NCARB

PRACTICE EXAM

ARCHITECT REGISTRATION EXAMINATION® 5.0

Project Management division

ARE® 5.0

For use by supervisors and mentors.

Licensure candidates should access the free practice exams through their NCARB Record.

ARE® LICENSE

The Architect Registration Examination (ARE) 5.0 Practice Exams ("Materials") are made available by the National Council of Architectural Registration Boards ("NCARB") in accordance with the following terms and conditions ("Agreement").

1. **LICENSE GRANT.** Conditioned on continued compliance with this Agreement, NCARB provides each individual person (identified herein as "you" or with "your), and whether an individual person or an individual person using pursuant to a license to an individual entity, with a revocable, personal, limited, non-exclusive, non-transferable, and non-sublicensable license to use the Materials solely for educational purposes in connection with (assisted) study and preparation for the Architect Registration Examination® ("ARE®"). This license permits you to create printouts or output from the Materials and discuss these works in public or private settings but only in accordance with this Agreement.

2. **LICENSE GRANT RESTRICTIONS.** The Materials are not intended to contain any questions currently in use in the ARE®. Consequently, no rights are granted under this Agreement to any questions or materials currently in use in the ARE®. All use is limited to the Materials (in the form and format) as made available by NCARB. Except as provided above, you may not modify, alter, recompile, reassemble, translate, create derivative work(s) of, distribute, publish, license, sub-license, transfer, sell, rent, timeshare, outsource, provide on a service bureau basis, lease, grant a security interest in, assign or transfer any right(s) in, or otherwise use in any manner not expressly permitted herein the Materials or any part thereof. In addition, you may not remove or alter any proprietary notice on the Materials or use any portion of the Materials independently from the Materials as a whole or for purposes other than as expressly permitted herein. All rights not expressly granted to you herein are hereby reserved to NCARB.

3. **USER OBLIGATIONS.** You represent that you are of the legal age to create a binding agreement with NCARB and agree to abide by all applicable local, state, national, and international laws and regulations with respect to your use of the Materials. You also agree to assume all responsibility concerning your use of the Materials.

4. **PROPRIETARY RIGHTS.** Any rights granted hereby are licensed and not sold or otherwise transferred or assigned to you or any third party. NCARB shall retain all ownership right, title, and interest in and to the Materials. Unless otherwise noted, the Materials are Copyright © 2022 The National Council of Architectural Registration Boards. All rights reserved. NCARB, ARE®, ARCHITECT REGISTRATION EXAMINATION, and all other names, logos, and icons identifying NCARB and its programs, products, and services are proprietary trademarks of NCARB, and any use of such marks, including, without limitation, as domain names, without the express written permission of NCARB is strictly prohibited. Unauthorized use of the Materials may violate intellectual property or other proprietary rights laws as well as other domestic and international laws.

5. **FEEDBACK.** NCARB welcomes your feedback and suggestions about how to improve the Materials. You agree that NCARB shall have the perpetual, royalty-free, and irrevocable right to use such feedback and suggestions in any manner it deems desirable without providing any consideration, attribution, or payment to you. You also represent and warrant that such feedback does not infringe or violate the intellectual property or proprietary rights of any third party (including, without limitation, patents, copyrights, or trademark rights) and that you have all rights necessary to convey to NCARB and enable NCARB to use such feedback.

6. **WARRANTY DISCLAIMER.** Use of the Materials is solely of your own volition and at your own risk. NCARB does not guarantee a passing score on the ARE® or similar standardized tests. NCARB ALSO MAKES NO REPRESENTATIONS OR WARRANTIES ABOUT THE SUITABILITY, COMPLETENESS, TIMELINESS, RELIABILITY, LEGALITY, OR ACCURACY OF THE MATERIALS FOR ANY PURPOSE. THE MATERIALS ARE PROVIDED "AS IS" WITHOUT WARRANTY OF ANY KIND, INCLUDING, WITHOUT LIMITATION, ALL IMPLIED WARRANTIES AND CONDITIONS OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, AND NON-INFRINGEMENT AS WELL AS ANY WARRANTY RELATED TO THE USE, OR THE RESULTS OF THE USE, OF THE MATERIALS OR ANY DOCUMENTATION ASSOCIATED

THEREWITH. NCARB may make modifications and/or changes to the materials at any time and for any reason.

7. **LIMITATION OF LIABILITY.** YOU AGREE THAT IN NO EVENT SHALL NCARB BE LIABLE FOR ANY INDIRECT, PUNITIVE, INCIDENTAL, SPECIAL, OR CONSEQUENTIAL DAMAGES ARISING OUT OF OR IN ANY WAY CONNECTED WITH THE USE OF THE MATERIALS BY YOU OR ANYONE ELSE, WHETHER BASED IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE, EVEN IF YOU HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES. WITHOUT LIMITATION OF THE FOREGOING, THE TOTAL LIABILITY OF NCARB FOR ANY REASON WHATSOEVER RELATED TO USE OF THE MATERIALS, INCLUDING FOR ANY CLAIMS RELATING TO THIS AGREEMENT, SHALL NOT EXCEED $100 (USD).

8. **INDEMNITY.** You agree to defend, indemnify, and hold harmless NCARB and its affiliates, employees, licensors, agents, directors, officers, partners, representatives, shareholders, attorneys, predecessors, successors, and assigns from and against any and all claims, proceedings, damages, injuries, liabilities, losses, costs, and expenses (including reasonable attorneys' fees and litigation expenses) relating to or arising from your use of the Materials and any breach by you of this Agreement.

9. **GOVERNING LAW.** This Agreement has been made in and will be construed and enforced solely in accordance with the laws of the District of Columbia as applied to agreements entered into and completely performed in the District of Columbia. Any action to enforce this Agreement will be brought solely in the federal or local courts in the District of Columbia, U.S.A., and you and NCARB expressly agree to be subject to the jurisdiction of such courts. You also agree that because there is no adequate remedy at law, NCARB shall be entitled to equitable relief in the courts of the District of Columbia, including injunctive relief, in the event of any breach or threatened breach of the provisions of this Agreement, and you shall not oppose the granting of such relief. Entitlement to equitable relief shall not be the exclusive remedy but shall be in addition to damages and all other remedies available to NCARB. If NCARB takes legal action to enforce this Agreement and is granted any material relief because of your breach, NCARB shall be entitled to reasonable attorneys' fees, expenses, and costs of litigation.

10. **TERM AND TERMINATION.** This Agreement and your right to use the Materials will take effect at the moment you install, download, access, or use the Materials, whichever occurs first, and is effective until terminated as set forth below. This Agreement will terminate automatically if you fail to comply with any of the terms and conditions described herein, including by exceeding the scope of the license. Termination or expiration of this Agreement will be effective without notice. You may also terminate at any time by ceasing to use the Materials, but all applicable provisions of this Agreement will survive termination, as outlined below. Upon termination or expiration, any right to use the Materials will immediately cease and you must return, destroy, or delete from your system all copies of the Materials (and any associated materials) in your possession. The provisions concerning NCARB's proprietary rights, indemnity, disclaimers of warranty and liability, termination, and governing law, however, will survive the termination or expiration of this Agreement for any reason.

11. **MISCELLANEOUS.** Failure to insist on strict performance of any of the terms and conditions of this Agreement will not operate as a waiver of that or any subsequent default or failure of performance. A printed version of this Agreement and of any related notice given in electronic form shall be admissible in judicial or administrative proceedings based upon or relating to this Agreement to the same extent and subject to the same conditions as other business documents and records originally generated and maintained in printed form. No joint venture, partnership, employment, alliance, or agency relationship exists between you and NCARB as result of this Agreement or your utilization of the Materials. Moreover, you may not bind NCARB in any way or otherwise make any representations or statements for or on behalf of NCARB without NCARB's separate, express, and written permission. This Agreement represents the entire agreement between you and NCARB with respect to use of the Materials, and it supersedes all prior or contemporaneous communications and proposals, whether electronic, oral, or written, between you and NCARB with respect to the Materials. This Agreement may not be assigned or transferred by you without the prior express written consent of NCARB.

NCARB released this PDF version of the ARE Project Management division practice exam to help supervisors and mentors understand the content that exists across this division. If you are a supervisor or mentor, please use this to guide your engagements with the licensure candidates you are helping.

If you are a licensure candidate, please access the free practice exam through your NCARB Record rather than referring to this PDF version.

Note: for case study questions in this practice exam, the case study resources are not reproduced as part of this PDF for copyright and other reasons. Each case study question does identify which case study resources should be used to properly answer the question. Any licensure candidate can access the practice exam at no cost through their NCARB Record and show their supervisor/mentor the available case study resources.

Question 1

An owner receives a grant to construct a community center. The owner informs the architect that the total project budget, including soft costs, must not exceed the amount of the grant. Therefore, maintaining the budget is established as a primary design objective. As a result, the architect hires a third-party estimator to help monitor costs throughout the design process.

During a review of the design development documents, the owner directs the architect to include a playground that was not in the original program. The estimated value for the playground will exceed the owner's budget.

How should the architect respond first to the owner's directive?

A. Document the owner's directive and solicit alternative funding.
B. Notify the owner of fees for additional services due to scope creep.
C. Inform the owner the directive will require a contract change order.

Correct answer: B

CORRECT RESPONSE

Notify the owner of fees for additional services due to scope creep.

Upon recognizing the need to perform additional services, the architect must notify the owner promptly and explain the facts giving rise to the need. In this instance, scope creep results from a change to the owner's original program.

Section: Project Quality Control

Question 2

Labor	Fee	Hours
Planned	$350,000	2,800
Used on the job to date	$105,000	850
Estimate needed for completion	$262,000	2,100

Refer to the exhibit.

An architect planned $350,000 in labor costs and 2,800 hours for the construction documents phase of a project. The project is now at 25% construction documents.

How should the architect keep the project within budget?

A. Continue to work at the current pace for the remainder of the phase.
B. Use more experienced staff to reduce labor hours for the remainder of the phase.
C. Reduce the time planned for documentation quality control to meet the project deadline.

Correct answer: B

CORRECT RESPONSE
Use more experienced staff to reduce labor hours for the remainder of the phase.
This project phase is not performing well at this time. Using more experienced staff is the most appropriate way to bring the project back within budget. This choice allows the firm to reduce labor hours without sacrificing quality.

Section: Project Work Planning

Question 3
An architect hires a structural engineer consultant for a new condominium project. Five days before the design document drawings are due, the owner requests that a rooftop garden and patio be included in the project. The structural engineer sends an e-mail to the architect, requesting additional time and compensation for the incorporation of the new roof modifications.

If an e-mail is an approved form of documentation according to the consultant contract, what action should the architect take?

A. Forward the e-mail request with a description to the owner for review and approval.
B. Attach the e-mail to the owner's design document deliverables and invoice for payment.
C. Reply to the e-mail asking the engineer to send their request to the architect in the form of a letter.

Correct answer: A

CORRECT RESPONSE
Forward the e-mail request with a description to the owner for review and approval.
Per the AIA B101 agreement, any adjustments to the schedule and estimate must be submitted to the owner for approval. As e-mail has been deemed an approved form of documentation in the architect-consultant agreement, so the architect should not request correspondence in the form of a letter. The architect should incorporate the engineer's communication into their correspondence with the owner.

Section: Contracts

Question 4
An architect is contracted with an owner using an AIA B101 agreement. During construction, the owner informs the architect in writing to change the configuration of the restrooms. The architect responds that this work will require a $2,000 fee and one week will be required to make changes to the drawings. The owner agrees to the fee and timeline, noting an urgency to complete the work.

What should the architect do next?

A. Invoice the owner for the added service and confirm receipt of the payment before starting the work.
B. Begin the work immediately and issue an add service proposal to formalize the change in scope.
C. Provide an add service proposal for the owner's signature prior to starting the work.

Correct answer: B

CORRECT RESPONSE
Begin the work immediately and issue an add service proposal to formalize the change in scope.
This course of action is appropriate as the change has been agreed to in written correspondence and it accommodates the owner's request in a timely fashion.

Section: Project Work Planning

Question 5
An architect is reviewing the contractor's bids for the renovation of an early education school located within an historic district. The owner asks the architect to issue an addendum stating the following:

- "The Historic Preservation Agency has committed to provide the owner up to $500,000 towards the renovation costs, if the owner agrees to restore furnishing and landscaping in an adjacent park."

According to the AIA B101, which service is included in the architect's standard service?

