Solutions to EA-2(A) Examination
Fall, 2010

Question 1

Treasury regulation 1.430(d)-1(d)(1)(i) states that any plan amendment effective at any time during the plan year and adopted no later than the valuation date for the plan year **must** be taken into account (unless prohibited under IRC section 436) in the determination of the funding target and target normal cost for the year. If the plan amendment does not become effective until a subsequent plan year, then it must be ignored for purposes of the current year funding target and target normal cost.

The amendment in this question was adopted in December, 2010 (before the 2011 plan year), so the benefit increase that takes effect on 7/1/2011 <u>must</u> be taken into account in determining the funding target and target normal cost, and the benefit increase that takes effect on 7/1/2012 is not included. Note that the amendments are not impacted by IRC section 436.

The statement is true.

Answer is A.

Question 2

IRC section 432(b)(1) states that a plan is in seriously endangered status if <u>both</u>:

(1) The plan's funded percentage for the plan year is less than 80%, and
(2) The plan has an accumulated funding deficiency for the plan year or is projected to have a deficiency in any of the next 6 years.

The statement is false because both of these conditions must be true (not either, as stated in the question).

Answer is B.

Question 3

IRC section 401(a)(12) states that generally, in order for a plan to be qualified, the participants immediately after a merger would receive a benefit (if the plan terminates) at least as large as they would have received had the plans not merged. However, there is an exemption from this requirement for multiemployer plans. The statement is false.

Answer is B.

Question 4

IRC section 4971(f)(1) states that the initial excise tax for failure to make a required liquidity shortfall payment is 10%. The statement is true.

Answer is A.

Question 5

IRC section 4971(a)(2) states that the initial excise tax for a multiemployer plan upon failure to meet the minimum funding requirement is 5% (not 10%, which applies to single employer plans). The statement is false.

Answer is B.

Question 6

When the prior year is a short plan year, proposed Treasury regulation 1.430(j)-1(c)(5)(iii) states that the required quarterly contribution for the current year is simply equal to 90% of the current plan year's minimum required contribution. There is no proration to be done. The statement is false.

Answer is B.

Question 7

IRC section 430(f)(3)(C) provides that the prefunding balance and the funding standard carryover balance cannot be applied to the minimum required contribution if the ratio of the prior year plan assets (reduced only by the prefunding balance) to the prior year funding target (determined on a not at-risk basis) is less than 80%.

As of 1/1/2010, this ratio is:

$$\frac{90,000,000 - 5,000,000}{100,000,000} = 85\%$$

The funding standard carryover balance can be applied to the minimum required contribution in 2011. The statement is true.

Answer is A.

Question 8

The AFTAP is equal to the ratio of the actuarial value of the assets (reduced by the prefunding balance and funding standard carryover balance) to the funding target (see IRC section 436(j)(2)). (Note that actually, the AFTAP must include in both the numerator and denominator an addition of the total amount used to purchase annuities for NHCEs in the past 2 years – but since this information is not provided, it must be assumed that there were no purchases of annuities.)

$$1/1/2011 \text{ AFTAP} = \frac{92,000 - 15,000}{100,000} = 77\%$$

There is a lump sum option under the terms of the plan (for lump sums less than $10,000), so the limitations of accelerated distributions under IRC section 436(d) would apply unless the funding standard carryover balance is reduced to $12,000 (as required by IRC section 430(f)(3)), making the 1/1/2011 AFTAP 80%. This deemed reduction is therefore required to be made. Treasury regulation 1.430(f)-1(d)(1)(ii)(A) provides that this deemed reduction must be taken into account for purposes of determining the amount of the funding standard carryover balance available to pay for quarterly contributions.

The remaining $12,000 funding standard carryover balance is accumulated with interest at 6% to 4/15/2011 to determine the amount available to pay for the 4/15/2011 quarterly contribution:

$$\$12,000 \times 1.06^{3.5/12} = \$12,206$$

Since the quarterly contribution due on 4/15/2011 is $13,000, the funding standard carryover balance is not sufficient to satisfy the entire quarterly contribution. The statement is false.

