

Test Items for IGEN Modules

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Zero Energy Buildings

1. Which of the following could be a component of Net Zero building?
Choose all that apply
 - a. Solar photovoltaics
 - b. Energy optimized windows
 - c. Heat recovery ventilation
 - d. Geothermal heat pumps
2. List at **least three** homeowner benefits of a Net Zero Building.
High efficiency
Substantially lower operational costs
Lower operational costs can offset upfront additional construction costs
Increased comfort, safety, and durability
3. Explain what homeowners should be aware of before deciding on the Net Zero Building.
Policy and implementation
Incentives and tax credits
Evaluation and implementation process
Cost
Finding expertise to consult and/or install
4. List at **least three** careers for those interested in Net Zero Buildings.
Energy Raters / Building Science
Construction
HVAC
Project Management
Architecture
Energy Programs
Higher Education
For more detailed answers, consult these lists on current slides 20 & 21

Passive House Construction

1. Which of the following is **the basic goal** of the Passive House design principle?
 - a. quantifiable and rigorous level of energy efficiency
 - b. quantifiable comfort level
 - c. health and safety on the construction site
 - d. a and b
2. Which of the following is **true** about passive buildings in comparison to traditional buildings? **Choose all that apply.**
 - a. Energy costs are between 75%-95% lower
 - b. Upfront building costs are 10% - 20% lower
 - c. Emphasizes long-term heat retention methods
 - d. Uses thermal mass
3. Explain **at least three** passive building design principles.

Continuous insulation throughout its entire envelope without any thermal bridging.
The building envelope is extremely airtight, preventing infiltration of outside air and loss of conditioned air.
High-performance windows (double or triple-paned windows depending on climate and building type) and doors - solar gain is managed to exploit the sun's energy for heating purposes in the heating season and to minimize overheating during the cooling season.
Uses some form of balanced heat- and moisture-recovery ventilation.
Uses a minimal space conditioning system
4. List **three** homeowner benefits of passive house construction.

Energy Efficiency: Affordable home energy. Passive House consumes about 75-90% less energy than a code-built house.
Comfort: With superinsulation and airtight construction occupants can be comfortable even in extreme weather conditions.
Excellent Indoor Air Quality: Continuous mechanical ventilation of fresh filtered air
Resiliency: comprehensive systems approach to modeling, design, and construction produces resilient buildings.
Environmental Benefits: Passive building minimizes the load that renewable energy sources are required to provide. This approach is an excellent path to Net Zero or Net Positive (producing more energy than used) buildings.
5. List **at least three** careers for those with Passive House experience and credentials.

Energy Raters / Building Science
Construction
HVAC
Project Management

Architecture

Energy Programs

Higher Education

For more detailed answers, consult these lists on current slides 36 & 37

Green Construction

1. Explain at **least three** Green Construction fundamental principles
 - Uses less materials
 - Minimizes waste
 - Efficient designs (e.g., use of advanced framing)
 - Uses materials with lower negative impacts on the environment and human health
 - Building designs that will be efficient to operate in terms of energy, water, and occupant behavior
 - Resilient structures are produced that can adapt and will survive over time
2. List **one criticism** voiced in the use of LEED certification for Green Construction
 - Costly
 - Slow
 - Confusing
 - Unwieldy
 - LEED-certified buildings actually performed worse than buildings in general
3. What is the advantage of using advanced framing?
 - Techniques to reduce the amount of lumber in wood frame construction.
 - Use of this method improves energy performance, estimated up to 20% improvement over conventional framing.
4. Name **two** Green Construction careers
 - Sales
 - Consultants
 - Developers
 - Design-Architects, Engineers, Urban Planners
 - Construction-Construction Management, tradesmen

Healthy Homes

1. Which of the following is **true**? The number of children in the U.S. who have asthma is:
 - a. 1 in 5
 - b. 1 in 7
 - c. 1 in 12
 - d. 1 in 18
2. Which of the following creates outgassing in homes? **Choose all that apply.**
 - a. Pressed wood products
 - b. Formaldehyde in carpeting
 - c. VOCs in paints
 - d. Varnishes
3. What are some things specific IAQ monitors can measure in the home? **Choose all that apply.**
 - a. Moisture
 - b. Radon
 - c. Carbon dioxide
 - d. VOCs
4. List the **eight principles** of a healthy home.
Dry
Clean
Pest-free
Ventilated
Safe
Contaminant-free
Maintained
Climate-controlled
5. Pick **2** of the Healthy Homes principles and list **2 examples for each** of when the principles are not being met.
Examples of when the principles haven't been met include:
 - holes on the exterior of a house that pests may enter through
 - outside doors that do not lock could be a safety issue for the resident
 - clutter throughout the space could be a haven for pests, promote allergies, and be unsafe (trip hazards)
 - broken windows may allow in pests, prevent proper ventilation, and make the room or home cold or hot (not climate controlled)
 - having no working smoke or CO detectors could be unsafe
 - having a lot of pets could trigger allergies, allow in pests, and make for an unclean environment
 - unsecured rugs could be trip hazards (unsafe) and, if new, could outgas formaldehyde (perhaps triggering breathing problems) (contaminant-free)

- Students could list several more not on here