A. Provide the client with costs of site furnishing and landscaping.
B. Request that contractors include furnishing and landscaping costs in their bids.
C. Provide the client a list of historic preservation criteria and standards.

Correct answer: B

CORRECT RESPONSE
Request that contractors include furnishing and landscaping costs in their bids.
AIA B101 states that an architect must assist the owner in negotiation with prospective contractors.

Section: Project Execution

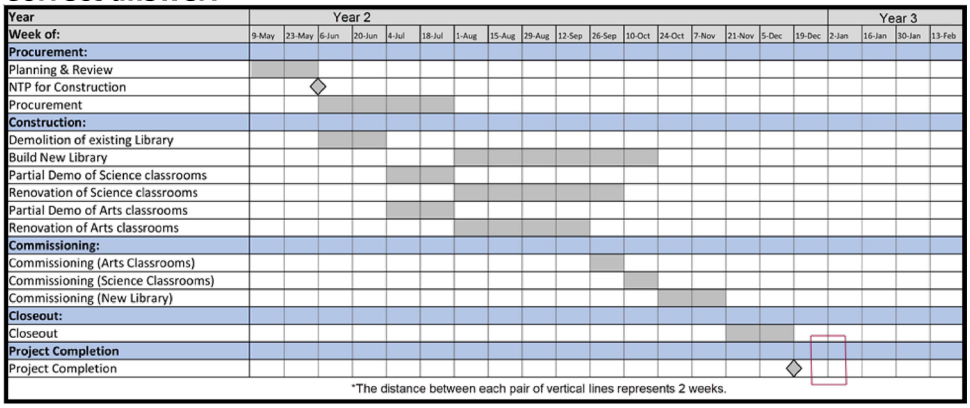
Question 6

An elementary school project includes the renovation of existing Science Classrooms, existing Arts Classrooms, and the construction of a new Library.

- A material delivery issue leads to a two-week delay in the construction of the new Library.
- The discovery of asbestos in the Science Classrooms adds two weeks to the demolition.

Click on the schedule to indicate the new project completion date.

Correct answer:



CORRECT RESPONSE
2-Jan, Year 3
Even though two weeks are added to the demolition of the Science Classrooms, which delays their construction and commissioning, the two-week delay on the Build New Library happens concurrently. The commissioning of the Science Classrooms and New Library are each delayed two weeks, which pushes out Closeout by two weeks. This brings the project completion date to 2-Jan in Year 3.

Section: Project Work Planning

Question 7

An architect planned 1,000 hours for the design development (DD) phase of a project with an average billing rate of $50 per hour. The project has a planned multiplier of 3.05 and a total DD phase compensation of $152,500. At the end of DD, the architect finds that an excess of 240 labor hours were needed for DD.

What is the additional project cost?

$ _____

Correct answer: 36600

CORRECT RESPONSE
$36,600

CALCULATION
1. 240 (additional hours) x $50 (average hourly rate) x 3.05 (multiplier) = $36,600 in additional project costs

Section: Resource Management

Question 8

An architect is working under AIA B101 for a project. The terms of the agreement state that compensation is to be calculated as 6% of the owner's $17,500,000 budget for the cost of the work. The compensation for the architect's basic services are as follows:

- Schematic Design: 10%
- Design Development: 20%
- Construction Documents: 30%
- Procurement: 10%
- Construction: 30%

Prior to completing construction documents, the owner requests changes that increase the cost of work by 2%.

How much compensation will the architect receive for the construction documents phase?

A. $315,000
B. $321,300
C. $630,000
D. $636,300

Correct answer: B

CORRECT RESPONSE
$321,300
Since the cost of work increased by 2% during the CD phase, the architects fee for this phase of work is based on the increased cost of work. See calculations for compensation for the construction documents phase.

CALCULATIONS
1. Calculate new total cost of work: $17,500,000 + 2%($17,500,000) = $17,850,000
2. Calculate the total architect compensation following the increase: $17,850,000 x 6% = $1,071,000
3. Calculate architect compensation per basic services for construction documents phase: $1,071,000 x 30% = $321,300

Section: Resource Management

Question 9

An architect at a firm with in-house MEP design services pursues an RFP for a design-build refrigerated warehouse project with an aggressive schedule.

Which of the following consultants or partners will need to be contracted by the architect's firm? **Check the three that apply.**

A. General contractor
B. Food service consultant
C. Refrigeration consultant
D. Electrical engineer
E. Structural engineer
F. Construction manager

Correct answer: ACE

CORRECT RESPONSES
General contractor
A general contractor will be necessary in a design-build team.

Refrigeration consultant
A cold-storage warehouse will require the additional expertise of a refrigeration consultant, which is above what a general practice multidisciplinary firm can provide.

Structural engineer
The design-build team will require a structural engineer for ground-up construction.

Section: Resource Management

Question 10

An architect has designed a project that the owner needs to be operational before the end of the year. As the bid package is being put together, the owner asks the architect for the most appropriate method of ensuring that the

selected contractor meets the deadline. The owner is committed to not changing the design during construction.

Which one of the following should the architect recommend?

A. Provide a contract provision for consequential damages to complete unfinished work.
B. Provide a budget contingency for unforeseen schedule impacts.
C. Provide a contract provision for liquidated damages.

Correct answer: C

CORRECT RESPONSE
Provide a contract provision for liquidated damages.
A liquidated damage provision, based on the financial loss expected to be incurred by the contractor if there is a delay in construction, can be included in the contract to motivate the contractor to meet the deadline.

Section: Contracts

Question 11

Working under an AIA B101, an architect is hired by an owner to renovate an existing performing arts center. A design-bid-build delivery method will be used. The owner has contracts with an advising construction manager and a series of consultants who each coordinate their scope of work with the architect.

Instead of the agreed-upon 21 days, the owner's theatrical lighting consultant sends updated drawings to the architect for final coordination 14 days prior to completing the construction documents. The consultant's updated drawings show significantly more lighting equipment and materials than the previous coordination drawings. The start of bidding cannot be delayed.

What should the architecture firm do first after receiving the updated drawings?

A. Send the owner a request for compensation for additional coordination services.
B. Instruct the electrical engineer to prioritize the coordination of the new lighting drawings.
C. Ask the construction manager to update the theatrical lighting submittals.

Correct answer: A

CORRECT RESPONSE
Send the owner a request for compensation for additional coordination services.
The architect should coordinate their services with the services provided by the owner's consultants. However, neither the architect nor the architect's consultants should immediately perform any additional services as a result of a failure of performance on the part of the owner's consultants. After recognizing the need for additional services, the architect must explain the facts and circumstances and establish an agreement in writing with the owner before proceeding.

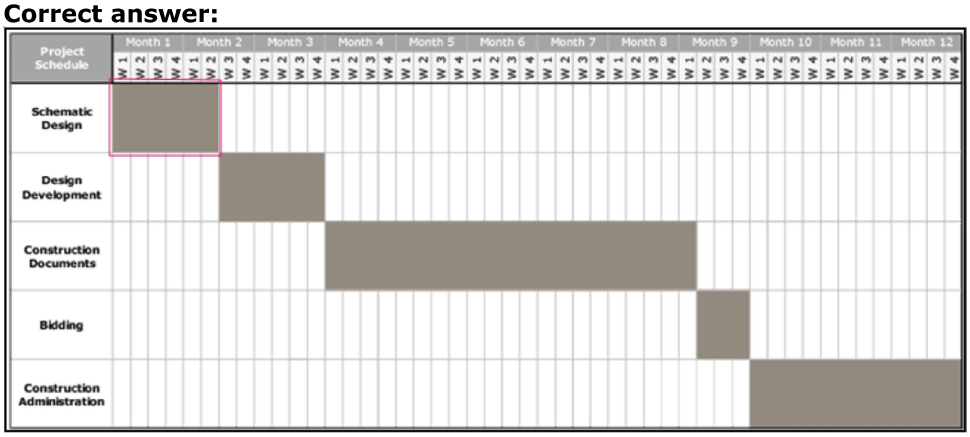
Section: Contracts

Question 12

Using an AIA C401, an architect contracts with a subconsultant to help build the strategic plan and vision for a new airport project. The subconsultant is another architect who has airport and aviation industry expertise.

Click in the shaded area on the project schedule to indicate when the subconsultant will receive their first payment.

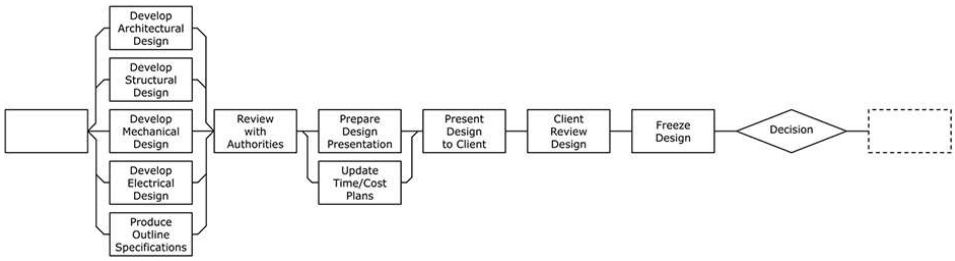
Correct answer:



CORRECT RESPONSE
Schematic Design
The subconsultant will receive their first payment during the schematic design phase because the subconsultant's role relates to the overall strategic vision for the project, meaning that they will be providing their services early in the project.

Section: Contracts

Question 13



Refer to the exhibit.

An architect is mapping out tasks in a flow chart in order to develop a project work plan.

To which phase do the tasks belong?

A. Schematic design
B. Preliminary design
C. Design development
D. Contract documentation

Correct answer: C

CORRECT RESPONSE
Design development
The design development phase is when the structural, mechanical, and electrical designs, as well as the outline specifications, are developed.

Section: Project Work Planning

Question 14

An owner hires a civil engineer to complete site design and an architect to complete building design. The architect hires a mechanical engineer to design the plumbing for the building. During design review, the architect notices that the site's storm drain system is incorrectly tied in to the sanitary sewer at the street.

Who is responsible for correcting this error?

A. Owner
B. Architect
C. Mechanical engineer

Correct answer: A

CORRECT RESPONSE
Owner
The error is due to work performed by the civil engineer. The owner hired the civil engineer and is responsible for the coordination of their work with the architect.

Section: Contracts

Question 15

Click on the name of the team member in the meeting minutes with whom the architect should confirm Schedule item 4.d.

Correct answer:

ATTENDEES: Deb Masterson, Lindy Scralin, Mike David, Jim Dealer, Jen Mills
Appleton College, County Fair Board, Springfield County Parks and Recreation
Springfield City Park
Covered Arena
Kick-off Meeting

MEETING NOTES:
The purpose of this meeting was to kick-off the covered arena project at Springfield City. The following items were discussed:

1. Basic project scope to include the following:
   a. Pre-fabricated covered arena with steel structure and metal roof
   b. Size approximately 100' x 130', maximize to fit existing space and topography
   c. Site south of existing horse barn, and align as possible – consider centers or west side
   d. Keep existing sand floor
2. Arena shall be used for:
   a. Shows
   b. Temporary bleachers
3. Budget:
   a. The county has $20,000 budgeted for design in FY14 and $200,000 budgeted for construction in FY15
   b. Cost sharing by the horse council will be coordinated by Jim Dealer
4. Schedule:
   a. Refer to attached milestone schedule
      i. Aug 2014 – begin conceptual design
      ii. Nov 2014 – commission – conceptual approval
      iii. Mar 2015 – commission – construction approval
      iv. May 2015 – construction start
         1. Alternate – July 2015
      v. Jun 2015 – construction complete
         1. Alternate August 2015
   b. Site plan review may impact the schedule and needs to be confirmed
   c. No construction can be done during fair and fair preparation, mid-June to mid-July
   d. Goal will be to complete construction before fair, though construction may have to start after fair

ACTION ITEMS:
- Jen Mills
  - Confirm site plan review requirements
- Deb Masterson
  - Confirm horse council representation and main contact

CORRECT RESPONSE
Lindy Scralin
Schedule item 4.d involves the timing of construction in relation to the beginning of the county fair. Lindy Scralin is associated with the "County Fair Board" and is the only team member to have such an association. Thus, Lindy Scralin is the person with whom the architect should confirm Schedule item 4.d.

Section: Project Work Planning

Question 16

An architect issues completed design development documents to prospective contractors for bidding. While interviewing contractors, the owner expresses concerns about schedule and budget changes. The owner also wants to know the cost of the project in order to apply for a community grant.

What type of price should the architect advise the owner to request from the contractors?

