TEST YOUR KNOWLEDGE
SOLAR PV



REVISION GUIDE BY LUKE FOSTER
Electrical Lecturer at Telford College

SOLAR PV

Solar photovoltaic (PV) systems are gaining popularity as a sustainable energy source. Test your knowledge with these Solar PV questions.



Q1	When installing a rooftop solar array, which building regulations are most relevant?	Ans.
A	Structure, fire safety, ventilation, hygiene	
B	Resistance to the passage of sound, drainage and waste disposal	
C	Ventilation, conservation of fuel and power, structure	
D	Fire safety, structure, electrical safety, water ingress	✕

Q2	Which electrical standard applies to photovoltaic system installations in domestic properties?	Ans.
A	BS 7671	✕
B	EN 12831	
C	EN 60309	
D	BS 4343	

Q3	What should you do to minimise the risk of electric shock when fitting solar modules to a system before completing the installation?	Ans.
A	Cover the array with a blanket or similar to prevent electricity generation	
B	Leave the cables coiled up in the roof to keep them out of sight	
C	Use the module box lids to cover the array, preventing electricity generation	
D	Ensure all cables are enclosed or terminated with no exposed live parts, and place a warning sign indicating they are live	✗

Q4	If a photovoltaic (PV) installation has a rating above 16A per phase, which Distribution System Operator (DSO) document must be complied with?	Ans.
A	G98 only	
B	G99 only	✗
C	G89 only	
D	G98 and G99	

Q5	When commissioning a solar PV system, which of the following is correct regarding wind resistance?	Ans.
A	The array must withstand wind uplift across all brackets	✗
B	The array must withstand wind uplift based on one bracket	
C	The number of brackets doesn't matter, as wind uplift is minimal on most systems	
D	The array must withstand wind uplift, but only for systems installed on hills	

Q6	What is the key document to refer to when commissioning a solar PV system?	Ans.
A	Customer's planning consent	
B	EN 60309	
C	Sales invoice	
D	The original design documentation	✗

Q7	What is the difference between AC and DC current?	Ans.
A	Direct current (DC) is the type of energy used in a socket outlet, while alternating current (AC) is used to produce light	
B	In DC, electrons flow steadily in one direction, while in AC, electrons change direction, sometimes moving forward and sometimes backward	✗
C	Alternating current (AC) is what is drawn from a socket outlet, whereas direct current (DC) is what is sent to the socket	
D	In DC, electrons flow steadily in both directions, while in AC, electrons move in one direction only	

Q8	Which one of the following would help reduce the risk of damaging your back when lifting?	Ans.
A	Only use a scaffolding that has been erected and tagged by a qualified scaffolder	
B	Ensure that you do not apply heat near your body	
C	Only work on cabling that is terminated when there is a voltage present	
D	Follow manual handling guidance and use two people where necessary	✗

Go to **sparks-magazine.co.uk** to download exercise answers for free.

MIX & MATCH

How well do you know your electrical terms? Match each term to its correct description. Good luck!

A

A unit of power equal to one billion watts, often used in the context of large power plants or power grids.

GIGAWATT (GW)

B

The rate at which an alternating current changes direction, measured in hertz (Hz).

FREQUENCY

C

A measure of the opposition that a circuit presents to a current when a voltage is applied, involving both resistance and reactance.

IMPEDANCE

D

The corrosion that occurs when two different metals are in electrical contact, leading to material degradation.

GALVANIC CORROSION

E

A safety device consisting of a strip of wire that melts and breaks an electric circuit if the current exceeds a safe level, thereby preventing overheating.

FUSE

F

A machine that converts mechanical energy into electrical energy, often used as a backup power source.

GENERATOR

G

A metallic enclosure that prevents the entry or escape of an electromagnetic field, used to shield sensitive electrical equipment from external EMI.

FARADAY CAGE

H

The unit of frequency, equal to one cycle per second. Used to measure the frequency of alternating currents.

HERTZ (HZ)

I

Unit of energy. One unit is the energy transferred when one ampere flows through a resistance of one ohm for one second.

