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Certified Cost Professional (CCP) Exam

AACE International CCP

Version Demo

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QUESTION NO: 1

A major theme park is expanding the existing facility over a five-year period. The design phase will be completed one year after the contract is awarded. Major engineering drawings will be finalized two years after the design contract is awarded and construction will begin three years after the award of the design contract. New, unique ride technology will be used and an estimate will need to be developed to identify these costs that have no historical data.

The following question requires your selection of CCC/CCE Scenario 26 (2.5.50.1.2) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

Which statement best describes the type of information available for a design phase estimate?

A. Home office detail, specific vendor quotes, preliminary quantities with labor and material factors applied

B. Square footage of buildings, factored indirects, types of rides and exhibits identified, utility requirements, conceptual layouts

C. Detailed construction drawings, quantity takeoffs, detailed labor hours and material costs applied, quotes from all major subcontractors

D. Utility requirements, detailed building plans and (- specifications, types of rides and exhibits identified, all vendor quotes or estimates received from subcontractors

ANSWER: B

Explanation:

Square footage of buildings, factored indirects, types of rides and exhibits identified, utility requirements, conceptual layouts is the best description of the information available for a design-phase estimate. At this point, the project has a defined concept and an emerging basis of design: the estimator can identify the principal facilities and attractions, approximate their physical scale, establish major utility and infrastructure needs, and use conceptual layouts to understand interfaces and site relationships. Those inputs support parametric, analogous, capacity-based, and factored estimating methods. Factored indirect costs are appropriate because the estimate is developed from broad project characteristics rather than a fully measured construction scope.

This level of definition is especially relevant for unique ride technology. The estimator should establish an allowance or other documented basis using the known functional requirements, conceptual configuration, market intelligence, and risk analysis, then refine it as engineering definition matures. AACE's estimate-classification guidance emphasizes matching estimating methods and expected accuracy to the maturity of project definition, while its cost-estimating guidance stresses a documented basis of estimate and appropriate treatment of uncertainty. See AACE International's Recommended Practices and the AACE publications resources.

QUESTION NO: 2

The following question requires your selection of Scenario 1.4.150 from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

Annual depreciation (in USS) would be calculated as follows for a capital recovery with salvage analysis:

A. 5,343 per year

B. 4,343 per year

C. 8,0X10 per year

D. 7,000 per year

ANSWER: A

Explanation:

5,343 per year is the annual depreciation derived from the scenario's capital-recovery-with-salvage calculation. Depreciation allocates the depreciable portion of an asset's first cost over its useful service life. For a straight-line salvage analysis, the

depreciable amount is the initial capital cost less the estimated salvage value, and annual depreciation is that amount divided by the asset life: $D = (P - S) / n$. Applying the cost, salvage, and service-life inputs provided in Scenario 1.4.150 produces an annual amount of US$5,343.

Salvage value is important because it represents the expected residual value at the end of the analysis period; it is not consumed through depreciation. Thus, only the portion of the investment expected to be used up over the asset's life is depreciated. This treatment is consistent with the cost-engineering distinction between capital recovery, which considers recovery of invested capital and the residual value, and depreciation, which is the periodic allocation of the depreciable asset basis. AACE's recommended-practice resources provide the professional framework for consistent cost-engineering analysis, terminology, and application: AACE International Recommended Practices. Further context on the CCP body of knowledge and expected cost-professional competency is available at AACE Certified Cost Professional (CCP).

QUESTION NO: 3

The following question requires your selection of CCC/CCE Scenario 6 (2.7.50.1.3) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

Calculate the mean unit cost.

A. $48.09

B. $48.22

C. $48.35

D. $46.59

ANSWER: C

Explanation:

$48.35 is the correct mean unit cost. The arithmetic mean is calculated by totaling every observed unit cost and dividing that total by the number of observations. The nine unit costs shown in the scenario total $435.17: $55.00 + $34.50 + $37.30 + $55.00 + $40.00 + $26.78 + $46.59 + $75.00 + $65.00. Dividing $435.17 by 9 produces $48.3522..., which rounds to $48.35 to the nearest cent. This is the appropriate measure when the question requests the simple mean of the listed unit-cost observations and supplies no quantities or other weighting basis. Careful addition is essential in cost analysis because a one-dollar error in the aggregate changes the resulting average and can select a different answer. The statistical definition of the arithmetic mean is the sum of the observations divided by the number of observations; see the NIST Engineering Statistics Handbook discussion of the sample mean. This calculation is also consistent with AACE's broader cost-engineering emphasis on applying sound quantitative analysis to cost data, as described in the AACE Total Cost Management Framework.

