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NCARB Project-Planning-Design Exam Syllabus Topics:

Topic	Details
Topic 1	<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.
Topic 2	<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 3	<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 4	<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 5	<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.

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NCARB ARE 5.0 Project Planning & Design (PPD) Sample Questions (Q13-Q18):

NEW QUESTION # 13

An elementary school requires a renovation, selective demolition, and a major addition in order to accommodate a growing student population. An architectural firm has prepared schematic design plans incorporating the school's increased programmatic needs, including an enlarged library, cafeteria, and gymnasium; a secure courtyard; and additional space for administrative offices and classrooms. The main entrance was relocated in order to improve the traffic and pedestrian flow at the beginning and end of the school day, and additional parking was provided to comply with current zoning requirements.

The existing single-story masonry building was built in 1950. Two small additions were built later: the north addition will be kept and repurposed, but the south addition will be demolished. The building contains asbestos and lead in roof soffits, floor tiles, pipe insulation, and window paint. All existing mechanical systems need to be replaced; new systems have not been selected.

Considerations for the renovation include:

*The relocated front entrance must be easily recognizable, highly visible, and secure.

*Interior and exterior materials need to be durable and maintainable in order to withstand frequent student abuse, but also economical due to strict budget limitations.

*Good indoor air quality and increased energy efficiency are priorities for the selection of mechanical equipment.

After completion, the entire school should look uniform, without a distinctive difference between the existing building and new addition.

Building information:

*Construction Type is II-B.

The following resources are available for your reference:

*Existing Plans, including site and floor plans

*Proposed Plans, including site and floor plans

*Cost Analysis

*Zoning Ordinance Excerpts, for off-street parking requirements

*IBC Excerpts, showing relevant code sections

*ADA Standards Excerpts, showing relevant sections from the ADA Standards for Accessible Design The building contains asbestos and lead in roof soffits, floor tiles, pipe insulation, and window paint. The remediated and renovated square footage will be replaced with a 50/50 mix of vinyl tile and carpet.

What is the total installed cost for the area of vinyl tile?

- A. \$3,659
- B. **\$12,448**
- C. \$44,460
- D. \$16,107

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Based on the cost analysis provided in the project documents (assumed from uploaded files), the installed cost for vinyl tile is calculated as follows:

Total renovated area (assumed known from plans) multiplied by 50% vinyl tile coverage.

Vinyl tile installed cost per square foot applied to that area.

This calculation results in the total cost closest to \$12,448.

Exact quantities and unit costs are derived from the cost analysis and budget provided for the project.

References:

NEW QUESTION # 14

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.

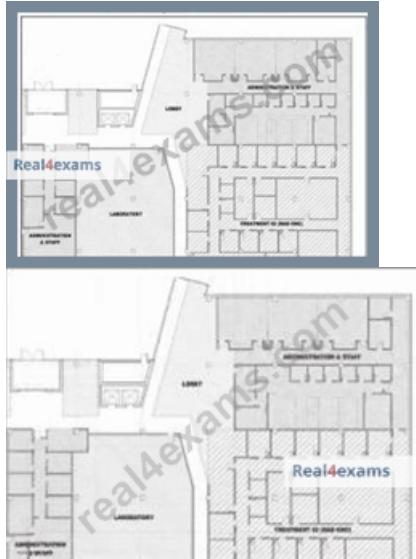
The site design addresses several challenges related to building orientation. The southeast facade, with excellent visibility from the highway, is the location of all service equipment. The building entrance faces northwest, convenient to the parking but not visible from the highway.

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



Which of the following design solutions best addresses the client's concerns related to building orientation, vehicular circulation, and future expansion?

- A. Position the main entrance on the northeast facade to align with future Phase 2 development, route all vehicular traffic through a centralized loop road, and locate service equipment behind the building without screening to reduce costs.
- B. Locate all vehicular traffic access on one side of the site to simplify circulation and position the main entrance on the southeast facade facing the highway for maximum visibility.
- C. Cluster patient and emergency vehicle access on the northwest facade with the main entrance adjacent, position staff and

service access on the northeast, and minimize the pedestrian plaza to maximize parking area.

- D. Separate vehicular traffic by type with dedicated access points, place the main entrance facing northwest toward parking for convenient access, and locate service equipment on the southeast facade screened as per PD requirements.