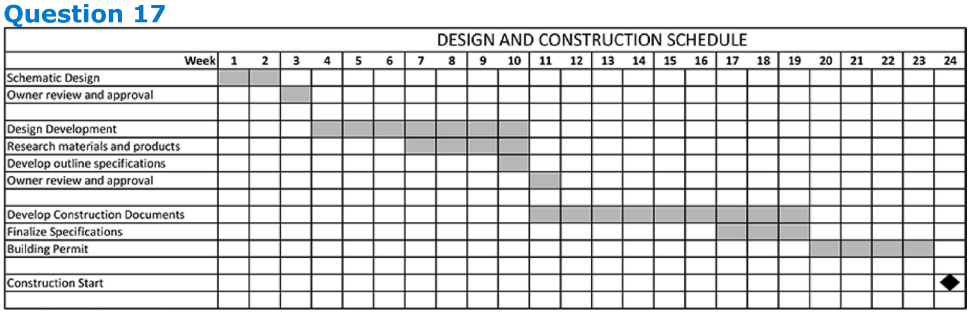
A. Stipulated lump sum
B. Guaranteed maximum price
C. Cost plus material

Correct answer: B

CORRECT RESPONSE
Guaranteed maximum price
A guaranteed maximum price allows the contractor to give the owner a price early on in the process using design development drawings that are not at the level of completed construction drawings. This process requires additional cost risks since the contractor uses incomplete drawings to set the price, but GMP does address the owner's desire to move forward with a schedule and have a price for grant applications.

Section: Project Execution

Question 17



Refer to the exhibit.

An architect develops a proposed schedule prior to the beginning of design. After the schedule is developed, the following changes occur:

- One week is added to Owner review and approval of the DD package.
- Develop Construction Documents is extended by two weeks.
- Finalize Specifications is extended by one week.

When will construction start?

A. Week 25
B. Week 26
C. Week 28

Correct answer: B

CORRECT RESPONSE
Week 26
Adding two weeks to CDs will cause permitting (Building permit) to start in Week 22. Permitting takes four weeks and will end in Week 25. Construction is to start the week after permitting, so the new construction start date is Week 26, two weeks later than scheduled. Extra weeks for owner review of the DD package and for finalizing specifications (Finalize specifications) will not impact the week in which construction will start.

CALCULATIONS
1. Add two extra weeks of CDs to the original end date of CDs: Week 19 + 2 extra weeks = Week 21
2. Add four weeks for permitting: Week 21 + 4 weeks of permitting = Week 25
3. Construction starts the following week: Week 26

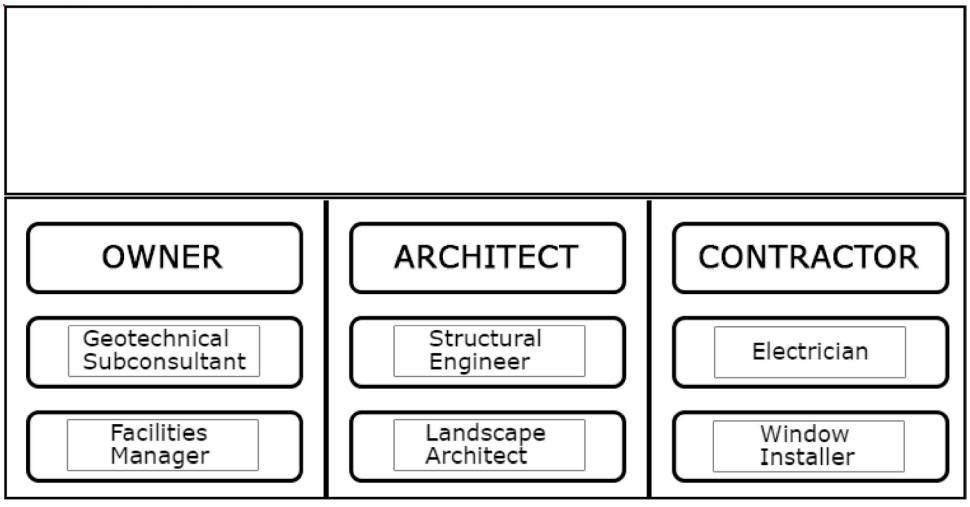
Section: Project Work Planning

Question 18

A project delivered through the design-bid-build method is entering the construction phase. The architect, contractor, and owner all have subconsultants or subcontractors.

Drag the team member labels into the boxes on the organizational chart to indicate the parties to whom each subconsultant or subcontractor should report.

Correct answer:



CORRECT RESPONSES
Facilities Manager - Owner Column
The work of a facilities manager occurs outside of the design and construction aspects of a project. The facilities manager is an employee of the owner.

Geotechnical Subconsultant - Owner Column
The geotechnical subconsultant is involved in the very early stages of a project and is focused on determining the characteristics of a site for an owner. Reports from the geotechnical subconsultant are then made available by the owner to the architect.

Landscape Architect - Architect Column

The landscape architect is part of the design team and contracts with the architect using an AIA C401 agreement between architect and consultant.

Structural Engineer - Architect Column
The structural engineer is also part of the design team and contracts with the architect using an AIA C401 agreement between architect and consultant.

Electrician - Contractor Column
The electrician is a subcontractor. Subcontractors contract with the contractors through an AIA A401 agreement.

Window Installer - Contractor Column
The window installer is subcontractor involved with construction and installation rather than design. The window installer contracts with the contractor through an AIA A401 agreement.

Section: Resource Management

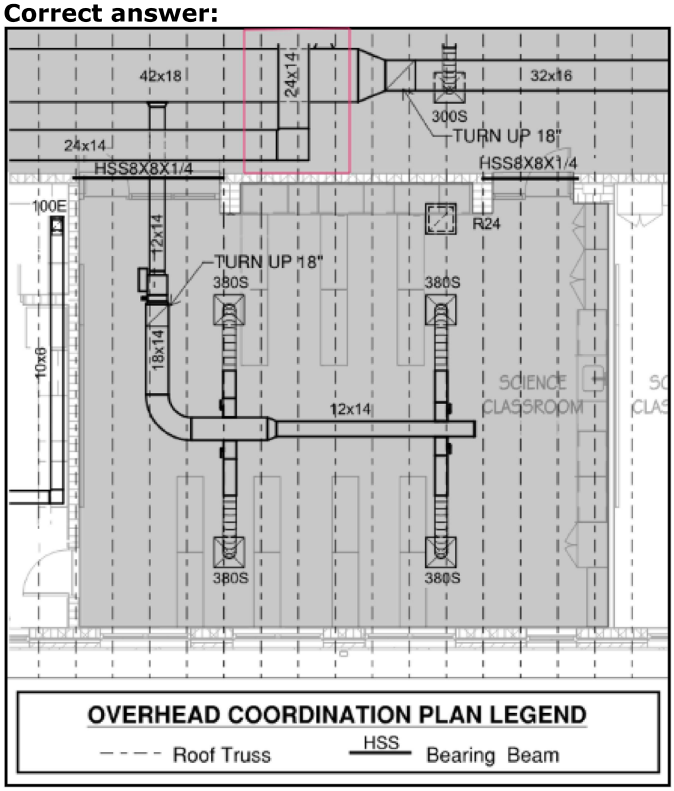
Question 19

An architect conducts a ceiling coordination review by overlaying the consultant's drawings. Design details follow:

- All ceilings: 12'-4" minimum
- Bottom of roof trusses: 14'-10"
- Top of bearing beams: 14'-10"
- All HVAC ducts: located below the roof structure

Click on the location in the shaded area of the RCP to indicate the issue that will require modification.

Correct answer:



CORRECT RESPONSE
Location where a 24" x 14" duct is routed above a 42" x 18" duct
Ductwork at this location would be below the minimum ceiling elevation, putting the bottom of the 42" x 18" duct at 12'-2", which is below the minimum ceiling height of 12'-4".

Section: Project Quality Control

Question 20

Project Phase	Budget / Invoiced	Spent at Fully-Burdened Rates
Programming	$14,000 / 100%	$12,840
Schematic Design	$18,000 / 100%	$17,200
Design Development	$24,000 / 100%	$22,800
Construction Documents	$76,000 / 50%	$39,200
Construction Administration	$28,000 / 0%	$0

Refer to the exhibit.

An architect determines that construction documents are now 50% complete. The total amount invoiced to the owner up to this point is $94,000.

How much profit has the firm currently earned from this project?

$ _____

Correct answer: 1960

CORRECT RESPONSE
$1,960

CALCULATIONS
1. Total spent: $12,840 + $17,200 + $22,800 + $39,200 = $92,040
2. Total invoiced: $14,000 + $18,000 + $24,000 + (0.5 x $76,000) = $94,000
3. Variance: $94,000 - $92,040 = $1,960 profit

Section: Resource Management

Question 21

During an architect's quality control review, the architect discovers the following code provisions for the minimum dimensions for all handrail extensions beyond the top riser of an egress stair:

- The state building code stipulates a minimum dimension that is two inches less than that required by the International Building Code.
- The local AHJ code stipulates a minimum dimension that is four inches greater than that required by the International Building Code.

Which code requirement must the architect follow for handrail extensions in the construction documents?

A. International Building Code
B. State building code
C. Local AHJ code

Correct answer: C

CORRECT RESPONSE
Local AHJ code
When multiple codes conflict, the most stringent code always takes precedence. Because the local AHJ code requires the extension to be four inches greater than the IBC, and therefore six inches greater than the state building code, the local AHJ code takes precedence as the most stringent code.

Section: Project Quality Control

Question 22

During construction of a design-bid-build commercial office building, an owner asks the architect to subdivide a meeting room to create three offices. This modification will add office doors, revise ceiling types, and increase power locations. As a result, drawings will also need to be modified by the electrical and HVAC consultants to capture the new scope. The general contractor will use these revised drawings to seek pricing from the subcontractors and vendors for owner approval.

If the owner approves the change, what record documents related to this modification must the contractor provide for the architect's review as part of the project closeout? **Check the three that apply.**

A. Contractor's payment application
B. Construction change order

C. Supplemental drawings
D. Product submittals
E. Punch list
F. Addenda

Correct answer: BCD

CORRECT RESPONSES
Construction change order
The approved modifications and related price are documented in a construction change order that is reviewed by the architect and approved by the owner. Change orders are considered record documents that are assembled by the contractor for review by the architect.

Supplemental drawings
Supplemental drawings are issued during construction and can be issued with supplemental instructions. Supplemental drawings are considered record documents that are assembled by the contractor for review by the architect.

Product submittals
The approved and reviewed product submittals prepared by the contractor are considered record documents that are assembled by the contractor for review by the architect.

Section: Project Execution

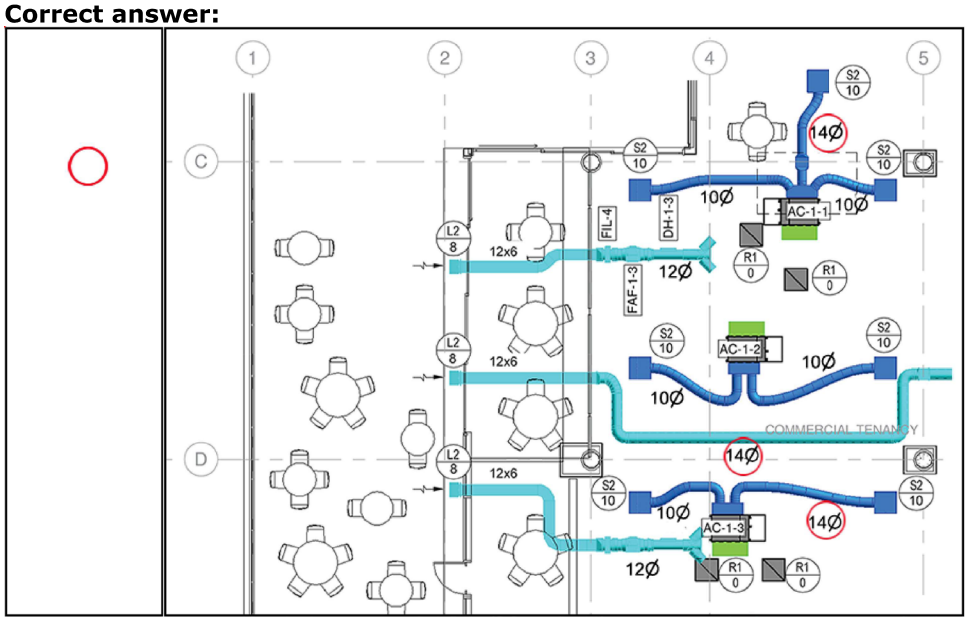
Question 23

An architect is conducting a coordination review of the mechanical drawings to ensure that ducts fit within the designed space. Assume the following:

- Floor to floor height: 13'-2"
- Ceiling height: 10'-0"
- Largest beam depth: 14"
- Concrete floor thickness: 10"
- Ceiling thickness: 3/4"

Drag the circles over the duct diameter annotations on the partial mechanical plan to indicate which duct sizes the mechanical engineer will need to revise. Not all circles will be used.