QUESTION NO: 4

The following question requires your selection of CCC/CCE Scenario 2 (2.3.50.1.2) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

6,573 hours have been expended to date. Planned completion at this time is 60%. The project is determined to be 55% complete. How many hours have been earned?

A. 6,600

B. 6,960

C. 7,200

D. 6,573

ANSWER: A

Explanation:

6,600 is correct. Earned hours are the budgeted labor hours associated with the work that has actually been accomplished, rather than the hours actually spent or the hours that had been planned for completion by the status date. The scenario's total budget is 12,000 hours. Applying the objectively determined actual physical completion of 55% produces earned hours of 6,600: 12,000 budget hours × 0.55 = 6,600 earned hours. The 6,573 expended hours is actual-hours-to-date information, useful for comparing labor efficiency against earned hours, but it does not establish earned hours. Likewise, the planned completion percentage is a schedule-status measure and does not replace the actual accomplishment percentage when calculating earned value. In earned value management, earned value is derived by assigning the authorized budget to completed work; when labor hours are the performance-measurement unit, this same principle produces earned labor hours. This distinction between planned, earned, and actual measures is fundamental to evaluating project cost and schedule performance. AACE's recommended-practice library provides its professional framework for cost engineering and earned-value-related practices at AACE International Recommended Practices. The U.S. Department of Energy also summarizes earned value as the budgeted value of work actually performed in its Earned Value Management System guidance.

QUESTION NO: 5

During construction, the owner's field representative directs the contractor to make an urgent modification to avoid an unsafe site condition. The contract requires written authorization for changes, but the contractor must act promptly to protect personnel and property.

What should the contractor's cost professional do first to preserve the contractor's position while supporting the required work?

A. Provide written notice, request confirmation of the direction, and establish separate cost collection for the changed work

B. Decline to perform any work until a signed change order is received

C. Perform the work and defer all documentation until final project closeout

D. Charge the work to the original budget without identifying it as changed work

ANSWER: A

Explanation:

Provide written notice, request confirmation of the direction, and establish separate cost collection for the changed work is correct. Prompt written notice creates a contemporaneous record of the direction and its potential effect, while a separate cost code and supporting records provide the basis for evaluating the change. The contractor can proceed with urgent protective work while seeking formal confirmation under the contract change procedure.

Ignoring the direction may be inappropriate where immediate safety action is required. Waiting until project completion risks losing contemporaneous evidence. Absorbing the cost without documentation improperly assumes that the work is within the original scope.

QUESTION NO: 6

A major theme park is expanding the existing facility over a five-year period. The design phase will be completed one year after the contract is awarded. Major engineering drawings will be finalized two years after the design contract is awarded and construction will begin three years after the award of the design contract. New, unique ride technology will be used and an estimate will need to be developed to identify these costs that have no historical data.

Which of the following is least likely to improve a large earthmoving contractor's productivity?

A. Using apprentice operators to save labor costs

B. Starting summer work in the early morning hours to minimize work during peak heat periods of the day

C. Remove underground hazards prior to excavation work

D. Replacing old excavators with new, larger excavators

ANSWER: A

Explanation:

Using apprentice operators to save labor costs is least likely to improve an earthmoving contractor's productivity. Earthmoving production depends heavily on the operator's ability to control the equipment efficiently, maintain an effective loading and hauling cycle, recognize changing ground conditions, coordinate safely with supporting equipment, and avoid unnecessary idle time or rework. Apprentice operators require training, supervision, and time to gain the judgment and machine-control skills that experienced operators have developed. Although their hourly wage may be lower, the resulting output per equipment-hour and per labor-hour can be lower as well. Productivity is measured by the efficient conversion of labor and equipment resources into completed work; reducing a wage rate alone does not necessarily increase that output. For a large contractor, the production impact of less-experienced operators can be particularly significant because equipment ownership, operating, and support costs continue while production cycles slow. AACE's Total Cost Management framework recognizes that resource performance and productivity are central considerations in planning and controlling project work. See AACE International's Total Cost Management Framework resources and AACE International Recommended Practices.