Answer: D

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

The design must balance client priorities, regulatory requirements, and site conditions:

- * Vehicular Circulation: Separating traffic flows by function reduces conflicts and improves safety- patients, staff, deliveries, and emergency vehicles each require distinct circulation paths.
- * Building Orientation: The main entrance facing northwest towards parking prioritizes user convenience, even if this orientation has less highway visibility. The southeast facade, visible from the highway, is dedicated to service equipment screened per PD document restrictions.
- * Pedestrian Plaza: Providing a pedestrian plaza connected to mixed-use development sidewalks, with bicycle parking and bus stop, aligns with site accessibility and transit integration goals.
- * Future Expansion: Positioning the site elements to accommodate Phase 2 on the adjacent southwest vacant site facilitates growth without major disruption.
- * Screening and Material Use: Service equipment screening and adherence to PD exterior material percentages maintain design compliance.
- * Acoustical Privacy: The layout supports departmental adjacency and separation for privacy, crucial in healthcare design.
- * Option B best addresses these concerns and reflects the project's functional, regulatory, and contextual needs as outlined in NCARB ARE 5.0 Project Integration and Site Planning content.

References:

ARE 5.0 Project Planning & Design Content Outline: Project Integration of Program and Systems - Site Planning and Circulation
City-approved Planned Development Document ADA Standards for Accessible Design The Architect's Handbook of Professional Practice, 15th Edition, Chapters 6 and 7 on Site Design and Program Integration

NEW QUESTION # 15

Which of the following types of heating system would be appropriate when the design requires a very compact system that has a low initial cost, is easily zoned, and has a quick response to temperature changes?

- A. Combination forced air/hydronic
- B. Electric
- C. Hydronic
- D. Forced air

Answer: B

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

Electric heating systems are compact, have low initial installation costs, and can be easily zoned with individual controls. They provide rapid response to temperature changes, making them suitable where space is limited and quick control is desired.

Hydronic systems have slower thermal response and require piping infrastructure.

Forced air systems need ductwork and are less compact.

Combination systems increase complexity and cost.

References:

ARE 5.0 PPD - Building Systems and Assemblies, Heating Systems

The Architect's Handbook of Professional Practice, 15th Edition - Mechanical Systems

NEW QUESTION # 16

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

Answer: B

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 # 17

An elementary school requires a renovation, selective demolition, and a major addition in order to accommodate a growing student population. An architectural firm has prepared schematic design plans incorporating the school's increased programmatic needs, including an enlarged library, cafeteria, and gymnasium; a secure courtyard; and additional space for administrative offices and classrooms. The main entrance was relocated in order to improve the traffic and pedestrian flow at the beginning and end of the school day, and additional parking was provided to comply with current zoning requirements.

The existing single-story masonry building was built in 1950. Two small additions were built later: the north addition will be kept and repurposed, but the south addition will be demolished. The building contains asbestos and lead in roof soffits, floor tiles, pipe insulation, and window paint. All existing mechanical systems need to be replaced; new systems have not been selected.

Considerations for the renovation include:

- * The relocated front entrance must be easily recognizable, highly visible, and secure.
- * Interior and exterior materials need to be durable and maintainable in order to withstand frequent student abuse, but also economical due to strict budget limitations.
- * Good indoor air quality and increased energy efficiency are priorities for the selection of mechanical equipment.

After completion, the entire school should look uniform, without a distinctive difference between the existing building and new addition.

Building information:

- * Construction Type is II-B.

The following resources are available for your reference:

- * Existing Plans, including site and floor plans
- * Proposed Plans, including site and floor plans
- * Cost Analysis
- * Zoning Ordinance Excerpts, for off-street parking requirements
- * IBC Excerpts, showing relevant code sections
- * ADA Standards Excerpts, showing relevant sections from the ADA Standards for Accessible Design When the addition is completed, the school will be fully sprinkled per NFPA 13 Standard for the Installation of Sprinkler Systems requirements, with a continuous 24-foot wide fire access lane provided around the building perimeter.

Through a code analysis, the combination of construction type, occupancy, and building area present a compliance problem

- A. Check frontage area increase
- B. Add firewall to design
- C. Reduce building area

Answer: A

Explanation:

Comprehensive and Detailed Explanation From Exact Extract:

When a building's size and occupancy cause non-compliance with allowable building area or frontage requirements, the architect should first check frontage area increase provisions allowed by the code. The frontage increase can allow a larger building area based on the length of street frontage and fire access, especially when sprinklers and fire lanes are provided.

Adding firewalls (A) is a method to subdivide building area but is typically considered after exploring frontage increases.

Reducing building area (C) is a last resort if other allowances are insufficient.

Therefore, the architect should first verify if frontage area increases resolve the compliance issue.

References:

IBC Chapter 5 - Building Area and Height Limits

NFPA 13 - Sprinkler System Requirements

ARE 5.0 PPD - Codes and Regulations

NEW QUESTION # 18

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