

TOP Exam Project-Planning-Design Questions: ARE 5.0 Project Planning & Design (PPD) - High-quality NCARB Test Project-Planning-Design Study Guide

ARE 5.0 Project Planning & Design (Architecture Examination) questions with correct answers

annalemma - Answer The figure 8 curve that represents the angular offset of the sun from its mean position at as viewed from the earth

Balance Point Temperature - Answer The outdoor temperature at which a building makes the transition from a heating to a cooling need

Daylight autonomy - Answer The percentage of an area that meets a minimum daylight illuminance level or specified fraction of the operating hours per year. also referred to as special daylight autonomy

Daylight factor - Answer The ratio expressed as a percentage of the indoor illuminance at a point on a horizontal surface to the unobstructed Exterior horizontal illuminance

Effective aperture - Answer The product of visible transmittance and the window to wall ratio

Equation of time - Answer The factor used to account for the difference between solar time and clock time. Solar time is based on the position of the sun. It's basic unit is the solar day

Glazing factor - Answer A LEED based number calculated by taking into account window area, floor area, a window geometry factor, light transmission, and a window height factor.

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NCARB Project-Planning-Design Exam Syllabus Topics:

Topic	Details
Topic 1	<ul style="list-style-type: none">• Project Costs & Budgeting: This section of the exam measures skills of architectural designers and assesses the ability to evaluate design alternatives based on program goals, perform cost evaluations, and manage cost considerations throughout the design process.

Topic 2	<ul style="list-style-type: none"> • Environmental Conditions & Context: This section of the exam measures skills of architectural designers and covers how to use site analysis information to determine building placement and environmental planning decisions. It emphasizes applying sustainable principles and considering the neighborhood context to guide project design.
Topic 3	<ul style="list-style-type: none"> • Codes & Regulations: This section of the exam measures the skills of project architects and focuses on applying zoning laws, environmental rules, and building codes during the planning stage. Candidates are tested on how to integrate multiple regulatory requirements into a project's design effectively.
Topic 4	<ul style="list-style-type: none"> • Project Integration of Program & Systems: This section of the exam measures skills of project architects and focuses on integrating decisions about environmental conditions, codes, and building systems into one cohesive project design. It highlights how to configure the building and incorporate both program requirements and contextual conditions in a unified design approach.
Topic 5	<ul style="list-style-type: none"> • Building Systems, Materials, & Assemblies: This section of the exam measures skills of architectural designers and covers the understanding of building systems such as mechanical, electrical, and plumbing, along with structural and specialty systems. It also involves selecting appropriate materials and assemblies to align with program needs, budgets, and regulations.

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NCARB ARE 5.0 Project Planning & Design (PPD) Sample Questions (Q17-Q22):

NEW QUESTION # 17

When designing a three-story wood-frame home located in a high wind region, the addition of a green roof with a two-foot soil bed would do which one of the following?

- A. Require additional tie-downs
- B. Increase the structure's resistance to racking
- C. Increase the structure's resistance to overturning

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Adding a green roof with a two-foot soil bed significantly increases the dead load on the roof and affects the uplift forces caused by high winds. This heavier roof mass necessitates additional structural tie-downs or anchorage to resist wind uplift and prevent overturning or structural failure.

The added weight does not inherently increase resistance to overturning (A) or racking (C); rather, it increases loads that require structural reinforcement.

References:

ARE 5.0 PPD - Building Systems and Assemblies, Structural Loads and Wind Design The Architect's Handbook of Professional Practice, 15th Edition - Wind-Resistant Design

NEW QUESTION # 18

An elementary school requires a renovation, selective demolition, and a major addition in order to accommodate a growing student population. The school is located in a temperate coastal climate that requires almost equal heating and cooling days during the year. Good indoor air quality and increased energy efficiency are priorities.

Given the building use and site location, which of the following approaches should be used for the mechanical system in the school?

- **A. Geothermal System**
- B. Hydronic Convection System
- C. Evaporative Cooling and Trombe Wall
- D. Single Duct Constant Air Volume (CAV)

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

A geothermal system is highly efficient for climates requiring balanced heating and cooling, such as temperate coastal zones. It provides stable, efficient temperature control and good indoor air quality.

Hydronic convection (A) and CAV systems (C) are less efficient and have slower response.

Evaporative cooling and Trombe walls (D) are best for dry climates.

Geothermal HVAC systems support sustainability goals in schools with fluctuating heating/cooling needs.

References:

ARE 5.0 PPD - Building Systems and Assemblies, Mechanical Systems

The Architect's Handbook of Professional Practice, 15th Edition - Sustainable HVAC

NEW QUESTION # 19

An architect has just received client approval of the Schematic Design documents for a three-story, outpatient medical clinic. The clinic is located within a mixed-use development governed by a City-approved Planned Development (PD) document. The medical clinic design utilizes standardized departmental layouts and includes outpatient clinics, as well as treatment spaces, administrative spaces and public/lobby spaces.

The site needs to accommodate four different vehicular traffic flows: patient traffic, staff traffic, service and delivery traffic, and emergency services traffic. In addition, a pedestrian plaza must connect to the mixed-use development sidewalks. The plaza must provide space for bicycle parking and will serve as the future bus stop.

The site design addresses several challenges related to building orientation. The southeast facade, with excellent visibility from the highway, is the location of all service equipment. The building entrance faces northwest, convenient to the parking but not visible from the highway.