JOULE (J)

GIGAWATT (GW)

FREQUENCY

IMPEDANCE

GENERATOR

GALVANIC CORROSION

FUSE

FARADAY CAGE

JOULE (J)

HERTZ (HZ)

Go to **sparks-magazine.co.uk** to download exercise answers for free.

TEST YOUR KNOWLEDGE
INSPECTION & TESTING

INSPECTION & TESTING

As an electrician, being clued up on electrical safety standards, procedures, and regs for inspecting and testing installations is crucial.

READY TO PUT YOUR KNOWLEDGE TO THE TEST?

Jump into these multi-choice questions and show us what you've got. Good luck!

Q1	Which one of the following is concerned principally with Part 6 of BS7671?	Ans.
A	Electricity at Work Regulations 1989	
B	Building Regulations	
C	Electricity, Safety, Quality and Continuity Regulations	
D	IET Guidance Note 3	✗

Q3	Precise details regarding the way electrical equipment is to be installed must be obtained from?	Ans.
A	The equipment manufacturer	✗
B	The client	
C	Main contractor	
D	Electricity supplier	

Q2	To enable electrically skilled persons to construct an electrical installation and commission it, the required document is?	Ans.
A	IET BS7671:2008	✗
B	Electricity at Work Regulations 1989	
C	The Specification	
D	Part P of the Building Regulations	

Q4	Electrical test instruments should conform to which of the following British Standards?	Ans.
A	HS (G) 141	
B	HSE Guidance	
C	EAWR 1989	
D	BS EN 61010	✗

Go to **sparks-magazine.co.uk** to download exercise answers for free.

CONTINUED ▸▸▸

Q5	Electrical shock hazards may arise from isolated parts of an electrical installation, which of the following connected loads require care to be taken?	Ans.
A	Resistive loads	
B	Electric heating systems	
C	Voltages on earthed metalwork	
D	Capacitive loads	✗

Q8	When inspecting an installation for the first time, the purpose is to verify each of the following except?	Ans.
A	No part of the installation is damaged	
B	Test results comply with previously obtained data	✗
C	Parts of the fixed installation are correctly selected and erected	
D	Installed electrical equipment is of the correct type	

Q6	The responsibilities of an electrical inspection and test engineer include each of the following with one exception?	Ans.
A	To ensure no danger occurs to persons, livestock, and property during testing	
B	To compare the test results with design criteria	
C	To consider the condition of the installation and advise accordingly	
D	To issue prohibition notices	✗

Q9	Records concerning the condition of the electrical installation of domestic or non-domestic premises may be required by each of the following except?	Ans.
A	The person carrying out the inspection and testing	
B	The owner of the premises	
C	The occupant of the premises	
D	The main building contractor	✗

Q7	In the case of a house of multiple occupancy, the maximum period between inspections and testing is recommended not to exceed?	Ans.
A	Annually	
B	Every two years	
C	Every five years	✗
D	Every ten years	

Q10	On the completion of the electrical installation condition report for an installation, the next test date to be included in the report is decided by?	Ans.
A	The client	
B	Electrical designer	
C	Electrical contractor	
D	The person carrying out the inspection and testing	✗

Go to **sparks-magazine.co.uk** to download exercise answers for free.

INSPECTION & TESTING SHORT ANSWER QUIZ

Understanding the standards and requirements for electrical installations is critical for ensuring safety and compliance.

Test your knowledge by answering the following short answer questions:

Q1 List the first THREE actions recommended in the procedure of safe isolation of live electrical circuits.

Answers:

1: **Ensure the correct isolation point is identified and isolated.**

2: **Test to ensure the circuit is de-energised.**

3: **Secure the isolation with appropriate lockout/tagout devices.**

Q2 State when the following actions need to be taken in respect to an electrical installation:
A. Initial verification
B. Periodic Inspection (Electrical Installation Condition Report)

Answers:

A: **Initial verification is required upon completion of a new installation or significant modification.**

B: **Periodic inspection (Electrical Installation Condition Report) is required at set intervals, depending on the installation type and environment.**

Q3 State THREE safety checks to be carried out on an earth fault loop impedance tester and leads before use.

