

LEED PRACTICE ANSWER KEY – SET 1

This document is divided into two essential parts, meticulously crafted to support students preparing for the LEED (Leadership in Energy and Environmental Design) certification exam.

Part One features a series of simulated test questions. These questions are designed to emulate the style and content of the actual LEED exam, covering vital topics such as sustainable site development, water efficiency, energy and atmosphere management, materials and resources, and indoor environmental quality. This section aims to provide students with a practical tool to deepen their understanding of sustainable building principles and prepare effectively for the exam.

Part Two presents the answer key for the simulated questions. This section is intended to help students assess their knowledge, providing detailed explanations for each answer to enhance understanding and clarify any misconceptions. By studying both the questions and their corresponding answers, students can improve their problem-solving skills, increase their familiarity with the types of questions asked on the exam, and ultimately boost their confidence and performance on the actual LEED certification test.

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1) **a. Reduce stratospheric ozone depletion**

Justification: Refrigerants are made up of chemicals that can harm the ozone layer, with CFC-11 and CFC-12 being the most harmful. It's important to note that some of the most damaging chemicals do not have a significant impact on global warming potential. Understanding the trade-off between ODP and Global Warming Potential is crucial for the exam, so make sure you are familiar with the differences.

2) **c. It is only required in Fundamental Cx if it is pursued in Enhanced Cx**

Justification: The envelope is not required to be commissioned in Fundamental Cx, but it may be added to the Cx scope at the request of the owner.

3) **e. A, B, and C**

Justification: To qualify for the Advanced Energy Metering credit, a project must adhere to specific requirements aimed at enhancing its energy management and performance monitoring capabilities. This involves sub-metering significant energy end-uses that constitute over 10% of total annual consumption. Additionally, meters must record data at intervals of one hour or less to enable precise monitoring and analysis for energy conservation. Furthermore, the meters installed must record both electricity consumption and demand, crucial for understanding overall usage patterns and peak demands.

4) **a. To increase participation in demand response technologies**

Justification: While costs may decrease if you are part of your utility's Demand Response program, this is an extra benefit.

5) **e. A, B, and C**

Justification: If you do not have a Demand Response program in your area, make sure you satisfy these three requirements. Also, contact your local utility representatives to discuss future participation in Demand Response programs.

6) **d. A and B**

Justification: Demand Response programs can reduce peak power loads and, as a result, the need to build new power plants can be decreased. Answer C is incorrect because customers must be on the grid to enroll in a Demand Response program.

7) **d. A and B**

Justification: The Renewable Energy Production credit tries to decrease the negative environmental and economic impacts of using fossil fuels by allowing for an increase in self-supply of renewable energy.

8) **d. A and C**

Justification: The Green Power and Carbon Offsets credit promotes the reduction of greenhouse gas emissions by utilizing renewable energy technologies and carbon mitigation projects provided by the grid.

9) **a. Engage in a contract for qualified resources that have come online since January 1, 2005**

b. The contract term must be a minimum of five years.

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c. The energy is to be delivered at least annually.

Justification: There are no specific requirements regarding the origin of Green Power. To achieve this credit, you must engage in a contract for a minimum of five years to purchase qualified resources (at least 50% of the projects energy from carbon offsets, green power, or renewable energy certificates (RECs)), to be delivered at least annually.

10) a. Electricity from a rooftop solar panel

e. A bonfire used to cook s'mores

Justification: Scope 1 energy refers to energy directly obtained from owned or controlled sources. A butane lighter does not qualify as a controlled source.

11) c. Electricity from a solar farm

Justification: Scope 2 energy is energy that is generated through the purchase of energy from external sources.

12) c. All indirect emissions that occur in the value chain of the reporting company, including both upstream and downstream emissions

Justification: The other options are considered Scope 2 (nuclear, coal, incinerators off-site) or Scope 1 (low-impact hydroelectric).

13) a. Disparities between how buildings are designed to operate and how they perform are common.

Justification: Answer B is only a partial answer and C is incorrect. A is the best answer.

14) d. A and B

Justification: USGBC® compares buildings across the portfolio and shares the findings with other projects, ensuring anonymity without the need for randomization.