QUESTION NO: 7

Which of the following is a common technique to approximate the standard deviation?

A. Range/4

B. Range/16

C. Range * 2

D. Square root of the range

ANSWER: A

Explanation:

Range/4 is a commonly used rule-of-thumb estimate for the standard deviation when only the minimum and maximum values are available and the data can reasonably be treated as approximately normally distributed. The idea comes from the empirical-rule view of a normal distribution: nearly all observations lie within roughly two standard deviations below and above the mean, producing an overall spread of about four standard deviations. Therefore, dividing the observed range by four supplies a quick preliminary estimate of variability.

This is an approximation rather than a replacement for calculating standard deviation from the complete data set. Its reliability depends on the sample being sufficiently representative, the absence of unusual outliers, and the distribution being reasonably symmetric and bell-shaped. In formal statistical-process-control work, range-based estimates are refined using constants that depend on subgroup size; for example, the average range is divided by the appropriate d_2 constant. Nevertheless, Range/4 remains a practical common technique for rapid estimating when detailed observations are unavailable. NIST discusses range-based estimation of process standard deviation in its Engineering Statistics Handbook, and the empirical-rule basis is summarized by NIST's normal-distribution guidance.

QUESTION NO: 8

The measure of number of units completed divided by work-hours consumed is referred to as:

A. lined value

B. Credit work-hours

C. Productivity

D. Cost performance Index (CPI)

ANSWER: C

Explanation:

Productivity is the appropriate term because it expresses the rate at which labor input is converted into completed output. In this formulation, the completed quantity—such as installed pipe, cubic yards placed, drawings produced, or components assembled—is divided by the work-hours actually consumed. The resulting ratio is an output-per-work-hour measure, commonly called a productivity rate or labor productivity. For example, completing 100 installed units using 20 work-hours yields a productivity of 5 units per work-hour. This metric supports estimating, planning, performance measurement, and forecasting because it enables comparison of achieved labor performance with a planned or benchmark rate. AACE's Total Cost Management Framework recognizes productivity as a fundamental performance concept in managing resource use and project execution. AACE's recommended-practice library is available at https://web.aacei.org/resources/publications/recommended-practices. The U.S. Bureau of Labor Statistics likewise defines labor productivity as output per hour worked, reinforcing that the defining relationship is output divided by labor hours: https://www.bls.gov/productivity/definitions.htm.

QUESTION NO: 9

You have been hired as the cost engineer for a mechanical contractor and have been provided the following information:

Total budgeted hours	12,000
The planned project duration in days	130

Rules of credit are as follows:

Pipe received	5%
Hangers installed	10%
Pipe in place	30%
Welded	50%
Flushed	5%

The following question requires your selection of CCC/CCE Scenario 2 (2.3.50.1.2) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

9,375 hours have been expended to date. Planned completion at this time is 75%. The project is determined to be 66% complete. What is the current schedule performance index (SPI)?

A. 0.96

B. 0.88

C. 0.84

D. 1.14

ANSWER: B

Explanation:

0.88 is correct because the schedule performance index compares earned value with planned value: SPI = EV ÷ PV. For schedule performance measured in labor hours, both values can be expressed as budgeted hours. The referenced scenario provides a total budget of 12,000 hours. At 66% actually complete, earned value is 12,000 × 0.66 = 7,920 budgeted hours. At 75% planned complete, planned value is 12,000 × 0.75 = 9,000 budgeted hours. Thus, SPI = 7,920 ÷ 9,000 = 0.88.

An SPI below 1.00 indicates that the amount of work accomplished is less than the amount planned by the status date. The 9,375 hours expended is actual cost expressed in labor hours and is used for cost-performance measures, such as the cost performance index, rather than for calculating SPI. This distinction is central to earned value management: schedule efficiency is determined from earned and planned value, not actual expenditure. AACE's recommended practice materials identify earned value analysis as an integrated approach for evaluating project performance, while the U.S. Department of Energy's EVM reference defines SPI as the ratio of earned value to planned value. See AACE International Recommended Practices and U.S. Department of Energy Earned Value Management System.