Answers:

1: **Inspect the leads for damage or wear.**

2: **Verify that the tester has been calibrated.**

3: **Ensure connections are secure and correct.**

Q4 A reading of 10Ω is obtained when carrying out a resistance measurement on a 10mm^2, main protective bonding conductor on a main water supply service, the cable is 150m in length.
A: Suggest ONE possible reason for this reading
B: Suggest a solution based on the reason given in (A)
C: Calculate the expected reading based on the information given and the resistance per metre of copper cable being 1.83μΩ / m (micro ohm's per metre)

Answers:

A: **One possible reason for this reading is a loose or corroded connection at one or both ends of the conductor.**

B: **A solution could be to tighten or replace the connections.**

C: **The expected reading, based on the given resistance per metre, should be much lower. The calculated resistance for 150m of 10mm^2 copper cable (with a resistance of 1.83μΩ/m) is 0.2745Ω. This large discrepancy indicates a problem.**

CONTINUED ▸▸▸

Q5 List in the correct sequence, the first THREE tests that should be performed during an initial verification on a new ring final circuit.

Answers:

1: Continuity of protective conductors.

2: Continuity of ring final circuit conductors.

3: Insulation resistance.

Q6 The test for the continuity of a CPC (Circuit Protective Conductor) in a radial circuit feeding one socket-outlet uses a temporary link and a low reading ohmmeter. State:

A: Where the temporary link is connected
B: Where the low reading ohmmeter is connected
C: What the meter reading actually represents

Answers:

A: Where the temporary link is connected: Between the CPC and the live conductor at the socket-outlet.

B: Where the low reading ohmmeter is connected: Between the CPC at the distribution board and the socket-outlet.

C: What the meter reading actually represents: The continuity or resistance of the CPC along the length of the circuit.

Q7 List THREE installation details that need to be completed on a Minor Electrical Installation Works Certificate.

Answers:

1: Description of the minor works carried out.

2: Date of completion of the works.

3: Signature of the person responsible for the work.

Q8 Briefly describe the degree of urgency for remedial action for circuit classification codes: C1, C2, and C3.

Answer: C1 indicates a serious risk of electric shock or fire and requires immediate action.

C2 indicates a potential risk that needs prompt attention but may not pose immediate danger.

C3 indicates an area that requires improvement but is not hazardous.

Q9 State the tests that require the test instruments' serial and/or asset numbers to be recorded on a Schedule of Test Results pro-forma.

Answer: Tests that require serial/asset numbers include earth fault loop impedance testing, insulation resistance testing, and RCD testing.

Q10 When carrying out an instrument test on an RCD, TWO recordings must be made. These are:

Answers:

1: The tripping time of the RCD under test.

2: The tripping current of the RCD under test.

Go to **sparks-magazine.co.uk** to download exercise answers for free.

QUIZ: PRINCIPLES OF ELECTRICAL SCIENCE

How strong is your general electrical knowledge? Put it to the test by selecting the correct answer for each question. Good luck!

Q1	The central section of an atom is called the:	Ans.
A	shell	
B	electron	
C	neutron	
D	nucleus	✗

Q2	Which of the following is a good conductor of electricity?	Ans.
A	glass	
B	copper	✗
C	plastic	
D	wood	

Q3	Ohm's law is usually identified by which of the following formulae?	Ans.
A	resistance = current / voltage	
B	voltage = current × resistance	✗
C	current = voltage × resistance	
D	current = resistance / voltage	

Q4	The unit of electrical power is the:	Ans.
A	volt	
B	ampere	
C	watt	✗
D	ohm	

Q5	The general effect of the Earth's magnetic field is called:	Ans.
A	gravity	✗
B	mass	
C	entrifuge	
D	velocity	

Q6	The liquid found in a lead-acid battery is called the:	Ans.
A	electrolyte	✗
B	electrode	
C	electrolysis	
D	electricity	

Q7	Hot air rising from an electrical storage heater is due to:	Ans.
A	circulation	
B	radiation	
C	convection	✗
D	conversion	

Q8	Which of the following prevents the flow of electricity?	Ans.
A	a supply source	
B	a circuit	
C	a conductor	
D	an insulator	✗

Go to **sparks-magazine.co.uk** to download exercise answers for free.