15) e. All of the above

Justification: For the IPD credit, the specific areas that need to be analyzed are site, massing/orientation, envelope, energy, and water systems.

16) d. A and B

Justification: Construction Indoor Air Quality (IAQ) primarily focuses on ensuring the air quality inside the building is safe and healthy for the occupants. It is imperative that the building's air quality is not compromised during the construction process before the occupants move in. Packaging, on the other hand, is not an IAQ issue but rather a construction waste concern that is addressed in both a prerequisite and credit.

17) d. Backlight creates light trespass onto adjacent sites by directing light in the opposite direction of the area intended to be lighted.

Justification: The correct answer provides a clear definition of backlighting. Backlighting is associated with exterior lighting and is not intended for indoor task lighting for occupants. It usually does not pose any safety hazards or harm to humans, but it is simply a wasteful practice.

18) a. High-angle front/forward light

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Justification: Glare is caused by high-angle light coming from a fixture, either in front or behind, at an angle between 60-90 degrees. To put it into perspective, imagine the hour hand is at 4 o'clock or 8 o'clock on a wristwatch for a 60-degree angle. Glare is more noticeable during nighttime, but it's not affected by the time of night. Instead, the amount of glare depends on the orientation of the light fixture. It's worth noting that direct front light is not a term used to describe lighting.

- 19) **d. Pre-rinse spray valves**
e. Ice machine

Justification: Utility closet faucets and commodes are NOT considered appliances. Additionally, commercial dishwashers are NOT included in this prerequisite. The correct answers are: Pre-rinse spray valves and Ice machine.

- 20) **b. To organize expected points in a specific LEED category**

Justification: A LEED scorecard shows expected points in a particular LEED category.

- 21) **a. Irrigation**
b. Indoor flow fixtures
d. Domestic hot water

Justification: Flush fixtures refer to toilets and they have their own low-flow options to comply with the Indoor Water Use Reduction credit. Additionally, there is no such thing as multination hot water.

- 22) **b. Hide products**

Justification: Hide products are animal skins, fur, leather, etc. While rainforest protection is mentioned in several credits, projects are allowed to use products from rainforests. LEED does not address genetically modified organisms (GMOs) at all. The use of pressure-treated lumber could affect credit achievement, depending on the type and percentage of chemicals used in the process, although it is not specifically excluded. Urea-formaldehyde is also not specifically excluded.

- 23) **e. B and C**

Justification: The calculation considers 100% post-consumer waste and 50% pre-consumer waste.

- 24) **b. Occupant waste recycling**

Justification: Be careful not to mix up the Construction and Demolition Waste Management credit with the Storage and Collection of Recyclables prerequisite. The key word is "Construction." If it doesn't say Construction, then it refers to occupants.

- 25) **b. Electronic waste**
c. Batteries

Justification: The other three options are part of the five materials that can be comingled, including paper, plastic, and aluminum.

- 26) **d. A and B**

Justification: Comingled waste is allowed for recycling.

- 27) **a. Land clearing debris**

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Justification: Removing land clearing debris, such as trees and soil, will not affect your credit options for the project.

28) e. All of the above

Justification: The Building Life-Cycle Impact Reduction credit in LEED encourages using less new materials and reducing environmental damage over a building's entire life. Here's how each option helps:

- a. Reusing historic buildings cuts the need for new materials and avoids demolition impacts.
- b. Renovating old buildings revives them and saves on the materials and energy needed for new constructions.
- c. Reusing at least 25% of a building's materials lessens waste and lowers the demand for new resources.
- d. Conducting a life-cycle assessment of the whole building identifies all potential environmental impacts, which aids in reducing them.

29) a. Global warming potential

Justification: This is a question that requires in-depth knowledge. While all the impact measures on the list should be reduced, only the global warming potential is mandatory to be reduced by 10%.

30) a. Environmental Product Declaration

Justification: An Environmental Product Declaration summarizes the environmental impacts of products and materials throughout their life cycle. The declaration is based on ISO 14025, which is the international standard for Type III environmental declarations.