Answer is B.

Note: The determination of an AFTAP and the corresponding deemed reduction in the funding standard carryover balance and prefunding balance in certain situations under IRC section 436 are not part of the EA-2A exam syllabus. Therefore, if this question were solved without reduction to the funding standard carryover balance, the statement would be true. Credit was given for answer choice A as well as choice B.

Question 9

The accrued benefit for a non-key employee in a top heavy plan is equal to the greater of the plan benefit formula accrued benefit or the top heavy minimum accrued benefit. The top heavy minimum accrued benefit under IRC section 416(c)(1) is equal to 2% of the highest consecutive 5-year average compensation (or fewer years, if the participant has less than 5 years of salary) per year of participation in the plan for years that the plan is top heavy

Plan benefit formula accrued benefit
$$= 1.5\% \times \frac{40,000 + 45,000 + 50,000}{3} \times 1 \text{ year of benefit service} = \$675$$

Treasury regulation 1.416-1, Q&A M-2, part (b), indicates that salary for each year of service is <u>generally</u> to be used for purposes of the top heavy minimum accrual. However, subsection (c) of that regulation says that compensation paid in years for which service is not earned under IRC sections 411(a)(4), (5), or (6) are to be ignored. IRC section 411(a)(4)(C) allows for exclusion of service prior to the plan effective date. Therefore, for purposes of the top heavy minimum benefit, salary paid prior to the plan effective date is to be excluded. Only the 2011 compensation of $50,000 is to be used for the top heavy minimum accrual.

The top heavy minimum accrual is 2% per year of plan participation for which the plan is top heavy.

Top heavy minimum accrued benefit
$$= 2\% \times \$50,000 \times 1 \text{ year of top heavy service} = \$1,000$$

The accrued benefit is equal to the greater of the plan accrued benefit or the top heavy minimum. This is $1,000.

Answer is D.

Note: IRC section 411(a) is not part of the EA-2A exam syllabus. Therefore, the top heavy minimum, without regard to that section, would use the same average salary as for the plan benefit formula. In this case,

Top heavy minimum accrued benefit
$$= 2\% \times \frac{40,000 + 45,000 + 50,000}{3} \times 1 \text{ year of top heavy service} = \$900$$

This results in answer range C. The Joint Board gave credit for that answer choice, as well as choice D.

Question 10

The IRC section 415(b) limit is equal to the smaller of the dollar limit and the compensation limit. The compensation limit is 100% of the high consecutive 3-year average salary (with each year's salary not to exceed the salary limitation of IRC section 401(a)(17)), reduced by 1/10 for each year of service with the employer less than 10 years.

Smith's salary was $250,000 each year, which always was in excess of the IRC section 401(a)(17) compensation limit. The limit for the last 3 years (2008 – 2010) was $230,000, $245,000, and $245,000 respectively.

Smith has 6 years of service with the employer, so the IRC section 415(b) compensation limit is:

$$\frac{\$230,000 + \$245,000 + \$245,000}{3} \times 6/10 = \$240,000 \times 6/10 = \$144,000$$

The dollar limit for 2010 is equal to $195,000, payable for retirement between the ages of 62 and 65. This is reduced by 1/10 for each year of plan participation less than 10 years. Smith has 5 years of plan participation, so the dollar limit is:

$$\$195,000 \times 5/10 = \$97,500$$

Smith is age 68 as of 12/31/2010, so the dollar limit is increased actuarially (from age 65 to age 68) to the smaller of the actuarially increased benefit using the plan actuarial equivalence, or the actuarially increased benefit using 5% interest and the applicable mortality table (statutory assumptions). The actuarial increase uses an interest only (no mortality) adjustment from age 65 to age 68 because there is a death benefit (the accrued benefit).