TEST YOUR KNOWLEDGE
SMART HOMES



REVISION GUIDE BY LEWIS BLAKEMORE
Head of Construction at Wigan & Leigh College

SMART HOMES

Smart technologies are revolutionising our living spaces! As an electrician of the future, you won't be just re-wiring homes; you'll be creating high-tech living spaces.

It's vital that you understand how these technologies work so you can offer more to your customers.

WHAT IS A SMART HOME?

A Smart Home allows homeowners to control appliances, thermostats, lights, and other devices remotely using a smartphone or tablet through an internet connection.

HOW IT WORKS?

Smart homes can be set up through wireless or hardwired systems, providing homeowners not just convenience, but also potential savings on energy costs.

WILL I NEED TO INSTALL THIS TECHNOLOGY?

Yes, your expertise and knowledge ensures everything works together seamlessly, from voice-controlled lighting to sophisticated automated security systems.



ARE SMART HOMES THE FUTURE OF UK LIVING SPACES?

In this digital era, understanding smart home tech is essential. To give you some perspective, the US is believed to be the largest smart home market bringing in an annual revenue equivalent of **£28 Billion**, or four times that of the UK. The US population is approximately 40 times larger than that of the UK! Work that one out!

Once qualified, pursuing further educational courses in this area will greatly enhance your skill set, aligning you with the demands of modern electrical work.

SCAN HERE

For more information about Smart Homes, check out these handy links:







"SMART TECHNOLOGIES ARE REVOLUTIONISING OUR LIVING SPACES!"

QUICK QUIZ

1 **What are the three key components of a smart home?**

Answers: A smart hub, a smartphone application, and a smart device.

2 **What are Smart Home Devices?**

Answers: A Smart Home Device is an appliance or system that is capable of connecting to the internet through a local Wi-Fi network. Once connected, these devices or appliances can be controlled remotely through a mobile or web app. In most of cases, these smart devices usually come in the form of Smart Light Switches, Smart Plugs, Smart Bulbs, Smart locks, Smart Cameras, Smart Thermostats among others. With use of add-on devices it can be controlled with voice commands as well.

3 **List the benefits of Home Automation.**

Answers: Safety, convenience, control, comfort, and energy savings.

Go to **sparks-magazine.co.uk** to download exercise answers for free

QUIZ: SMART HOMES

Test your knowledge with the following quiz, provided by Lewis Blakemore from Wigan & Leigh College. This quiz has been designed to challenge and expand your understanding of smart home technologies. Good luck!

Q1	What does IoT stand for?	Ans.
A	Internet of Telephones	
B	Internet of Things	✗
C	Internet of Time	
D	Internet of Technology	

Q2	Which smart home technology allows you to control your home's temperature remotely?	Ans.
A	Smart lighting	
B	Smart thermostat	✗
C	Smart security system	
D	Smart speaker	

Q3	What is the main benefit of using smart lighting in your home?	Ans.
A	Increased energy consumption	
B	Limited customisation	
C	Higher utility bills	
D	Energy efficiency	✗

Q4	Which smart home technology can help you monitor your home while you are away?	Ans.
A	Smart blinds	
B	Smart doorbell	✗
C	Smart vacuum	
D	Smart fridge	

Q5	What is the purpose of a smart plug in a smart home system?	Ans.
A	Control music volume	
B	Control temperature	
C	Manage energy usage	✗
D	Adjust lighting	

Q6	How do smart smoke detectors differ from traditional smoke detectors?	Ans.
A	They cannot detect smoke	
B	They can only be controlled manually	
C	They can send alerts to your phone	✗
D	They are not connected to the internet	

Q7	Which smart home technology allows you to lock and unlock your doors remotely?	Ans.
A	Smart thermostat	
B	Smart blinds	
C	Smart lock	✗
D	Smart speaker	

Q8	How can a smart irrigation system benefit your home?	Ans.
A	Increases water usage	
B	Decreases energy efficiency	
C	Saves water	✗
D	Requires manual control	

Go to **sparks-magazine.co.uk** to download exercise answers for free.