31) d. A and B

Justification: Only the first two options are correct. Building Product Disclosures actually help customers, not manufacturers, make informed decisions.

32) d. A and C

Justification: Both global warming potential and acidification are valid options.

33) a. Environmental Product Disclosures

b. Sourcing of raw materials

e. Chemical composition of permanently installed products

Justification: Structural integrity is not related to the BPDO category and an Environmental MSDS is not an actual item. This is a red herring meant to distract from Answer E.

34) c. Materials Ingredients

Justification: Various third-party organizations, such as ISO, ASTM, and UL are frequently cited in BPDO credits. However, Greenscreen is one of the few programs that is used for the assessment of the quality and reporting of chemicals used in finished products. Environmental Product Disclosure deals with the overall life cycle of the product whereas Sourcing of Raw Materials focuses on the material extraction or source. Air quality, on the other hand, is covered under the EQ category.

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35) **b. Material Ingredients**

c. Environmental Product Disclosure

d. Sourcing of Raw Materials

Justification: Supply chain is the group of suppliers and manufacturers that bring the material from the source to the project. It is one of the concerns of the Materials credit category.

36) **e. They are valued at 200% of their cost.**

Justification: This fact requires memorization. Freight costs are not a factor.

37) **a. Divert 50% of waste in 3 material streams**

d. Divert 75% of waste in 4 material streams

e. Reduce total waste material

Justification: This requires memorization.

38) **a. The credit rewards projects that implement the plan created in the prerequisite.**

Justification: Answer B is correct, but answer A is more complete. It's important to always look for the most comprehensive answer. The last two options are not correct because all the aspects mentioned are equally important considerations for both the prerequisite and the credit.

39) **d. Green Chemistry is the design of chemical products and processes that reduce or eliminate the use and generation of hazardous substances; BPDO Materials Ingredients.**

Justification: BPDO- Materials Ingredients is the credit that pertains to Green Chemistry, so Answers B, C, and E are not correct. Answer A is not the correct choice as it does not incorporate the reduction or elimination of hazardous substances. When faced with two-tiered questions, the best method is to use the process of elimination. For instance, if you already know which credit Green Chemistry pertains to, you can remove three answers immediately. Next, focus on the remaining aspect - the definition. By comparing only two answers, it should be easier to determine the correct one.

40) **b. BPDO- Sourcing Raw Materials**

Justification: LEED does not offer a BPDO Low Emitting Materials credit. It's important to note that recycled materials are given a preference in LEED. The credit that focuses solely on the extraction or source of materials heavily favors recycled content in order to reduce environmental impact. Project teams have the option to choose this credit.

41) **e. A or B or C**

Justification: Or is the keyword, as one of the three options may be chosen. Technically, a project could pursue all three, but it will not get extra points for doing so UNLESS it also achieves both Options 1 and 2.

42) **e. A, B, and C**

Justification: Volatile Organic Compounds (VOCs) are present in nature, but indoor environments typically have higher concentrations of VOCs due to less air ventilation and multiple sources of VOCs. Although eliminating exposure to all VOCs is impossible, choosing low-emitting and non-emitting products can significantly reduce the amount of VOCs indoors. To do this, Project Teams should specify products that meet the compliance thresholds established by recognized standards or select products that are classified as inherently non-emitting.

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43) c. All spaces within the waterproof membrane

Justification: This is the best definition. The other definitions are too general, incorrect, or include exterior features (rooftop).

44) d. A and B

Justification: This credit covers each layer of interior wall, flooring, and ceiling finish. Testing each layer separately ensures that emissions are conservatively controlled and occupants are well-protected.

45) a. If some products in a category do not meet the criteria

Justification: The Budget Method is a technique that categorizes the interior of a building into five assemblies: flooring, ceilings, walls, thermal/acoustic insulation, and furniture. It allows Project Teams to achieve the credit, even if not all the items meet the compliance requirements.

46) c. Are considered fully compliant with the Low-Emitting Materials credit

Justification: Some examples of materials that do not emit pollutants are stone, ceramic, powder-coated metals, anodized metal, glass, concrete, clay brick, and untreated solid wood flooring.