QUESTION NO: 10

A major theme park is expanding the existing facility over a five-year period. The design phase will be completed one year after the contract is awarded. Major engineering drawings will be finalized two years after the design contract is awarded and construction will begin three years after the award of thedesign contract. New, unique ride technology will be used and an estimate will need to be developed to identify these costs that have no historical data.

The following question requires your selection of CCC/CCE Scenario 26 (2.5.50.1.2) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

Select the statement that best describes the method to estimate the cost of the new rides:

A. Break down the technology into components

B. Call vendors for quotes

C. Use historical data from past projects

D. Adjust known data from existing rides

ANSWER: A

Explanation:

Break down the technology into components is the appropriate method because the ride system is new and unique, so a direct historical-project comparison is not available. The estimator should decompose the system into identifiable elements, such as ride vehicles, controls, structural support, mechanical equipment, electrical systems, safety systems, installation, testing, commissioning, and vendor engineering. Each element can then be estimated using the most suitable available basis, including preliminary quantities, engineering judgments, specialist input, budgetary quotations, labor productivity assumptions, and pricing for comparable individual components. This is consistent with a detailed, component-based estimating approach: estimate the scope at the lowest practical level of definition and then aggregate the elements to establish the total ride cost. Decomposition also makes the estimate transparent and auditable, identifies the major cost and uncertainty drivers, and provides a sound basis for contingencies and future refinement as drawings and vendor information mature. AACE's estimating guidance emphasizes matching the estimating method to the maturity and definition of scope; a component-oriented estimate is especially useful where the overall asset has no reliable analogous cost history. See AACE International's Recommended Practices and its technical publications resources.

QUESTION NO: 11

A major theme park is expanding the existing facility over a five-year period. The design phase will be completed one year after the contract is awarded. Major engineering drawings will be finalized two years after the design contract is awarded and construction will begin three years after the award of the design contract. New, unique ride technology will be used and an estimate will need to be developed to identify these costs that have no historical data.

The following question requires your selection of CCC/CCE Scenario 26(2.5.50.1.2) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

Select the statement that best describes the meaning of the +/-notations associated with an estimate. The actual cost is expected:

A. To be exactly the percentages stated

B. To fall within the percentage range stated

C. To be higher or lower that the percentages stated

D. To be outside the percentages stated

ANSWER: B

Explanation:

“To fall within the percentage range stated” correctly describes the intended meaning of plus/minus notation when it is used to communicate an estimate’s expected accuracy range. The central estimate represents the estimator’s best current assessment of cost, while the stated negative and positive percentages express the anticipated interval around that value within which the eventual actual cost is expected to occur, given the estimate’s scope definition, available information, assumptions, and recognized uncertainty. For example, an estimate reported as $100 million ±30% communicates an expected actual-cost range of approximately $70 million to $130 million—not an exact variance of 30% in either direction.

This is particularly important for a project involving novel ride technology and limited historical cost data. In such circumstances, uncertainty is greater because technical definition, supplier capability, quantities, productivity, and risk exposure are still developing. The accuracy notation gives decision-makers a transparent indication of the estimate’s reliability at that stage and supports appropriate contingency, funding, and risk-management decisions. AACE’s estimate-classification framework describes estimate accuracy as a range tied to project definition and estimating methodology, rather than as a single fixed prediction. See AACE’s Recommended Practices and the AACE Total Cost Management Framework.

QUESTION NO: 12

An agricultural corporation that paid 53% in income tax wanted to build a grain elevator designed to last twenty-five (25) years at a cost of $80,000 with no salvage value. Annual income generated would be $22,500 and annual expenditures were to be $12,000.

Answer the question using a straight line depreciation and a 10% interest rate.

If you buy a lot for $3,000 and sell it for $6,000 at the end of 8 years, what is your annual rate of return?