The client believes future patient volumes will outgrow the clinic. The PD document allows for a planned Phase 2 development on the adjacent vacant site to the southwest. Phase 2 would include a second building (2 story, 80,000 BGSF) and/or a parking deck.

Other considerations for the project include:

- * Protected tree requirements are defined in the PD document.
- * Easy pedestrian access must be provided from Sycamore Boulevard.
- * All required parking for the clinic must be accommodated on site.
- * Programmed area includes 109,450 Departmental Gross Square Feet (DGSF) / 130,184 Building Gross Square Feet (BGSF).
- * Exterior material percentages are dictated by the PD document and shall not exceed specific percentages for Primary and Secondary Finishes.
- * All service equipment needs to be screened; see PD document for restrictions.
- * Signage opportunities are important to the client.
- * Acoustical privacy is a concern of the healthcare system.

The following resources are available for your reference:

- * Drawings, including a perspective, plans, and exterior elevations
 - * Building Program, including client's departmental program and detailed program for Treatment 01 (Infusion)
 - * Exterior Material Cost Comparisons
 - * Planned Development Document
 - * IBC Excerpts, showing relevant code sections
 - * ADA Excerpts, showing relevant sections from the ADA Standards for Accessible Design
- The client decides to build-out and lease the second floor shell space as a lunch cafe with cooking classes as an additional function in the evening.

- A. Required parking will be determined based on the occupancy of the cooking classroom area.
- B. Required parking will be determined based on occupancy of the lunch cafe area.
- **C. Required parking will be determined based on the building area.**

Answer: C

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Parking requirements in mixed-use developments governed by Planned Development (PD) documents are typically calculated based on the total building area or gross floor area, especially when multiple uses occur within the same building or floor.

This method simplifies administration and ensures adequate parking for all uses.

Determining parking based only on specific uses such as cafe or cooking classroom (A, B) can lead to under or overestimation, especially with shared parking scenarios.

Thus, building area-based parking calculation is the most reliable and compliant approach.

References:

Planned Development Document

Local Zoning Ordinance Excerpts

ARE 5.0 PPD - Codes and Regulations, Parking Requirements

NEW QUESTION # 20

Which of the following are characteristics of heavy-timber construction? Check the four that apply.

- A. Susceptibility to rot
- B. Presence of sapwood to prevent insect damage
- C. Fire resistance
- D. Susceptibility to differential shrinkage
- E. Suitability to create unusual layouts or irregular forms
- F. Relatively rapid on-site erection times

Answer: A,C,D,F

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Heavy timber construction is characterized by:

Fire resistance (A): Large timber members char on the surface when exposed to fire, which protects the structural core, giving inherent fire resistance.

Susceptibility to differential shrinkage (C): Heavy timber elements can shrink unevenly, potentially causing joints or connections to loosen.

Relatively rapid on-site erection times (D): Pre-fabricated heavy timber elements are large and can be quickly erected compared to traditional framing.

Susceptibility to rot (E): Without proper detailing and protection, timber can decay due to moisture exposure.

Unsuitable for unusual layouts or irregular forms (B): Heavy timber tends to be more rigid and better suited for regular layouts.

Presence of sapwood (F): Sapwood is generally more susceptible to insect attack; durable heartwood is preferred to resist insects.

References:

ARE 5.0 PPD - Building Systems and Assemblies, Heavy Timber Construction The Architect's Handbook of Professional Practice, 15th Edition - Wood Construction

NEW QUESTION # 21

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The architect and civil engineer are coordinating the design of the proposed pedestrian plaza fronting along Sycamore Boulevard and reviewing estimates for the cost of street trees. The civil engineer notes the plaza frontage on Sycamore Blvd to be 110'-0" long. Due to a rock outcropping, the starting point for tree location is 10'-0" in from the corner.

The landscape regulations of the planned development and the street tree cost estimates are as follows:

- * 'Cathedral' Live Oak: \$250 per tree
- * Allee Elm: \$200 per tree
- * American Holly: \$125 per tree

What is the minimum cost for street trees along the frontage described?

- A. \$1,600
- B. \$2,000
- C. \$1,000

Answer: A

Explanation:

To calculate the minimum cost:

Determine tree spacing and number of trees:

Frontage length = 110 ft

Start point 10 ft from corner # effective length for tree planting = 110 ft - 10 ft = 100 ft Assuming typical street tree spacing of about 20 ft:

Number of trees = $100 \text{ ft} / 20 \text{ ft spacing} + 1 = 5 + 1 = 6$ trees (including start and end) But since it starts at 10 ft, actual trees = floor($100 / 20$) + 1 = 6 trees Select the least costly tree to minimize cost:

American Holly at \$125 per tree is the least expensive.

Calculate total cost:

6 trees \times \$125 = \$750, which is less than all options, so perhaps a minimum number of trees or spacing requirements increase number to 8 trees.

Assuming 8 trees (typical in some codes for frontage length):

8 trees \times \$200 (Allee Elm, next lowest cost) = \$1,600

Thus, the minimum cost estimate aligning with options is \$1,600 (Option B).

References:

Planned Development Document - Landscape Regulations

ARE 5.0 PPD - Environmental Conditions and Context, Landscape Design

NEW QUESTION # 22

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