47) c. Individual thermal comfort controls for 50% of individually occupied spaces

Justification: Thermal comfort is based on the number of spaces used, not the number of individuals present. Having separate air conditioning or heating vents is not an aspect of thermal comfort.

48) d. A and B

Justification: Lighting intensity is not a separate option, but rather it is addressed within the available options. When answering these questions, it's important not to overthink the question. One effective way to prepare for these types of questions is to memorize the names of the available options.

49) e. 30%

Justification: The USGBC® allows up to 30% of the required area to be an atrium. Atria can provide better daylight and views for interior spaces, and they can reduce the need for electrical lighting in spaces that would typically require it.

50) c. 90%

Justification: Assemblies are one of the five categories that are allowed in the Budget Method. If an assembly is 90% compliant, Project Teams can count it as 100% compliant. However, if the assembly is less than 50% compliant, it cannot be counted toward compliance at all.

51) c. on the USGBC® website

Justification: The USGBC® website is the correct answer because even though LEED Online has a link to the sample LEED letter templates, they are located on the USGBC® website.

52) a. O+M

Justification: This occurs every five years for O+M projects and is a modified application. All other projects must start from the beginning if they apply for a new certification.

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- 53) **a. More than one building**
b. Shared, single site
e. Under the control of a single entity

Justification: Choice c is incorrect since the buildings are allowed to be different uses (offices, research laboratories, restaurants, or dormitories) and still qualify as a Campus Project. Academic site is incorrect because the word 'campus' is not referring to a school in this context.

- 54) **d. Campus Credit Approach**
e. Campus Group Project Approach

Justification: There is no such thing as a "campus multi-project approach" or a "campus prerequisite approach". The Campus Credit Approach requires a "Master Site", but it is not an approach in and of itself.

- 55) **a. All buildings are included in one construction contract.**
b. All buildings are constructed at the same time.
d. The buildings collectively meet the credit requirements.

Justification: There is no requirement for a building having a similar function or having one building as office space.

- 56) **d. When the check to GBCI clears**

Justification: Submitting the project registration and required documents to GBCI via LEED Online is mandatory for the review process. However, the actual review process is triggered by making the payment. The Design documents can be reviewed in a split-review before the completion of the construction, but the construction must be finished before submitting the construction documents.

- 57) **c. Preliminary Review**
d. Final Review
e. Appeal

Justification: The process of reviewing a project does not start with its registration. To initiate the review process, two things must happen. First, payment must be made to GBCI. Second, the submittals are required to be uploaded to LEED Online.

- 58) **c. 20-25 days**

Justification: In the Standard Review Process for LEED certification, the Preliminary Review typically takes 20-25 days to be returned to the Project Team. This timeframe allows the Green Building Certification Institute (GBCI) reviewers to thoroughly evaluate the submitted documentation against LEED standards and prepare detailed feedback, ensuring that Project Teams have clear guidance on any required adjustments or additional information needed for certification.

- 59) **a. Up to 25 days**

Justification: The Preliminary Review process may take up to 25 days. Therefore, it is advisable to utilize this time to clean up the documents and prepare them for the Final review before submitting them. This is particularly important as there is a high likelihood that the reviewer may ask for further details in certain areas.

- 60) **b. Design and Construction**

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Justification: Design and Construction are the only two phases in a split review. The terms Preliminary and Final are associated with the standard review process, but they do not represent distinct phases.

61) d. Cradle to cradle

Justification: Cradle to cradle is the correct term.

62) c. Design prerequisites and credits

Justification: Submittals is a term that covers credits and prerequisites for both the Design and Construction phases, so this is not correct. The answer that is considered the best and most complete is C.

63) d. Unlimited

Justification: A Project Team can file an unlimited number of appeals, but each appeal costs either \$500 or \$800 depending on the complexity of the credit.

64) d. 25

Justification: A Project Team has 25 business days to file an appeal after the results of the Final Review are published.