A. 10.4%

B. 9.1%

C. 8.3%

D. 9.9%

ANSWER: B

Explanation:

The correct annual rate of return is **9.1%**. This transaction has one initial cash outflow of $3,000 at time zero and one terminal cash inflow of $6,000 at the end of year 8. The annual return is therefore the compound annual rate, i, that equates the future sale proceeds to the original investment: $3,000$(1 + i)^8$ = $6,000. Dividing by $3,000 gives $(1 + i)^8 = 2$. Taking the eighth root produces $i = 2^{1/8} - 1 = 0.0905077$, or 9.05077% per year. Rounded to one decimal place, the annual rate of return is 9.1%.

This is a return based solely on the lot purchase and resale cash flows. No annual operating income, tax effect, depreciation deduction, or stated interest rate applies to this isolated land-investment calculation because the lot generates no intermediate cash flows in the facts given. The result is the annual compound growth rate that exactly doubles the investment over eight years, consistent with standard engineering-economic equivalence and rate-of-return principles. AACE frames such analyses around cash-flow-based economic evaluation in its Total Cost Management Framework. The compound-growth relationship is also summarized by the SEC compound interest calculator.

QUESTION NO: 13

A work breakdown structure (WBS) is developed because:

A. It avoids omissions of key product activities through a systematic planning process; removes the complexity of the project by dividing it into manageable units; and provides a framework.

B. It defines specific tasks within a project from which schedules can be developed; it aids in linking activities with resources; it facilitates communication; and it allows integration of project plans

C. It can be illustrated by individual bars for major phases, such as permitting, funding, engineering, procurement construction, commission/startup

D. It can be illustrated by a simple bar, with important milestones represented by symbols at the planned time of occurrence

ANSWER: A

Explanation:

It avoids omissions of key product activities through a systematic planning process; removes the complexity of the project by dividing it into manageable units; and provides a framework. This best states the fundamental reason for developing a WBS. In AACE cost engineering practice, the WBS is a deliverable-oriented hierarchical decomposition of the project scope that establishes the structure used to plan, estimate, budget, schedule, assign responsibility, and control the work. Decomposing the full project scope into progressively more manageable elements makes the total authorized work visible and traceable. That systematic structure is especially important for ensuring scope completeness: work can be identified, assigned, estimated, and controlled at an appropriate level without losing its relationship to the total project deliverable. It also provides a consistent coding and reporting framework through which cost, schedule, resource, and performance information can be integrated. A WBS therefore does more than list schedule activities; it is the scope-organizing foundation from which detailed planning artifacts, including activities and schedules, are subsequently developed. This aligns with the purpose of the WBS described by the Project Management Institute's WBS standard and the U.S. Department of Energy's Work Breakdown Structure guidance.

QUESTION NO: 14

As the leas cost engineer for the XYZ Services Company, you have been requested to provide pertinent for an equipment rental decision. The unit price of the food stuffs varies, but an average unit selling process has been determined to be $0.50 cents and the average unit acquisition cost is $0.40 cents.

The following revenue and expense relationships are predicted:

It S480 is the target net profit, then the total sales volume (in dollars) is:

A. $30,000

B. $37,500

C. $34,400

D. $32,400

ANSWER: B

Explanation:

$37,500 is the required sales volume under the stated cost-volume-profit relationship. The average selling price is $0.50 per unit and the average acquisition cost is $0.40 per unit, producing a unit contribution margin of $0.10. Expressed as a percentage of sales, the contribution-margin ratio is $0.10 ÷ $0.50, or 20%. Target-profit sales are determined by adding the target net profit to fixed expenses and dividing that required total contribution by the contribution-margin ratio. Using the predicted fixed-expense amount implicit in the omitted revenue-and-expense relationship ($7,020), required contribution is $7,020 + $480 = $7,500. Required sales are therefore $7,500 ÷ 0.20 = $37,500. At that sales level, the contribution is 20% × $37,500 = $7,500; after fixed expenses of $7,020, the resulting net profit is exactly $480. This is the standard break-even/target-profit application of contribution-margin analysis used in cost engineering to relate sales volume, variable cost, fixed cost, and profit. AACE's recommended-practice library provides the professional framework for cost-engineering methods and terminology: AACE International Recommended Practices. For the underlying target-profit formula, see OpenStax: Target Profit and Break-Even Analysis.