Correct answer:



CORRECT RESPONSES
All 14" duct diameter annotations
Duct sizes 12 inches in diameter or smaller are allowed to go under the beam. The 14-inch-diameter ducts cannot go under the beam and need to be revised.

CALCULATIONS
1. 13'-2" (floor-to-floor height) - 10'-0" (ceiling height) - 14" (largest beam depth) - 10" (floor thickness) - 3/4" (ceiling thickness) = 1'-1 1/4"
2. 13'-2" - 1'-1 1/4" = 13 1/4" available space

Section: Project Quality Control

Question 24

An architect is executing a field survey for the renovation of an existing facility constructed in 1962 and unmodified since 1987. The architect observes what appears to be utility piping insulation that is original to the building.

How should the architect address this observation?

A. Alert the local building official of the potential hazardous materials.
B. Advise the owner to engage a third-party hazardous materials testing consultant.
C. Direct the plumbing consultant to include potential hazardous materials abatement in their bid drawings.

Correct answer: B

CORRECT RESPONSE
Advise the owner to engage a third-party hazardous materials testing consultant.
Material at risk of containing asbestos should be tested by an owner-engaged third-party company and mitigated appropriately if found to be hazardous.

Section: Contracts

Question 25

An architect hires an electrical engineer using AIA C401. The electrical engineer, in turn, hires a specialty subconsultant. Review comments from the AHJ note that there are significant electrical code oversights that need to be addressed. The architect must inform the owner that these revisions will cause a delay in the overall project schedule.

Who is responsible to the owner for the delay in the project schedule?

A. The architect
B. The electrical engineer
C. The specialty subconsultant

Correct answer: A

CORRECT RESPONSE
The architect
This option is correct because the architect and electrical engineer used AIA C401, through which the architect is liable to the owner for consultant work and for informing the consultant about code requirements for the consultant's respective portion of the work.

Section: Contracts

Question 26

During the design of a restaurant, a local Design Review Board (DRB) must approve the building elevations before the AHJ can issue a permit, which the owner wants to obtain as soon as possible. The DRB reviews the rendered elevations and rejects the branded signage shown on the restaurant as inappropriate for the neighborhood. The signage is not part of the architect's scope of design work.

How should the architect proceed?

A. Submit the drawings to the AHJ without DRB approval.
B. Submit the drawings to the AHJ and apply for a variance from the DRB review requirement.
C. Remove the signage from the permit drawings to get DRB approval and submit the signage under a separate sign permit.
D. Provide elevations without signage for DRB review and issue a separate construction set to the contractor that includes the signage.

Correct answer: C

CORRECT RESPONSE
Remove the signage from the permit drawings to get DRB approval and submit the signage under a separate sign permit.
This will allow permitting to proceed, and it will allow the discussion about the signage to continue with the board until it is resolved. Under the International Building Code, signage is treated as a trade permit, and since it is excluded from the architect's scope, it is reasonable to

remove it from permit documents. Jurisdictional approvals for signage are considered separate from building, and the configuration of signage will rarely impact the building.

Section: Project Quality Control

Question 27

A developer hires an architect to design a prototype for a series of five-story waterfront hotels. The purchase agreements have been finalized for the first four sites just as the DD phase is complete. The architect finds that the AHJ for one of the sites requires a building setback from a right-of-way that is slightly larger than anticipated. The developer is concerned this will negatively impact the waterfront amenities provided to the guests and has asked the architect to contact the AHJ.

What action should the architect immediately take to address the developer's concerns?

A. Request a waterfront master plan hearing review.
B. Appeal to the zoning authority for a variance.
C. Petition for a right-of-way use permit.

Correct answer: B

CORRECT RESPONSE
Appeal to the zoning authority for a variance.
If a project concept does not conform to the site's permitted use, an organization must appeal to the zoning AHJ for a zoning variance. Since the permitted and conditional use could not be fully evaluated until after the site was purchased, the architect should take immediate action to request the variance since this can be a lengthy process.

Section: Project Execution

Question 28

An owner wants to build a warehouse and has hired the architect to develop a building program and document the owner's requirements. The programming documents have just been completed.

Which delivery method should the architect suggest to minimize the need for owner involvement in finishing the project?

A. Design-bid-build
B. Design-build
C. CM at-risk
D. Integrated project delivery

Correct answer: B

CORRECT RESPONSE
Design-build
Design-build delivery provides a single point of accountability for the owner; this requires minimal involvement from the owner beyond the programming document.

Section: Resource Management

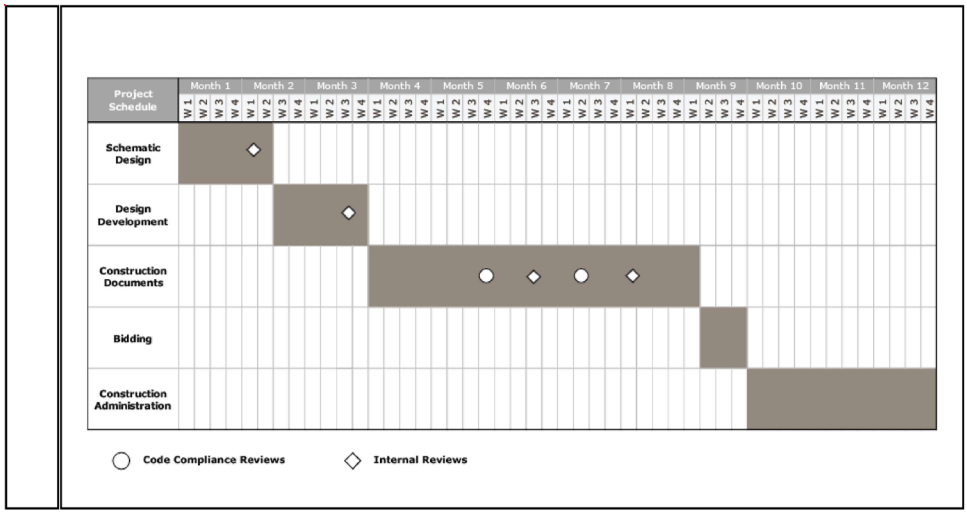
Question 29

An architect is incorporating code compliance reviews and internal reviews into a project quality control plan. The architect must account for the following:

- An internal review will be conducted after each design phase is 80% complete
- Construction documentation will have an additional internal review when 50% complete.
- There will be a code compliance review three weeks before each construction documents internal review.

Drag the review symbols onto the shaded bars on the schedule to indicate the weeks when internal reviews and code compliance reviews should occur.

Correct answer:



CORRECT RESPONSES

Internal Review - Schematic Design, Month 2 Week 1
The project quality control plan calls for internal reviews to be conducted after 80% complete in each design phase.

Internal Review - Design Development, Month 3 Week 3
The project quality control plan calls for internal reviews to be conducted after 80% complete in each design phase.

Internal Review - Construction Documents, Month 6 Week 3
The project quality control plan states that constructions documents will have an internal review at 50%.

Internal Review - Construction Documents, Month 8 Week 1
The project quality control plan calls for internal reviews to be conducted after 80% complete in each design phase.

Code Compliance Review - Construction Documents, Month 5 Week 4
The project quality control plan states that constructions documents will have a 90% design deliverable and that a code compliance review will occur three weeks before each construction document design deliverable.

Code Compliance Review - Construction Documents, Month 7 Week 2
The project quality control plan states there will be a code compliance review three weeks before each construction documents internal review.

Section: Project Quality Control

Question 30

An architect completes the design development phase for a new apartment complex. The client approves the design pending minor changes to the three-bedroom unit. During the meeting with the architect, the client requests that a pool be added to the project scope.

How should the architect reduce risks associated with this request?

A. Call the client to confirm the changes and determine the amount of additional services to include the pool.
B. Update the consultant's action items list with tasks related to the three-bedroom unit and pool design.
C. Send the client meeting minutes via e-mail for approval noting the discussed pool addition to the project.

Correct answer: C

CORRECT RESPONSE

Send the client meeting minutes via e-mail for approval noting the discussed pool addition to the project.
E-mail documentation is an effective way to mitigate risk. According to the *Architect's Handbook of Professional Practice*, it is necessary to document conversations that can meaningfully affect the project. It is important to keep a written record of who generated decisions and directions, as well as when and where these actions were taken.

Section: Project Quality Control

Question 31

Cost/SF	Division	Description	Construction Budget	Design Development Estimate
$ 0.25	2	Demolition	$ 17,300	$ 15,000
$ 7.75	3	Concrete Foundations, slabs on grade	$ 536,300	$ 525,000
$ 14.00	3	Cast-in-Place Concrete walls - ICF's	$ 968,800	$ 916,500
$ 1.25	3, 5	Conc on metal form deck	$ 86,500	$ 84,200
$ 12.75	4	Brick veneer	$ 882,300	$ 1,168,000
$ 11.00	5	Struc steel, bar joists, mtl deck, steel stairs	$ 761,200	$ 721,000
$ 1.50	6	Rough Carpentry, casework, millwork	$ 103,800	$ 98,000
$ 1.66	7	Wtrprfg, air/mst brs, insul, wall pnls, caulk, firestopg	$ 114,872	$ 115,000
$ 7.00	7	Roofing, roof specialties	$ 484,400	$ 461,400
$ 3.75	8	Interior doors, hardware, windows, frames	$ 259,500	$ 250,000
$ 4.60	8	alum entry doors, windows, frames, glazing	$ 318,320	$ 313,400
$ 27.00	9	Interior studs, furring, gypbd, floor/wall/clng finishes	$ 1,868,400	$ 2,200,000
$ 1.35	10	Tlt comparts, accessories, FECs,	$ 93,420	$ 94,000
$ 1.33	10	Operable partitions, lockers	$ 92,036	$ 79,000
$ 10.25	11	Foodservice equipment, walk-in cooler & freezer	$ 635,000	$ 600,000
$ 0.50	11	Athletic equipment - gymnasium	$ 34,600	$ 32,900
$ 0.20	12	Window roller shades	$ 13,840	$ 15,600
$ 0.45	12	Lab casework and countertops - science rooms	$ 31,140	$ 30,000
$ 1.05	14	Elevator	$ 72,660	$ 72,000
$ 2.20	21	Fire Suppression	$ 152,240	$ 150,000
$ 17.00	22	Plumbing	$ 1,176,400	$ 1,150,000
$ 28.00	23, 25	HVAC and controls	$ 1,937,600	$ 2,224,000
$ 21.80	26,27,28	Electrical, telco, security	$ 1,508,560	$ 1,465,000
$ 8.00	32	Site-civil: Entry Rd, Prkg Areas, Walks, Landscaping	$ 553,600	$ 525,000
$ 14.00	31	Site-civil: Grading, fill, drainage, storm, bioretention	$ 500,000	$ 715,000
$ 5.00	33	Site-civil: Site utility connections	$ 346,000	$ 330,000

Refer to the exhibit.

An architect is evaluating a construction cost estimate for a new school. Each portion of the work is to be designed at or below the construction budget. At the completion of design development, the estimate is over budget.

Which of the following strategies are appropriate for bringing the project back in budget? **Check the three that apply.**

A. Explore alternative exterior cladding materials.
B. Change glazing from triple to double pane insulating units.
C. Investigate how to reduce the amount of imported fill material.
D. Consider specifying less expensive light fixtures as an alternate bid item.
E. Reduce the number of heating/cooling zones by increasing the area of each zone.
F. Ask the owner to directly purchase gymnasium equipment to reduce overhead costs.

Correct answer: ACE

CORRECT RESPONSES

Explore alternative exterior cladding materials.
Division 4 Brick Veneer is over budget. It is appropriate to explore other exterior cladding materials to bring this cost category into budget.

Investigate how to reduce the amount of imported fill material.
Imported fill material is a component of Division 31, which is over budget. It is appropriate to investigate means to bring this cost category into budget.

Reduce the number of heating/cooling zones by increasing the area of each zone.
This is an appropriate strategy to reduce the cost of Division 15 HVAC, which is over budget.

