

NRGY 235: Building Energy Efficiency

Week 2 Quiz



1. What is an R-Value?
 - a) Thermal Conductivity as applied to individual building materials in units of [BTU-in/(hr*ft*F)]
 - b) Thermal Transmittance in units of [BTU/(hr*ft²*°F)] – The amount of heat in BTUs that flows through one square foot of building cross-section each hour per degree Fahrenheit of temperature difference
 - c) Thermal Resistance as applied to areas of individual construction materials or areas of assemblies of construction materials in units of [hr*F*ft²/BTU]
 - d) It is a measure of how well a material or assembly will transfer heat, and a higher R-value indicates a greater ability to conduct heat
2. What is the difference between Balloon and Platform framing?
 - a) Balloon is stick framing and Platform is planer
 - b) In platform framing each floor is framed as a separate unit, in Balloon framing floors joists are attached to studs that span two or more floors in height
 - c) Platform framing has less thermal bridges than Balloon
 - d) Platform framing is an older technique, Balloon is the modern framing standard
3. What is the purpose of the Advanced Framing methods?
 - a) Help electrical and plumbing sub-contractors route their wiring/plumbing lines
 - b) Create stronger structures that will be more durable and will stand to increased weather threats such as hurricanes that are expected to increase in frequency
 - c) Reduce thermal bridging
 - d) Speed up the construction process
4. Which is not a roof style?
 - a) Butterfly
 - b) Mansard
 - c) Shanty
 - d) Gable

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5. What is the whole house or buildings approach?
 - a) It is a holistic approach to building design and construction, looking at how the occupant, building, and environment interact with each other. The process involves a feasibility study to determine the most cost effective efficiency improvements. Through this approach efficiency, comfort, safety, durability, and sustainability of the building can be maximized.
 - b) This approach maximizes active systems in the building while minimizing passive systems.
 - c) This approach combines the green building certification categories and building science to create ultra high efficiency buildings through technological advancements in building systems.
 - d) It looks at the building as its systems individually without considering their interactions.
6. What are the typical units of Energy use Intensity (EUI)?
 - a) 1,000 BTU/ft²
 - b) BTUh/square yard
 - c) BTU/(H*ft²*F)
 - d) kWh/(HP * ft)
7. How many British Thermal Units are there in one kilowatt-hour?
 - a) None: BTUs are a measure of power, and kWh are a measure of energy so they cannot be converted one to the other
 - b) 736 BTU/kWh
 - c) 12,000 BTU/kWh
 - d) 3,412 BTU/kWh

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8. Two houses of equal square footage, and located next door to one another use about the same amount of energy annually for space heating, but one (house “A-NG”) is heated with natural gas and the other (house “B-Elec”) is heated with electric heat systems. Both houses are homes to families of four, with similar lifestyles. Choose the answer that most accurately compares these two buildings
- a) The two houses have comparable efficiency, but the annual utility cost for house A-NG will be higher than for house B-Elec
 - b) House A-NG is a more efficient building, and will therefore have lower annual utility cost. Electric heat is inefficient.
 - c) House A-NG will have a much lower Energy Use Intensity than house B-Elec
 - d) The two houses have comparable efficiency, but the annual utility cost for house A-NG will likely be lower than for house B-Elec
9. Which of the following statements about efficiency, in the context of buildings and systems operating in buildings, is most correct?
- a) $\text{Efficiency} = \text{Energy} * \text{Load} / \text{Performance}$
 - b) “Efficiency”, by definition is a subjective term and cannot be applied to compare on building to another in a truly meaningful way.
 - c) “Efficiency” generally implies a ratio of useful output to total input. The output and input are defined based on the particular application, and can be measured in different units, or can be equivalent units.
 - d) When comparing the efficiency of two different buildings, it is important to subtract energy that is used by occupants for “unnecessary” leisure activities such as video gaming

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10. Which of the following is NOT a legitimate strategy toward improving efficiency of a typical cold-climate residential structure?
- a) Ensure there is sufficient infiltration of at least 4 air changes per hour with a static pressure differential of 50 Pa applied between building interior and exterior.
 - b) Invest in insulation beyond what is required by code, even though this will cost more in terms of first-cost at construction than a minimally code-compliant house.
 - c) Execute good passive solar design by placing most of the windows on the East and South facades, and minimize glazing area on the North façade.
 - d) Choose envelop materials to minimize the U-values of the wall and roof assemblies.