to accessories

GN3 Page 48 2.7.12 (Polarity)

- 1. All single-pole devices are connected in the phase conductor*
- 2. The centre contact of Edison screw lamps are connected in the phase conductor*
- 3. All socket outlets*

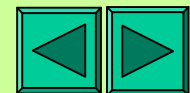


Question 25

Identify the test that should be applied to verify polarity after the supply is energised

GN3 Page 48 2.7.12 (Polarity)

Test to verify correct polarity of the incoming live supply (PES). Test made at the origin using approved voltage indicator



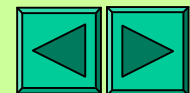
Question 26

*Identify the **THREE** electrodes used when used with a proprietary earth resistance tester*

GN3 Page 50 2.7.13 (Earth electrode resistance)

- 1. Main electrode*
- 2. Potential electrode (auxiliary electrode)*
- 3. Current electrode (auxiliary electrode)*

Note: This method can be use for electrodes used for transformers, lightning protection systems etc.

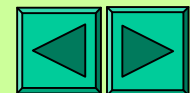


Question 27

State the action to be taken regarding the earthing conductor before measuring the resistance of an earth electrode

GN3 Page 52 2.7.13 (Earth electrode testing)

- 1. Disconnect earthing conductor at MET to avoid parallel earth paths*
- 2. Do **NOT** disconnect any protective conductors before isolating the supply*



Question 27

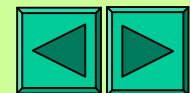
State the maximum value of permitted earth electrode resistance for a TT system when protection is afforded by a 500mA r.c.d.

GN3 Page 50 2.3 (Earth electrode for RCD's)

Table 2.3 Normal 100Ω Special locations 50Ω

By calculation $50V/0.5A = 100\Omega$ Dry

$25V/0.5A = 50\Omega$ Special Loc



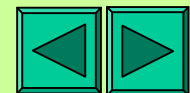
Question 28

State the maximum recommended value of resistance for an earth electrode

GN3 Page 53 2.3 (Earth electrode for RCD's)

Electrodes having resistances in excess of 200Ω will require further investigation.

Note: Electrode resistances obtained in excess of 200Ω may indicate unstable soil conditions



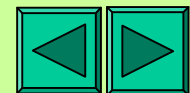
Question 29

State the formula used to calculate Impedance Z_s , at the furthest point within a circuit

GN3 Page 53 2.7.14 (Earth fault loop)

$$Z_s = Z_e + (R_1 + R_2)$$

Where Z_e is by measurement or enquiry and $(R_1 + R_2)$ by measurement

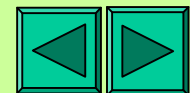


Question 30

State TWO reasons why it is necessary to measure external earth fault loop impedance at the origin of an installation

GN3 Page 53 2.7.14 (Determining Z_e)

- 1. To verify an earth connection*
- 2. The value is equal to or less than the value determined by the designer*

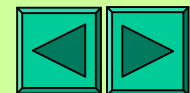


Question 31

State THREE methods by which the impedance of a circuit may be obtained without operating any r.c.d.'s protecting the circuit

GN3 Page 56 (Residual current devices)

- 1. D-Lok*
- 2. Soft test (15mA)*
- 3. By calculation $Z_s = Z_e + (R_1 + R_2)$*



Question 32

Determine the prospective fault current given following information (Three phase supply)

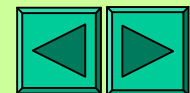
1. Impedance between P and N = 0.25Ω
2. Impedance between P and E = 0.5Ω

(General knowledge)

1. $240V(uoc)/0.25 = 960A = 0.96kA$

2. $240/0.5 = 480A = 0.48kA$

3. For three phase multiply P to N value by 2
 $0.96 \times 2 = 1.92kA$

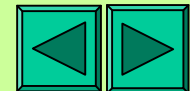


Question 33

State the reason for undertaking a prospective fault current measurement at the distribution board at the origin of the installation

Page 57 2.7.15 (Prospective fault current)

- 1. To ensure the adequate breaking capacity of the overcurrent devices*
- 2. To ensure the adequate breaking capacity of the main switch*

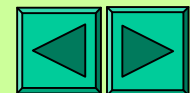


Question 34

State the three required electrical tests required to be undertaken on a 30mA r.c.d. complying with BS 4293

Page 62 2.7.16 (Functional testing)

- 1. 1/2 test - 15mA for 2 seconds - device does not trip*
- 2. 1 x test - device tested at full rated current trips within 200mS (0.2 seconds)*
- 3. 5 x test when tested at 150mS device operates within 40mS*



Question 35

State FIVE items of electrical equipment that would require functional testing

Page 63 2.7.16 (Functional checks)

1. *R.c.d.'s*

2. *Circuit breakers*

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3. *Isolators*

4. *Interlocks*

5. *Switches*