Section: Project Execution

Question 32

Milestone Schedule	Date
Project Kickoff, Field Work	31-Jan
Conceptual Design Phase	7-Feb
Owner Preliminary Concept Approval	28-Feb
City Preliminary Development Plan Submission*	7-Mar
City Comments Due	14-Mar
Owner Final Concept Approval	21-Mar
City Final Development Plan Submission**	1-Apr
SD Phase	11-Apr
DD Phase	16-May
CD Phase	4-Jul
Issue for Permit	24-Aug

* City accepts submissions 1st business day each week
** City accepts submissions 1st business day each month

Refer to the exhibit.

During Owner Final Concept Approval, it is discovered that part of the program has 200% more square feet than needed, causing massing changes for the building shell concept. This creates a two-week design delay, but all milestone durations are to be maintained.

By how many weeks will the City Final Development Plan Submission be delayed?

A. 2 weeks
B. 3 weeks
C. 4 weeks

Correct answer: C

CORRECT RESPONSE
4 weeks
The city only accepts final development plan submissions on the first business day of each month. The two week design delay pushes the City Final Development Plan Submission past April 1. The project will now have to wait until the beginning of the next month, May 1, to submit for the City Final Development Plan Submission.

Section: Project Work Planning

Question 33

An architect is preparing an initial project budget using the following fee information:

- There is a total fee of $300,000 for the entire project team.
- 40% of the total fee is allocated for all consultants.
- 8% of the net fee is allocated for the architect's non-reimbursable expenses.
- 7% of the net fee is allocated for the architect's contingency.

What is the available budget for project labor?

A. $153,000
B. $165,000
C. $180,000

Correct answer: A

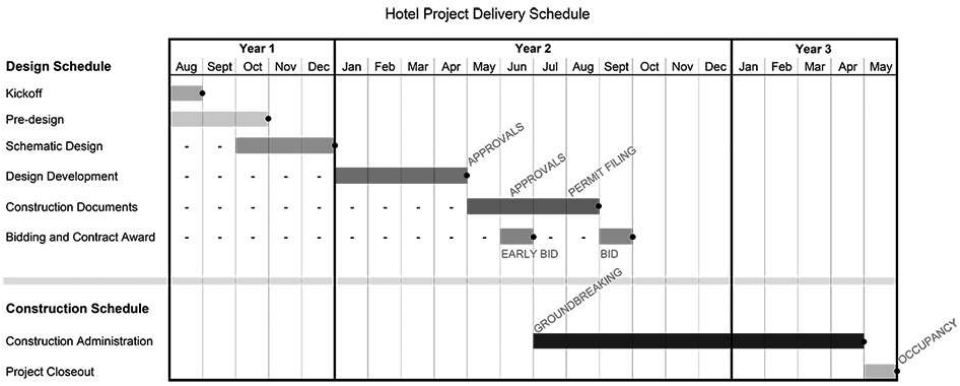
CORRECT RESPONSE
$153,000
This response results from a calculation that accounts for the net fee.

CALCULATIONS
1. Consultant fee: 40% x $300,000 (total fee) = $120,000
2. Net fee: $300,000 - $120,000 (consultant fee) = $180,000

3. Non-reimbursable expenses and contingency: 15% x $180,000 (net fee) = $27,000
4. Total available for labor: $180,000 (net fee) - $27,000 (combined percentage of fee for contingency and non-reimbursable expenses) = $153,000

Section: Resource Management

Question 34



Refer to the exhibit.

A project is on schedule and just beginning in the design development phase. The architect is developing the workplan for February and March of Year 2.

Which one of the following activities should the architect include in the workplan?

A. Development of the outline specification based on the design and project requirements.
B. Definition of the cost of work through a guaranteed maximum price in preparation of issuing the project to bid.
C. Coordination of design narratives between the architect and consultants to define basic project characteristics.

Correct answer: A

CORRECT RESPONSE
Development of the outline specification based on the design and project requirements.
The outline specifications should be developed during design development to identify specific products and anticipated assemblies.

Section: Project Quality Control

Question 35

A project is running over budget. To cut costs, the architect suggests substituting metal panels for brick veneer. Other project details follow:

- Brick veneer costs $15 per square foot.
- Metal panels costs $13 per square foot.
- The building has four 375-foot-long sides.
- The building is 70 feet in height.
- Glazing is 30% of the entire building.

What are the cost savings of this substitution?

$ _____

Correct answer: 147000

CORRECT RESPONSE
$147,000

CALCULATIONS
1. Total square footage of exterior wall: 375 feet in length x 70 feet in height x 4 sides = 105,000 sf of exterior wall
2. Total square footage of exterior wall that is not glazing: 105,000 sf x 0.70 (removing 30% glazing) = 73,500 sf
3. Cost savings per square foot of metal panels: $15.00 per sf (for brick) - $13.00 per sf (for metal panel) = $2 per sf
4. Total cost savings: 73,500 sf x $2 per sf = $147,000

Section: Project Execution

Question 36

An owner places a project on hold after receiving completed construction documents from the architect. After six months, the owner requests that the project continue into the bidding phase.

According to AIA B101, how should the architect proceed?

A. Adjust the cost of work to reflect changes in the construction market.
B. Prepare a change order and submit it to the owner for approval.
C. Revise billable rates for architectural staff and consultants.

Correct answer: A

CORRECT RESPONSE
Adjust the cost of work to reflect changes in the construction market.
The B101 agreement stipulates that if the bidding phase doesn't start within 90 days after the architect submits construction documents, the owner's budget is to be adjusted to reflect changes in costs for construction. (Section 6.4)

Section: Contracts

Question 37

Under an AIA B101 agreement, an owner asks an architect to resume a laboratory project that was put on hold three years ago during the initial project phase. Project information follows:

- Program calls for 10 laboratories at 500 square feet each.
- Cost per square foot three years ago was $400.
- Total construction inflation for the past three years is 15%.
- The architect's fee is 5% of construction costs.
- The owner does not want the project to exceed $2,700,000.

How much is the architect's new total fee?

$ _____

Correct answer: 115000

CORRECT RESPONSE
$115,000
The architect's new total fee is based on the new total construction cost and not the value that the owner does not want to exceed.

CALCULATIONS
1. Calculate the project square footage: 10 labs x 500 sf each = 5,000 sf
2. Calculate the cost per square foot due to inflation: $400 (cost per sf three years ago) x 1.15 (15% inflation) = $460 per square foot
3. Calculate the new total cost for construction: $460 x 5,000 sf = $2,300,000
4. Determine architect's new fee: $2,300,000 x 0.05 = $115,000

Section: Project Execution

Question 38

An architect and a structural engineer are contracted under an AIA C401 agreement. The client revises the program, expanding the structural engineer's scope of services. The structural engineer is now preparing an additional fee request.

How should the structural engineer submit the additional fee request?

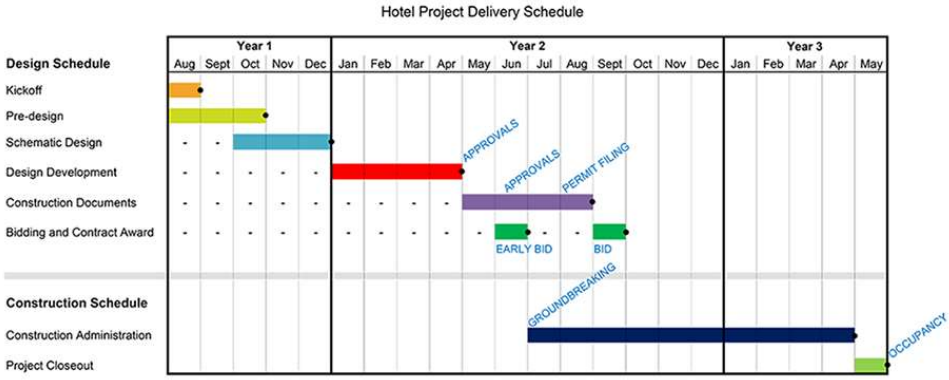
A. Submit to the owner and wait for authorization to proceed.
B. Submit to the owner and proceed with additional services.
C. Submit to the architect and proceed with additional services.
D. Submit to the architect and wait for authorization to proceed.

Correct answer: D

CORRECT RESPONSE
Submit to the architect and wait for authorization to proceed.
AIA Document C401 is the Standard Form of Agreement Between Architect and Consultant. Since the engineer is a consultant of the architect, the engineer must submit requests to the architect and should await authorization before proceeding with any additional services.

Section: Contracts

Question 39



Refer to the exhibit.

A developer hires an architect for a project that includes additional cost estimating beyond the basic scope of design services. The architect must provide a cost estimate at the end of each design phase for cost control measures.

Which estimating technique is most appropriate at the end of April, Year 2?

A. Order of magnitude
B. Unit price
C. Assemblies

Correct answer: C

CORRECT RESPONSE
Assemblies
An assemblies cost estimate is more precise than the order of magnitude approach and is possible after early detailed information about project construction is defined during the design development phase. A unit price estimating approach requires a greater level of detail that is not defined until after the design development phase. An assemblies estimate may also be referred to as a systems estimate.

Section: Project Quality Control

Question 40

Early in the construction documents phase of a project, a fire protection engineer alerts the architect that the architect improperly classified the materials planned to be stored in a warehouse space. The architect will need to revise the analysis of the materials so that the fire protection engineer can correctly plan sprinkler coverage and fire pump sizing.

What should the architect do first to respond to the lack of coordination?

A. Develop and submit a request for additional services.
B. Identify and take corrective actions to modify the project work plan.
C. Advise the owner of the design conditions and any impact on the schedule.

Correct answer: B

CORRECT RESPONSE
Identify and take corrective actions to modify the project work plan.
Identifying and taking corrective action if a project is not performing according to the project work plan is the first step the architect should take. The architect must alert the owner of the situation but should *first* identify the root cause of the error and define a path forward to resolve it prior to the discussion with the owner.

Section: Project Work Planning

Question 41

STAFF	MONTH 1	MONTH 2	MONTH 3	MONTH 4	MONTH 5
Architect	120	120	120	120	120
Designer 1	120	120	120	95	120
Designer 2	120	80	120	120	120

Refer to the exhibit.

An architect is scheduling workloads for the next three months. An ongoing project requires 300 hours per month until construction documents are completed at the end of Month 3. A new project will require 40 hours in Month 2 and 120 hours in Month 3.

If the schedule is fixed, what is the total number of overtime hours necessary to perform the expected work in months 1, 2, and 3?

_____ hours

Correct answer: 80

CORRECT RESPONSE
80 hours
The architect must add the expected workload each month, deducting each team member's availability for each month, and combine the total overtime from all months.

CALCULATIONS
1a. Month 1 requires 300 hours for the ongoing project.
1b. Amount of overtime required for Month 1: 360 hours are available - 300 hours required = 60 hours; because there are 60 unutilized hours, no overtime will be required for Month 1.
2a. Month 2 requires 300 hours for the ongoing project + 40 hours for the new project = 340 hours total
2b. Amount of overtime required for Month 2: 320 hours available - 340 hours required = - 20 hours; this means that 20 hours of overtime will be required.
3a. Month 3 requires 300 hours for the ongoing project + 120 hours for the new project = 420 hours
3b. Amount of overtime required for Month 3: 360 hours available - 420 hours required = - 60 hours; this means that 60 hours of overtime will be required.
4. 20 hours (overtime in Month 2) + 60 (overtime in Month 3) = 80 total overtime hours

Section: Project Work Planning

Question 42

An owner is assembling a project team for the conceptual design phase of an eight-story, greenfield office building development that will include underground parking.

Which team members should the architect recommend be required for this project team? **Check the four that apply.**

A. Architect
B. Construction manager
C. MEP engineers
D. Structural engineer
E. Geotechnical engineer
F. Landscape architect

Correct answer: ACDE

CORRECT RESPONSES
Architect
Because they will provide building design services.

MEP engineers
Because they will provide consulting services given the planned size and complexity of the building.

Structural engineer
Because they will provide consulting services given the structural requirements of the building.

Geotechnical engineer
Because they will identify the necessary below grade conditions that will inform the project.

Section: Resource Management

Question 43

An architect is working on a large project with a construction manager (CM) as-contractor. All designers and engineers have been retained and the design is approximately 50% complete. Due to the size of the project, the CM is unable to secure a bond for the entire contracted project. Smaller construction contracts will be necessary. The owner and architect want all design and construction team members to continue in their current roles.

Which delivery method should the architect recommend to the owner?