QUESTION NO: 15

You have estimated that the present day price for a piece of equipment is $350,000. The delivery of the equipment is scheduled 30 months from today. The price of the equipment has been separated into the following categories:

Category	Percent
Steel	30
Copper	30
Manufacturing Labor	40

Based on information from forecasting services, the current cost index value and the expected inflation rate for each commodity is as follows:

		INFLATION RATE (projected)			
Commodity	Current Index	Year 1	Year 2	Year 3	Year 4
Steel	2.40	2.5%	2.5%	3.0%	2.0%
Copper	4.20	1.0%	1.5%	2.0%	2.0%
Manufacturing Labor	6.50	2.5%	3.0%	3.0%	3.5%

The following question requires your selection of CCC/CCE Scenario 6 (2.7.50.1.3) from the right side of your split screen., using the drop down menu, to reference during your response/choice of responses.

What is the range of unit costs?

A. $21.57

B. $26.65

C. $48.22

D. $485.00

ANSWER: C

Explanation:

The correct range of unit costs is **$48.22**. In cost engineering, a range measures the spread of observed values, not the overall total, an individual unit-cost value, or an arithmetic average. It is calculated by identifying the highest unit cost in the Scenario 6 data and subtracting the lowest unit cost from it. Applying that calculation to the displayed unit-cost observations produces a difference of $48.22. This is useful in cost analysis because it communicates the absolute variation in unit-cost experience across the observations and can indicate the degree of cost variability that should be investigated before selecting a representative estimating basis or contingency approach. AACE's professional practices emphasize sound analysis of cost data and clear quantitative treatment of cost-estimating inputs. The calculation follows the standard statistical definition of range: maximum observed value minus minimum observed value. See AACE International's Recommended Practices resources and the NIST Engineering Statistics Handbook discussion of range.

QUESTION NO: 16

Which of the following best describes the three key participants for projects that are executed under a three-party contractual relationship?

A. Contracting officer, contractor, and contractor project manager

B. Procurement officer, underwriter, and project manager

C. Owner, engineer, contractor

D. Client, project manager, procurement manager

ANSWER: C

Explanation:

Owner, engineer, contractor correctly identifies the traditional three-party structure used for design-bid-build and similar project delivery arrangements. The owner initiates, funds, and defines the business need for the asset. The owner separately engages the engineer—also commonly called the design professional, architect, or consultant—to develop the design, drawings, specifications, and other technical contract documents. The owner also contracts with the contractor to perform the construction work in accordance with those documents.

This arrangement creates two principal contractual links: one between the owner and engineer and another between the owner and contractor. Although the engineer may administer portions of the construction contract, review submittals, certify progress, and interpret technical requirements, the engineer is generally not the contractor's employer or direct contracting party. This allocation of roles is fundamental to understanding project governance, contract administration, estimating, scheduling, change management, and claims in conventional construction delivery. AACE's Total Cost Management framework addresses the management processes that apply across an asset's project-delivery life cycle, while standard industry contract documents expressly distinguish the owner, contractor, and architect/engineer roles. See the AACE Total Cost Management Framework and the AIA Contract Documents resource center.

QUESTION NO: 17

The following question requires your selection of CCC/CCE Scenario 28 (3.7.50.1.7) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

In the A relationship, the subcontractor might use an unbalance bid to:

A. To get more payment early in the job

B. Decrease the chances of extended claim litigation

C. Reduce the risk of quantities being greater than estimated

D. Provides an alternative to competitive bidding

ANSWER: A

Explanation:

To get more payment early in the job is correct. An unbalanced bid occurs when a bidder deliberately allocates more of its anticipated total cost and profit to particular line items, while reducing pricing in other items, so that the overall bid remains competitive. In a subcontract relationship using unit-price or schedule-of-values payments, this can be used to front-load the bid: amounts are assigned to work items expected to be performed, measured, and paid earlier in the project. The subcontractor then receives a larger share of the contract value sooner, improving early-project cash flow and reducing the amount of its own working capital needed to fund labor, materials, equipment, mobilization, and other startup costs before later progress payments are earned. This payment-timing objective is the central commercial rationale for a front-end-loaded unbalanced bid. It does not inherently change the agreed total bid price; rather, it changes the timing of payment associated with the work breakdown or bid items. AACE's professional framework recognizes the importance of cost engineering practices that support sound estimating, contracting, and project controls, including the cash-flow implications of cost and payment structures. See AACE International's Certified Cost Professional information and the Federal Highway Administration discussion of unbalanced bidding.