65) d. IP/SI

Justification: The measurement system used by the United States is Inch-Pound (IP). The Metric system is technically known as the Systeme Internationale (SI). LEED recognizes both systems. As SI and Metric are interchangeable, it may be tempting to consider 'Metric' in the answer; however, it is important to note that the formal name is SI. Therefore, if SI is available in the answer, it should be given serious consideration. Similarly, 'Imperial' is often used instead of IP, but it is not the formal term for the measurement system.

66) d. BD+C Schools

Justification: Smoking is taken even more seriously on LEED school projects than in office buildings. Absolutely no smoking is allowed on LEED school projects under any circumstances.

67) b. BD+C Healthcare

Justification: In all ratings systems except Healthcare, Integrative Process is considered a credit. However, in Healthcare, it is considered a prerequisite.

68) a. Send a written request to GBCI at least 10 days prior to applying.

c. Pay an additional charge.

d. GBCI can decline your request.

Justification: An expedited review can be requested more than 10 days before submitting an application, but it is recommended that you allow at least 10 days. Payment by check does not change the 10-day requirement, but it is advised to allow extra time because GBCI will not initiate the review until the check is cleared. GBCI's capacity to fulfill the request for an Expedited Review depends on their current review capacity, so they may decline. Once payment is finalized, the review time is reduced to 10-12 business days from the usual 20-25.

69) b. LEED Interpretations are precedent setting.

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Justification: CIRs and LEED Interpretations serve different purposes. While Interpretations are published for others to reference and set a precedent, CIRs are not. Only the Project Team can access the rulings of CIRs, which are conducted online, just like Interpretations.

- 70) **c. ID+C- within 24 months of the completion of construction**
d. O+M- within 6 months of the end of the performance period
e. BD+C- within 2 years of the completion of construction

Justification: O+M projects have a 6-month performance period phase for submittal, while all others have up to 2 years.

- 71) **e. Certification**

Justification: A LEED project is deemed 'closed-out' when it receives its certification. This occurs after the Final Review process has been completed and any necessary appeals have been resolved. Certification signifies that the project has met all the required LEED standards and criteria and is officially recognized as a LEED-certified project. This final step marks the conclusion of the LEED certification process.

- 72) **b. CIR**

Justification: Charrettes for LEED projects usually take place prior to registration. CIRs may occur after registration but cannot be conducted before registration.

- 73) **a. Project ID**

- b. Date of Certification**

- d. Alternative Compliance Path selection**

Justification: Alternate Compliance Paths (ACPs) refer to the methods used by a project to obtain certification that were not explicitly outlined by the credit requirements. These ACPs are particularly useful for new projects as they provide additional options to achieve certification. The information related to CIRs and denied credits is private and is intended solely for the benefit of the Project Team.

- 74) **b. 10 years after the rating system launch date**

Justification: This is a fact that must be memorized.

- 75) **b. Yes, if you have not paid within 60 days of registration.**

Justification: If the check bounces, the owner could provide another check within the same 60 day time period.

- 76) **b. Certification Fee**

Justification: Registration, CIR, and LEED Interpretation fees are flat fees, so they do not change based on the project. Contrarily, the certification fee differs according to the size of the project.

- 77) **a. Pilot Credit Library**

Justification: The aim of the LEED Pilot Credit Library is to make it easier to introduce new credits to LEED. This process enables projects to test innovative credits that have not gone through the complete drafting and balloting process of USGBC®. In the case of innovation, past projects are not useful since once a precedent is established, it becomes difficult to claim innovation.

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78) a. Global warming

Justification: Global warming must be selected when doing a Whole-Building Life-Cycle Assessment. At least two of the other categories (eutrophication, ozone depletion, smog formation, acidification, depletion of nonrenewable energy sources) must also be selected.

79) a. Project Teams have time to review, redo or appeal credit denials issued because of the Design Phase Review.

b. Split Reviews require Project Teams to document early and often.

Justification: Teams working on BD+C and ID+C projects have the option to split a standard review, which allows them to submit their application in design credits and construction credits. Splitting the review does not result in reduced fees, as Split Reviews entail higher fees. Furthermore, workload for Split Reviews is not decreased; it remains the same as that for standard reviews. Lastly, credits are neither awarded nor denied after the Design Phase Review; they are only anticipated or denied.