A. Design-build
B. CM as-advisor
C. Multiple prime
D. Design-bid-build

Correct answer: B

CORRECT RESPONSE
CM as-advisor
Using a CM as-advisor delivery method will allow the CM as-contractor and the design team to continue in their current roles with their current responsibilities. It will also allow for the writing of smaller construction contracts once design is complete.

Section: Contracts

Question 44

An architect working on a project delivered through the design-build method conducts a site visit. The architect observes unsafe working conditions, noting that several construction workers are without hard hats.

How should the architect respond?

A. Immediately instruct the construction workers on the safety precautions that need to be taken.
B. Document the unsafe working conditions in a memo to the contractor that is also copied to the owner.
C. Document the unsafe working conditions in a memo to the owner that is also copied to the contractor.
D. Ask the contractor to review the safety precautions that need to be taken with the construction workers.

Correct answer: B

CORRECT RESPONSE
Document the unsafe working conditions in a memo to the contractor that is also copied to the owner.
The architect is only responsible for informing the contractor of any observed unsafe construction site conditions.

Section: Project Work Planning

Question 45

A university hires an architect to design a renovation and addition to a performing arts center. The university wants to use an integrated project delivery method and contract with a series of consultants who will each coordinate their scope of work with the architect. The work is to be executed in multiple phases and includes the following:

- Restore the original facade of the existing facility built in 1905.
- Convert the existing sloped concrete floor performance hall into a new flat floor performance space.
- Renovate existing classrooms to provide new advanced audio and video laboratories.
- Design a performance hall addition connected to the existing facility by an elevated walkway.
- Identify and address any AHJ or accessibility issues in the existing facility.

Who should the architect recommend the university hire before the schematic design phase? **Check the four that apply.**

A. General contractor
B. Lighting designer
C. Geotechnical engineer
D. Commissioning agent
E. Historical preservationist
F. Construction manager

Correct answer: ACEF

CORRECT RESPONSES

General contractor
As part of an IPD project, a general contractor will contract with the owner and should be involved in the predesign phase.

Geotechnical engineer
A geotechnical engineer will be a third-party consultant to the owner and should be involved in the predesign phase.

Historical preservationist
The owner should contract with an historic preservationist due to the facade restoration and should be involved in the predesign phase.

Construction manager
As part of an IPD project, a construction manager will contract with the owner and should be involved in the predesign phase.

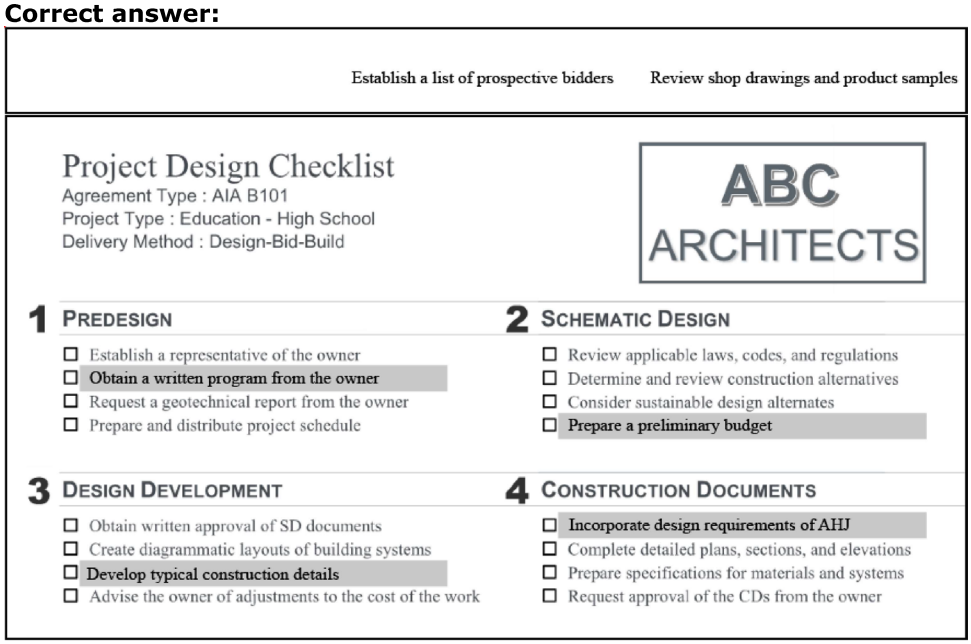
Section: Resource Management

Question 46

An architect uses a series of standard project design checklist forms as part of their firm's quality control program. Each form contains tasks to be completed chronologically by phase before starting construction administration.

Drag the tasks into the shaded areas on the Project Design Checklist to indicate the tasks that must be completed during each phase. Not all tasks will be used.

Correct answer:



CORRECT RESPONSES

Obtain a written program from the owner - 1 Predesign
This occurs in the predesign phase before proceeding to the SD phase.

Prepare a preliminary budget - 2 Schematic Design
This occurs in the SD phase before proceeding to the DD phase. Subsequent updates of the preliminary budget are required in the following phases.

Develop typical construction details - 3 Design Development
Typical construction detail development is part of the DD phase. Further development and completion of details occurs in the CD phase.

Incorporate design requirements of the AHJ - 4 Construction Documents
This occurs during the CD phase prior to completing construction documents.

Section: Contracts

Question 47

An architect is working on a large office building of Type V construction. A week before the 100% schematic design (SD) deliverable is due to the client, the architect conducts an internal review of the documents to confirm that the deliverable aligns with SD standards.

Which of the following review items should be included in the SD quality review checklist?

A. Complete procurement documents associated with allowances and unit prices.
B. Review private office count and square footage needs with current architectural plan.
C. Confirm structural engineer's documentation of final details to relocate existing columns.
D. Coordinate plumbing engineer's details with civil engineer's plan for fire protection service.

Correct answer: B

CORRECT RESPONSE
Review private office count and square footage needs with current architectural plan.
Review of programming needs with the current plan is appropriate for an SD quality review process.

Section: Project Quality Control

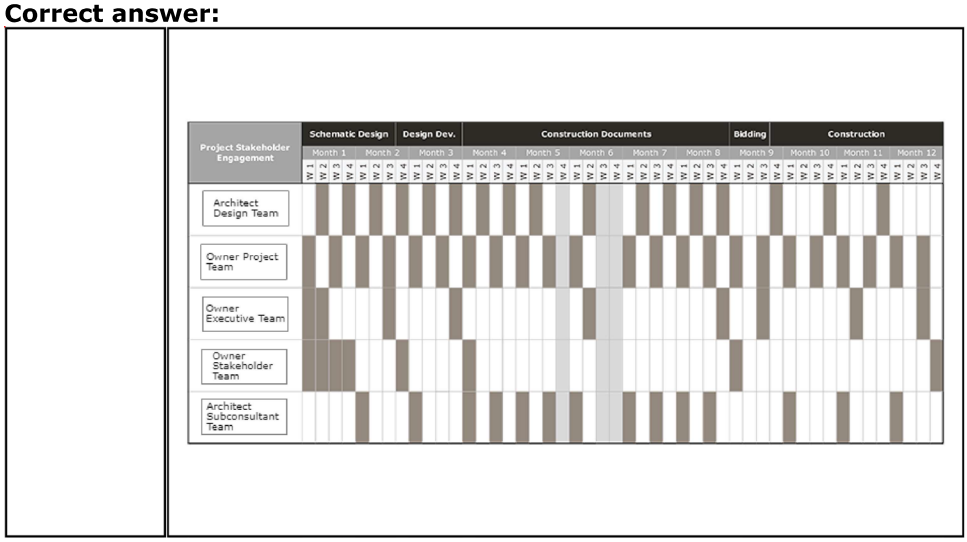
Question 48

In order to ensure design objectives are continually monitored and met across all phases of a project, an architect is mapping out the following communication plan for project stakeholders:

- The owner's project team will meet biweekly throughout the project.
- The owner's executive team will approve all deliverables before the end of each phase.
- The owner's stakeholder team will be interviewed early and receive updates at the beginning of each phase.
- The architect will meet biweekly with the internal design team.
- The architect will meet biweekly with the subconsultant team during the CD phase.

Drag the teams into the rows in the Project Stakeholder Engagement column in order to indicate the frequency with which project stakeholders will be engaged.

Correct answer:



CORRECT RESPONSES
Architect Design Team
This team goes in the first row of the Project Stakeholder Engagement column because the row shows that meetings occur every two weeks during the design phases. According to the communication plan, the architect's internal design team will meet biweekly.

Owner Project Team
This team goes in the second row of the Project Stakeholder Engagement column because the row shows biweekly meetings throughout the entire project. According to the communication plan, the owner's project team will meet biweekly throughout the project.

Owner Executive Team
This team goes in the third row of the Project Stakeholder Engagement column because the row shows meetings in the weeks at the end of each phase. According to the communication plan, the owner's executive team will approve the deliverables before the end of each phase.

Owner Stakeholder Team
This team goes in the fourth row of the Project Stakeholder Engagement column because the row shows several meetings at the beginning of the project and then at the beginning of each phase. According to the communication plan, the owner's stakeholder team will be interviewed early and will be receive updates at the beginning of each phase.

Architect Subconsultant Team
This team goes in the fifth row of the Project Stakeholder Engagement column because the row shows regular biweekly meetings throughout the construction document phase. According to the communication plan, the subconsultant team will meet with the architect biweekly

throughout the construction document phase.

Section: Project Quality Control

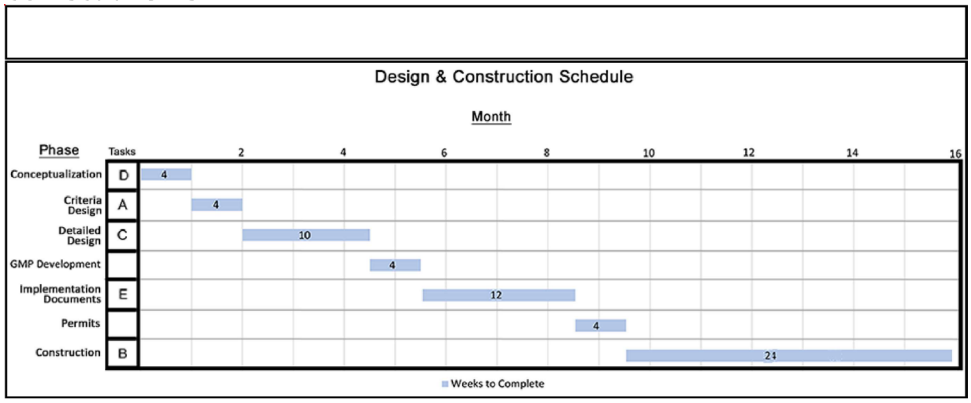
Question 49

As part of an integrated project delivery, an architect needs to perform the tasks listed in the following table:

Task Letter	Task
A	Create performance specifications and confirm sustainability targets.
B	Issue substantial completion and final completion documents.
C	Develop concept ideas into constructible forms and conduct detailed code study for compliance.
D	Prepare a design schedule and identify potential design and sustainability goals.
E	Finalize BIM and specifications.

Drag the task letters into the boxes in the "Tasks" column on the Design & Construction Schedule to indicate the design phase in which the tasks should be performed.

Correct answer:



CORRECT RESPONSES

A (Create performance specification and confirm sustainability targets.) - Criteria Design
The performance specifications and sustainability goals for the project are confirmed during the "Criteria Design" phase. The design team then proceeds to work toward these goals and specifications in the following phases.

B (Issue substantial completion and final completion documents.) - Construction
This task is carried out during the "Construction" phase.

C (Develop concept ideas into constructible forms and conduct detailed code study for compliance.) - Detailed Design
This task is carried out during the "Detailed Design" phase of a project.

D (Prepare a design schedule and identify potential design and sustainability goals.) - Conceptualization
This task is carried out in the initial "Conceptualization" phase of the project.

E (Finalize BIM and specifications) - Implementation Documents
The BIM and specifications are finalized during the "Implementation Documents" phase.

Section: Project Execution

Question 50

A contractor submits a punch list to an architect ten days before substantial completion of a gymnasium project. Days later, a subcontractor leaves a skylight open overnight, and rain floods the gymnasium floor, necessitating replacement of the flooring. The lead time for new flooring is twelve weeks.

If the architect's agreement with the owner is written to expire 30 days after substantial completion, which of the following documents must the architect prepare immediately? **Check the two that apply.**

A. A revised schedule for owner approval.
B. A request for liquidated damages for contractor review.
C. An invoice for additional services for owner payment.
D. A punch list for areas not damaged for contractor approval.