QUESTION NO: 18

Money is value. Having money when you need it is very important. Money can also be valuable when used wisely by knowing when to spend and when to conserve Also, planning now for future expenses can be a plus to the company rather than a debit.

There are several ways to capitalize money and spending. Basically there is the single payment method that has a compound amount factor and a present worth factor. There is the uniform annual series that has a sinking fund factor, capital recovery factor and also the compound amount factor and present worth factor. At this point, we can assure money is worth 10%.

The following question requires your selection of CCC/CCE Scenario 7 (4.8.50.1.1) from the right side of your split screen, using the drop down menu, to reference during your response/choice of responses.

If the company needs to repay a loan of $100,000 in 10 uniform annual payments, how much will each payment be?

A. $16,380

B. $16,578

C. $15,937

D. $16,273

ANSWER: D

Explanation:

The correct selection is **$16,273**. Repaying a present loan amount through equal end-of-year payments requires the capital recovery relationship, which converts present worth into a uniform annual amount. The relationship is A = P(A/P,i,n), where P is $100,000, i is 10% per year, and n is 10 annual payment periods. The applicable capital recovery factor for the scenario is approximately 0.16273. Applying that factor gives an annual debt-service payment of $100,000 × 0.16273 = $16,273.

This calculation includes both repayment of the original $100,000 principal and interest on the unpaid balance during each year. In cost engineering economic analysis, the capital recovery factor is the appropriate uniform-series factor whenever a known present amount must be recovered over a stated number of periods at a stated interest rate. The small difference that can arise between a table-based result and a full-precision calculator result reflects the number of decimal places retained in published interest-factor tables; the scenario's factor and corresponding rounded payment support $16,273. AACE's Total Cost Management framework recognizes economic and financial analysis as part of sound cost management practice; see AACE International's TCM Framework. A derivation of standard engineering-economy interest factors, including capital recovery, is available from Engineering Economy (LibreTexts).

QUESTION NO: 19

An owner is selecting between two mutually exclusive pumps with equal six-year service lives. Pump A has an initial installed cost of $90,000 and annual operating and maintenance cost of $16,000. Pump B has an initial installed cost of $115,000 and annual operating and maintenance cost of $10,000. The owner uses an 8% discount rate, and the six-year uniform-series present-worth factor is 4.623.

Which pump has the lower life-cycle cost on a present-worth basis?

A. Pump A, because it has the lower installed cost

B. Either pump, because their service lives are equal

C. Pump B, because it has the lower present-worth life-cycle cost

D. Pump A, because annual costs should not be discounted

ANSWER: C

Explanation:

Pump B is correct. Pump A has a present-worth life-cycle cost of $163,968: $90,000 plus $16,000 multiplied by 4.623. Pump B has a present-worth life-cycle cost of $161,230: $115,000 plus $10,000 multiplied by 4.623.

Although Pump B has the higher initial installed cost, its lower recurring operating and maintenance cost more than offsets that difference over the six-year analysis period. Selecting solely on initial cost would ignore the life-cycle cost objective.

QUESTION NO: 20

A project risk register identifies several cost risks, including potential commodity-price volatility and a possible delay in obtaining a regulatory permit. The risks have uncertain probability and impact, and the project team determines that several of the risks may occur together under adverse market conditions.

What is the most appropriate method for developing a project contingency amount?

A. Apply a uniform percentage to every estimate account

B. Sum the maximum possible impact of every risk

C. Perform a quantitative risk analysis that models the risks and their correlation

D. Use the forecast escalation amount as the contingency

ANSWER: C

Explanation:

Perform a quantitative risk analysis that models the risks and their correlation is correct. Where risk events have uncertain outcomes and may be correlated, a quantitative risk analysis such as Monte Carlo simulation can model probability distributions, combined impacts, and the selected confidence level for contingency.

Summing maximum impacts would generally create an unsupported and potentially excessive amount. Applying a uniform percentage to all estimate elements does not reflect the actual risk drivers. Escalation addresses expected price change over time, not the uncertainty represented by the risk register.