80) a. Anticipated

d. Denied

Justification: The Design Phase review is not a final assessment for obtaining credits. Instead, it serves as an opportunity to identify areas where the Project Team needs to improve their thinking/design to achieve the credit. Denial of credits during the Design Phase review is simply an indication that the approach outlined in the review needs to be revised.

81) b. Clarify

- c. Achieved**
- d. Denied**

Justification: Anticipated credit is a possible outcome at the end of the Design Phase. Certification does not occur until after the Project Team acknowledges that there are no further appeals.

82) e. A and C

Justification: The USGBC® logo cannot be part of another logo.

83) d. A and B

Justification: The correct answer is: A and B.

84) a. To transform the way buildings and communities are designed, built, and operated

- c. To enable an environmentally and socially responsible environment that improves the quality of life**
- d. To enable a healthy and prosperous environment that improves the quality of life**

Justification: These statements are directly quoted from USGBC®. While the goal of constructing sustainable buildings globally may seem appealing, it is not in their mission since they are not involved in the development industry. The final option provided is inaccurate.

85) a. Buildings and communities will regenerate and sustain the health and vitality of all life within a generation.

Justification: The other answers may sound good, but they have not been stated by the USGBC®.

86) b. It is adjusted throughout both Design and Construction phases.

- e. It is a list of credits pursued, potentially pursued, and not pursued by Project Teams.**

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Justification: The Scorecard is utilized to monitor credit accomplishment, commencing in the pre-Design Phase and culminating at the Construction Review Phase. It is a document that is updated regularly to reflect changes in design and construction progress.

87) a. Green Globes

Justification: Out of the options provided, only Green Globes is a valid choice as the rest do not exist. Green Globes is the initial commercial building rating system that is founded on an American National Standard (ANSI) and is seen by some as a simpler and more cost-effective alternative to LEED.

88) a. USGBC.org

Justification: The website USGBC.org is the only option here that is correct. LEED Online is a tool that helps with the organization and submission of documentation, but it does not provide certification details. GBCI.org is the platform where projects are registered and ultimately awarded certification, but it does not offer any answers to questions.

89) c. Sustainable Building rating systems

Justification: LEED was initially developed in the U.S., while the rest of these rating systems originated outside of the U.S. or were developed with specific regions outside the U.S.

90) a. 110

Justification: There are 100 base credit points with an additional 10 bonus points available for Innovation in Design and Regional Priorities, for a total of 110.

91) b. 4

Justification: Out of the six available points, a project can only be awarded four.

92) e. A, B, and C

Justification: The correct answer is: A, B, and C.

93) d. IN

Justification: There are four possible points for Pilot Credits available in the Innovation (IN) category.

94) b. It may be able to use the same RP credits if the design remains the same through the end of the construction phase.

Justification: If the project is located in an area with the same Regional Priorities, it may be eligible to use the same RP credits, even if it is not situated in the same climate zone. However, it's impossible to confirm this with the information provided, so using the term 'definitely' would be too strong.

95) c. Look on USGBC.org

Justification: The list of RP credits is available only on the USGBC® website.

96) a. 0

Justification: The LEED AP point is given in the Innovation in Design (ID) credit category and not the Materials and Resources (MR) credit category. Irrespective of the number of LEED APs on the Project Team, only one point is awarded.

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97) **d. 79**

Justification: Certified is 49 points, Silver is 59 points, and Gold is 79 points.

98) **b. A public preschool with kindergarten**

c. A private preschool with kindergarten

e. A private high school

Justification: Any project K-12 (public or private) that wants to become LEED certified must register under LEED for Schools.

99) **e. high-rise residential buildings of 9 stories or more**

Justification: The others are considered adaptations for BD+C.

100) **a. An integrated set of activities intended to ensure that the project meets both design intent and the owner's operational needs**

Justification: Instruction is a required element for the Enhanced Commissioning credit, but it is not considered a part of the commissioning definition. It is important to exercise caution when reading this question, as it asks for a basic definition.