E. A notice to the contractor for withholding final payment.
F. A change order to purchase new flooring.

Correct answer: CE

CORRECT RESPONSES
An invoice for additional services for owner payment.
According to AIA B101 Article 4.2.3, construction phase services exceeding those outlined by the agreement (here it is 30 days after the substantial completion), shall be compensated for additional services due to additional costs incurred by the architect.

A notice to the contractor for withholding final payment.
The AIA General Conditions prohibits final payment to the contractor until the project closeout documents have been submitted to the architect.

Section: Project Execution

Question 51

An architect is working on a renovation project under an AIA B101 agreement. The architect's compensation is to be calculated as 5% of the cost of the work. The cost of the work is initially determined to be $12,800,000. Compensation for the architect's basic services follows:

- Schematic Design: 12%
- Design Development: 23%
- Construction Documentation: 40%
- Construction Administration: 25%

At the beginning of construction, the underground foundation is uncovered and is found to require extra structural support, increasing the the total cost of work by 2%.

How much should the architect bill the owner for construction administration services when this phase is 25% complete?

$ _____

Correct answer: 40800

CORRECT RESPONSE
$40,800
According to AIA-B101 Article 11.6, a percentage basis fee for compensation is not adjusted for previous progress payment.

CALCULATIONS
1. Calculate the increased cost of work: $12,800,000 + ($12,800,000 x 2%) = $13,056,000
2. Determine the architect's compensation: $13,056,000 x 5% = $652,800
3. Calculate architect's fee for the construction administration phase: $652,800 x 25% = $163,200
4. Evaluate billing amount when constructions reaches 25%: $163,200 x 25% = $40,800

Section: Contracts

Question 52

An owner asks the architect to reduce the production portion of each project phase with a client review and approval activity by one week. In addition, the owner requests the client review and approval time at each phase be extended by three weeks. Project phases follow:

- Programming: 8 weeks
- Schematic Design: 8 weeks
- Design Development: 12 weeks
- Construction Documents: 16 weeks
- Bidding/Negotiation: 6 weeks
- Construction Contract Administration: 56 weeks

By how many weeks should the architect extend the overall schedule?

_____ weeks

Correct answer: 6

CORRECT RESPONSE
6 weeks

Only Schematic Design, Design Development, and Construction Documents phases have a client review and approval activity. For each of these phases, the architect must decrease the production portion of their work by one week but provide the client an additional three weeks to complete review and approval.

CALCULATIONS
1. 3 phases x -1 week of production time = 3 weeks less to the overall schedule
2. 3 client review and approvals x 3 weeks of more time = 9 weeks more to the overall schedule
3. -3 + 9 = 6 weeks of schedule extension

Section: Project Work Planning

Question 53

Early in the construction document phase of a building renovation project, a mechanical engineer alerts the project manager that the architect has improperly classified the use of the space. The architect will need to revise the use of the space so that the mechanical engineer can correctly size a large portion of the HVAC system and revise the distribution duct layout.

What should the architect do first to address the improper classification?

A. Submit a request for additional services.
B. Take corrective actions to modify the project work plan.
C. Identify the impact on the previous construction cost estimate.
D. Advise the owner of the design conditions and their impact on the schedule.

Correct answer: B

CORRECT RESPONSE
Take corrective actions to modify the project work plan.
Taking corrective action if a project is not performing according to the project work plan is the first step the architect should take. The architect should identify the root cause for the error and define a path forward to resolving it prior to discussion with the owner.

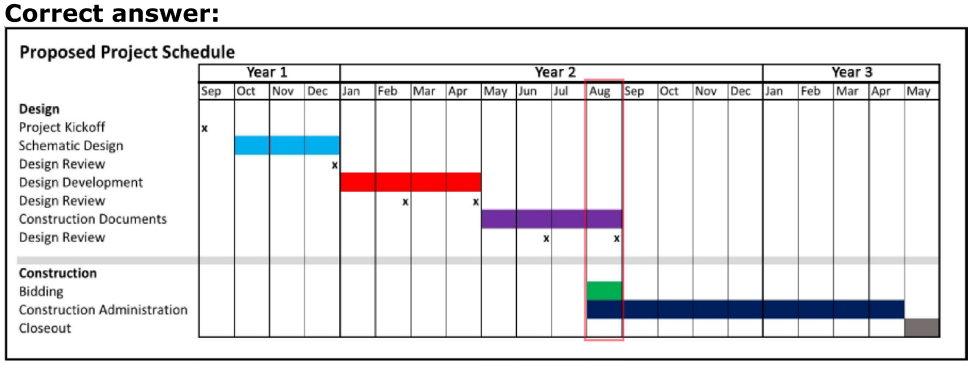
Section: Project Work Planning

Question 54

Following a review of the Proposed Project Schedule, the owner adds a one-month programming effort and a one-week delay for each 100% design review.

Click on the month column in the schedule that will now achieve 50% construction documents. Assume each month is four weeks.

Correct answer:



CORRECT RESPONSE
August, Year 2
50% construction documents will now occur in August, Year 2.

CALCULATION
1. 4 weeks (for programming) + 1 week (for 100% SD review) + 1 week (for 100% DD review) = 6 weeks added to the schedule at 50% CDs, bringing the new midpoint to August, Year 2.

Section: Project Execution

Question 55

An architect is creating the workplan and schedule for a 3,200-square-foot tenant infill project. The project will have a documentation phase and a construction phase. The architect's fee is $20,000 and the project must be ready for permit in six weeks.

What schedule type should be used for this project?

A. Critical path method
B. Milestone chart
C. Fast-track schedule

Correct answer: B

CORRECT RESPONSE
Milestone chart
This method is used for short-duration projects with relatively few tasks and fees typically under $35,000.

Section: Project Work Planning

Question 56

A renovation project is under construction. According to the general contractor's schedule, the owner's hazardous materials remediation contractor is to remove a plaster ceiling that contains asbestos. The owner's contractor does not appear, delaying other construction work.

How should the general contractor respond?

A. Stop all work until the ceiling is removed.
B. Make a claim for delay and/or additional cost incurred as a result.
C. Hire another remediation contractor and submit a change order to cover the cost.

Correct answer: B

CORRECT RESPONSE
Make a claim for delay and/or additional cost incurred as a result.
The A201 agreement allows for a contractor to make a claim when a delay is caused by the owner or by the owner's consultants. The making of a claim is the appropriate response to a situation where a contractor hired by the owner, who reserves the right to hire that contractor, causes a delay to the project.

Section: Contracts

Question 57

	Original Material	Alternate
Cost:	$6 per sf	$13 per sf
Lead Time:	14 weeks	2 weeks

Refer to the exhibit.

During construction, the construction manager submits an alternate material for approval due to supply chain delays for 6,000 square feet of exterior wall finishes. The owner has asked the architect to determine the cost savings. Labor costs are $4,000 per week.

What are the cost savings of using the alternate?

$ _____

Correct answer: 6000

CORRECT RESPONSE
$6,000

CALCULATIONS
Original Material
1. $6 x 6,000 sf = $36,000
2. Cost due to lead time: 14 x $4,000 = $56,000
3. Total cost for original material: $36,000 + $56,000 = $92,000

Alternate 1
4. $13 x 6,000 sf = $78,000
5. Cost due to lead time: 2 x $4,000 = $8,000

6. Total cost for alternate 1: $78,000 + $8,000 = $86,000

Savings
7. $92,000 (original) - $86,000 (alternate) = $6,000 savings

Section: Project Execution

Question 58

An architect is responding to an RFP for a ground-up research laboratory located on a wetland site. The site includes new road access and must be designed to meet local codes and ordinances.

Which of the following subconsultants should the architect include on their project team? **Check the four that apply.**

A. Environmental engineer
B. MEP engineer
C. Construction manager
D. Civil engineer
E. Landscape architect
F. Site surveyor

Correct answer: ABDE

CORRECT RESPONSES

Environmental engineer
Because the project will be located in a wetland and will require expertise in evaluating and designing for this type of environment.

MEP engineer
Because a laboratory building will require specialty expertise in mechanical, electrical, and plumbing.

Civil engineer
Because the project is located in a wetland and will require expertise in how to bring road and infrastructure to the site.

Landscape architect
Because the site around the building must be landscaped to meet local codes and ordinances.

Section: Resource Management

Question 59

An architect is working on a project under an AIA B101 agreement. During the construction phase of the project, the architect notices that brick masons are performing their work in an unsafe manner.

How should the architect address this situation? **Check the two that apply.**

A. Deliver OSHA guidelines to subcontractor.
B. Inform the general contractor of the unsafe conditions.
C. Instruct subcontractor to stop work immediately.
D. Inform the building official of the unsafe conditions.
E. Document the situation in a field report.
F. Stop visiting the construction site until the safety issue is corrected.

Correct answer: BE

CORRECT RESPONSES

Inform the general contractor of the unsafe conditions.
The general contractor is responsible for job site safety. The architect should report their observations of the situation to the general contractor.

Document the situation in a field report.
The architect should use a field report to document their observations of the situation.

Section: Contracts

Question 60

An architect is designing a new apartment building. The owner has a separate contract with the structural engineer. After the 100% CD set is issued to the contractor for construction, the structural engineer increases the floor beam

size due to a miscalculation of the seismic load. As a result, the plumbing engineer needs to reroute the sanitary stack and the architect must redesign the bathroom layouts to accommodate a new chase.

What should the architect do first?

A. Incorporate the changes into the drawings and issue a revision to the contractor.
B. Revise the drawings and send an invoice to the structural engineer for additional design fee due to their errors.
C. Submit an additional service request to the owner for approval prior to incorporating changes into the drawings.

Correct answer: C

CORRECT RESPONSE
Submit an additional service request to the owner for approval prior to incorporating changes into the drawings.
The architect must request an additional service for approval by the owner before performing the work because the additional work is due to a performance error by the owner's consultant.

Section: Contracts

Question 61
An owner purchases a 45,000-square-foot, three-story hotel with the intention of converting it into an office building. The project will be complex and the owner's schedule is tight. The owner asks the architect for advice on project delivery.

Which delivery method should the architect recommend to the client?

A. Design-bid-build
B. Construction manager
C. Design-build

Correct answer: B

CORRECT RESPONSE
Construction manager
Based on the complexity and tight schedule that characterize this project, hiring a construction manager will best serve the owner.

Section: Project Work Planning

Question 62
The hotel renovation project had been approved under a conditional use approval process, but the program change alters the original review.

To which entity must the project be resubmitted?

A. Zoning commission
B. Zoning administrator
C. Plan commission
D. Plan administrator

Correct answer: C

CORRECT RESPONSE
Plan commission
Section 19.380 of the Zoning Excerpts describes the process of changing an approved plan. "If the proposed change would likely alter a finding, the proposal shall be submitted to the *plan commission* for review..."

CASE STUDY RESOURCES USED
Scenario
Zoning Excerpts

Section: Project Execution

Question 63
In response to the owner's decision to change the program, the project team holds a design review and assigns action items to members of the project team.

What should the HVAC and structural engineers be instructed to do?

A. Size and frame exhaust fan penetrations in exterior concrete walls.
B. Coordinate the floor opening size and locations for water lines.
C. Route ductwork through the ceiling space of the spa.
D. Locate and support a rooftop air handling unit.

Correct answer: D

CORRECT RESPONSE
Locate and support a rooftop air handling unit.
The structural engineer coordinates the loads of the rooftop unit that is designed by the HVAC engineer.

CASE STUDY RESOURCES USED
Scenario

Section: Project Work Planning

Question 64

During construction, the contractor sends the architect an RFI about the concrete mix specified for the balconies. The architect reviews the RFI and concludes that there is an error in the structural documents.

According to the C401, how should the architect address the error? **Check the two that apply.**

A. Forward the RFI to the structural engineer for review.
B. Instruct the contractor to use a modified concrete mix on the balconies.
C. Direct the structural engineer to modify the concrete specification for the balconies.
D. Draft an RFI response that incorporates the structural engineer's recommendations.
E. Seek approval from the owner to modify the concrete specification for the balconies.
F. Request that the contractor send the RFI to the owner for review with the owner's consultants.

Correct answer: AD

CORRECT RESPONSES
Forward the RFI to the structural engineer for review.
The architect must confer with the consultant prior to interpreting or clarifying documents prepared by the consultant.

Draft an RFI response that incorporates the structural engineer's recommendations.
The architect drafts the RFI response and incorporates the documents prepared by the consultant.

CASE STUDY RESOURCES USED
Scenario
AIA Document C401-2017

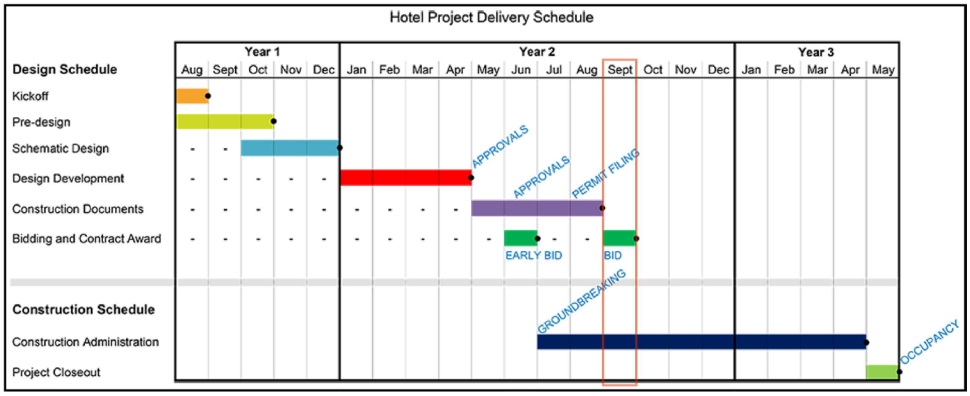
Section: Contracts

Question 65

The client's decision to change the program will extend construction document hours by 16%. The client has requested to delay the early bid period by two months in order to continue the demolition of existing interior finishes in the hotel. The construction administration phase can only begin once the demolition subcontractor is selected.

Click on the month column in the schedule to indicate the month when groundbreaking will begin.

Correct answer:



CORRECT RESPONSE
September, Year 2
The early bid period originally was scheduled for June, Year 2. The delay of two months to the early bid period - the months of June and July - means that the new early bid period will be August, Year 2. Groundbreaking cannot start until after the early bid period.

CASE STUDY RESOURCES USED
Scenario
Project Schedule

Section: Project Work Planning

Question 66

The architect is calculating the impact of the client's changes to the program on the DD and CD phases of the work plan. The project manager estimates that 15% more hours will be needed to complete the client's program changes. The average fee rate is $120 per hour.

What is the additional total contract fee?

A. $27,000
B. $27,846
C. $25,704

Correct answer: A

CORRECT RESPONSE
$27,000

CALCULATIONS
1. Calculate the original hours for DD and CD: 700 hours (for design development) + 800 hours (for construction documents) = 1,500 hours
2. Calculate the increase in hours: 1,500 hours x 15% (number of extra hours needed to complete the modified program) = 225 hours
3. Calculate the additional contract fee: 225 hours x $120/hr = $27,000

CASE SUDY RESOURCES USED
Scenario
Cost and Budget

Section: Project Work Planning

Question 67

The architect has just completed 60% of the construction documents when the owner decides to proceed with the revised building program. The architect needs to evaluate the effects of the changes on the project and communicate them to the owner.

How should the architect respond to the changes in the program? **Check the three that apply.**

A. Prepare an additional services proposal for the revised design.
B. Review an updated estimate of construction costs with the owner.
C. Provide an addendum to the documents in order to clarify the changes for the contractor.
D. Notify the local building code official of the revised program and the change in occupancy.
E. Resubmit the design development documents to the owner for review of the revised program.
F. Establish a revised construction start date and determine its impact on the substantial completion date.

Correct answer: ABF

CORRECT RESPONSES
Prepare an additional services proposal for the revised design.
B101-2017 Article 4.2, any necessary services that arise from a change made by the owner qualify as an additional service.

Review an updated estimate of construction costs with the owner.
B101-2017 Article 3.4.4, the architect is to provide an updated cost estimate during the CD phase.

Establish a revised construction start date and determine its impact on the substantial completion date.
B101-2017 Article 1.4 records the construction start and substantial completion dates and any changes to those dates must be agreed to by both the architect and the owner.

CASE STUDY RESOURCES USED
Scenario
AIA Document B101-2017

Section: Contracts

Question 68

Which aspects of the probable cost estimate will need to be revised due to the client's decision to change the program?

A. Plumbing, Exterior Wall, Fire Protection, Vertical Transportation
B. Plumbing, Exterior Wall, Fire Protection, Electrical & Technology, HVAC
C. Plumbing, Exterior Wall, Demolition, Electrical & Technology

Correct answer: B

CORRECT RESPONSE
Plumbing, Exterior Wall, Fire Protection, Electrical & Technology, HVAC
The probable cost for plumbing, exterior walls, fire protection, electrical technology, and HVAC will all need to be revised because of the increased footprint that will result from the transition from individual hotel bays into new hotel suites.

CASE STUDY RESOURCES USED
Scenario
Cost and Budget

Section: Project Execution

Question 69

The facade signs on the prototype design of the ice cream store face a residential district. This triggers a public meeting for a neighborhood review and approval of the signage. The architect will need to spend a significant amount of time and money to prepare a detailed presentation for the meeting.

According to the B101 agreement, which one of the following must the architect do first to receive additional compensation?

A. Send an itemized bill for the additional services.
B. Notify the owner of the additional expense.
C. Receive written authorization from the owner.

Correct answer: B

CORRECT RESPONSE
Notify the owner of the additional expense.
According to AIA B101-2017 4.2.1, the architect must first notify the owner that additional services will be required.

CASE STUDY RESOURCES USED
Scenario
AIA Document B101-2017

Section: Project Work Planning

Question 70

The owner learns that the survey drawing provided to the architect contains an incorrectly rendered property line. The owner directs their surveyor to revise the drawing to reflect the correct site boundaries, but the corrected survey reveals problems with the permitted building location.

What are the owner's responsibilities as a result of this error? **Check the four that apply.**

A. Provide a revised survey to the architect.
B. Send a written notice of the survey error to the architect.
C. Coordinate the services of the surveyor with the services of the architect.
D. File the revised survey to the planning and zoning commission for approval.
E. Approve any additional service requests sent by the architect for design revisions.
F. Direct the architect to file the revised survey to the planning and zoning commission for approval.

Correct answer: ABCE

CORRECT RESPONSES
Provide a revised survey to the architect.
B101-2017 Article 5.4, the owner is to provide the survey to the architect. This includes the original survey and any revisions of the survey.

Send a written notice of the survey error to the architect.
B101-2017 Article 5.11, the owner is to provide prompt written notice of any errors to the architect.

Coordinate the services of the surveyor with the services of the architect.
B101-2017 Article 5.8, the owner must coordinate the services of their consultants with the services provided by the architect.

Approve any additional service requests sent by the architect for design revisions.
B101-2017 Article 4.2, the architect is entitled to submit this type of change as additional service.

CASE STUDY RESOURCES USED
Scenario
AIA Document B101-2017

Section: Contracts

Question 71

An architect is reviewing the ice cream store elevations as part of a quality control review and finds that a cupola was added during the final stages of design. The cupola is 40% taller than zoning allows, and the architect questions if the AHJ will allow this architectural feature.

What should the architect do to obtain AHJ approval for this design?

A. Request a special permit from the Zoning Board of Appeals.
B. Request approval from the City Environmental Review Board.
C. Provide elevations that show that the cupola height is 40% taller than the allowable height.
D. Provide elevations that show the average height across the entire facade meets the allowable height.

Correct answer: C

CORRECT RESPONSE
Provide elevations that show that the cupola height is 40% taller than the allowable height.
According to Zoning Ordinance 1260.5, cupolas and other appurtenances are allowed to be up to 50% taller than the allowable height.

CASE STUDY RESOURCES
Scenario
Zoning Ordinance

Section: Project Quality Control

Question 72

The ice cream chain plans to use Lot 3 for the proposed development. Due to site constraints, the civil engineer decides to place the building six feet from the west property line. After reading the requirements in Chapter 1260 of the Zoning Ordinance, though, the architect is reevaluating this decision.

Why should the architect inform the civil engineer to reevaluate placing the building in that location?

A. The exterior wall must have a fire rating.
B. The building must have parking on all sides.
C. The side yard must allow rear yard access to the fire department.
D. The side yard must be large enough for a mechanical enclosure.

Correct answer: C

CORRECT RESPONSE
The side yard must allow rear yard access to the fire department.
Section 1260.5 indicates that the side yard for any property in a commercial district must maintain eight feet to permit fire-fighting equipment to reach the rear yard.

CASE STUDY RESOURCES USED
Scenario
Zoning Ordinance
Land Survey

Section: Project Execution

Question 73

The owner and the contractor are in a dispute regarding the signage, leading the owner to issue a claim against the contractor.

Which party is responsible for rendering an initial decision on the claim?

A. Sign subcontractor
B. Arbitrator
C. Architect
D. AHJ

Correct answer: C

CORRECT RESPONSE
Architect
According to AIA Document B101-2017 Article 3.6.2.5, it is the responsibility of the architect to render an initial decision in a dispute between the owner and contractor.

CASE STUDY RESOURCES USED
Scenario
AIA Document B101-2017

Section: Contracts

Question 74

The ice cream chain directs franchisees to add ice cream trucks to their business plan. With a large area of the site available for construction, the owner directs the architect to provide a fee for the design of the largest storage and maintenance garage that can be accommodated on the site. The architecture firm calculates their standard fee for a garage at $5.00 per square foot.

What is the firm's total fee for the garage?

$ _____

Correct answer: 22750

CORRECT RESPONSE
$22,750

CALCULATIONS
1. For the maximum square footage of the garage: 13,000 sf (square footage of the principal structure) x .35 (percentage for accessory structures) = 4,550 sf
2. For the firm's fee for the garage: 4,550 sf (allowable square footage of the garage) x $5.00 (firm's fee per square foot) = $22,750

CASE STUDY RESOURCES USED
Scenario
Zoning Ordinance

Section: Project Execution

Question 75

Proposed Submittals	
Spec No	**Description**
030000	Concrete
032000	Concrete Reinforcing
040000	Masonry
052000	Metal Joists
054000	Cold-Formed Metal Framing
061000	Rough Carpentry
061000	Finish Carpentry
066000	Plastic Fabrications
068000	Composite Fabrications
071000	Waterproofing
072400	Exterior Insulation and Finish System
072500	Weather Barriers
075000	Membrane Roofing

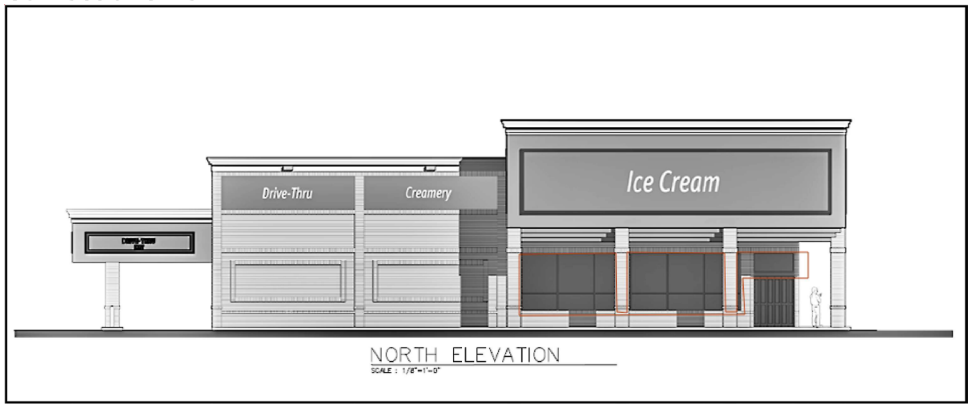
076000	Flashing and Sheet Metal
081000	Doors and Frames
087000	Hardware
092000	Gyspum Board
095000	Ceilings
096000	Floorings
097000	Wall Finishes
099000	Painting
101400	Signage
112000	Commercial Equipment
114000	Foodservice Equipment
125000	Furniture
129300	Site Furnishings

Refer to the exhibit.

The architect is reviewing the Proposed Submittals list provided by the contractor.

Click on the exterior material in the North Elevation that is missing from the Proposed Submittals list.

Correct answer:



CORRECT RESPONSE
Storefront glazing
Storefront glazing is not included in the submittal list.

CASE STUDY RESOURCES USED
Scenario
Prototype Elevations

Section: Project Execution

Testing Resources
For more information on test preparation references and resources, as well as testing policies and procedures, please refer to the ARE 5.0 Guidelines, available on ncarb.org.