Increased dollar limit using plan equivalence (7.5%) $= \$97,500 \times \ddot{a}_{65}^{(12)} \times 1.075^3 \div \ddot{a}_{68}^{(12)}$
$$= \$97,500 \times 9.85 \times 1.242297 \div 9.22$$
$$= \$129,400$$

Increased dollar limit using statutory assumptions $= \$97,500 \times \ddot{a}_{65}^{(12)} \times 1.05^3 \div \ddot{a}_{68}^{(12)}$
$$= \$97,500 \times 12 \times 1.157625 \div 11.06$$
$$= \$122,461$$

The IRC section 415(b) dollar limit for Smith is $122,461. This is the overall 415(b) limit since it is smaller than the compensation limit.

Answer is C.

Question 11

The target normal cost for each participant for 2011 as of 1/1/2011 is equal to the present value of the difference between the 12/31/2011 accrued benefit and the 1/1/2011 accrued benefit. The benefit formula provides a flat benefit of $50 per month per year of service, so the increase in the 2011 accrued benefit for each participant is $50 each year.

In determining the present value, the segment interest rates must be used. Smith is 41 as of 1/1/2011. The segment 3 interest rate (applicable to payments that begin at least 20 years from the valuation date) is applicable for all of Smith's benefit payments because they will not begin for 24 years, at age 65 (age 65 is the assumed retirement age under the general conditions of the exam).

$$\text{Smith target normal cost}_{1/1/2011} = 50 \times 12 \times \ddot{a}^{(12)}_{65@7\%} \times \frac{D_{65@7\%}}{D_{41@7\%}}$$

$$= 600 \times \frac{N^{(12)}_{65@7\%}}{D_{65@7\%}} \times \frac{D_{65@7\%}}{D_{41@7\%}}$$

$$= 600 \times \frac{N^{(12)}_{65@7\%}}{D_{41@7\%}} = 600 \times \frac{11{,}276}{6{,}156} = 1{,}099$$

Jones is 51 as of 1/1/2011. The segment 2 interest rate (applicable to payments that begin at least 5 years but no more than 20 years from the valuation date) is applicable for Jones' payments from age 65 through 71. The segment 3 interest rate (applicable to payments that begin at least 20 years from the valuation date) is applicable for Jones' benefit payments from age 71 and later.

$$\text{Jones target normal cost}_{1/1/2011} = 50 \times 12 \times \left[\frac{N^{(12)}_{65@6\%} - N^{(12)}_{71@6\%}}{D_{51@6\%}} + \frac{N^{(12)}_{71@7\%}}{D_{51@7\%}} \right]$$

$$= 600 \times \left[\frac{22{,}369 - 12{,}145}{4{,}993} + \frac{5{,}863}{3{,}093} \right] = 2{,}366$$

Total target normal cost$_{1/1/2011}$ = 1,099 + 2,366 = 3,465

The funding target for each participant for 2011 as of 1/1/2011 is equal to the present value of the 1/1/2011 accrued benefit.

Smith accrued benefit on 1/1/2011 = $50 × 11 years of service = $550
Jones accrued benefit on 1/1/2011 = $50 × 26 years of service = $1,300

$$\text{Smith funding target}_{1/1/2011} = 550 \times 12 \times \frac{N^{(12)}_{65@7\%}}{D_{41@7\%}} = 6{,}600 \times \frac{11{,}276}{6{,}156} = 12{,}089$$

$$\text{Jones funding target}_{1/1/2011} = 1{,}300 \times 12 \times \left[\frac{N^{(12)}_{65@6\%} - N^{(12)}_{71@6\%}}{D_{51@6\%}} + \frac{N^{(12)}_{71@7\%}}{D_{51@7\%}} \right]$$

$$= 15{,}600 \times \left[\frac{22{,}369 - 12{,}145}{4{,}993} + \frac{5{,}863}{3{,}093} \right] = 61{,}515$$

Total funding target$_{1/1/2011}$ = 12,089 + 61,515 = 73,604

The funding shortfall is equal to the funding target less the actuarial value of the assets (reduced by the funding standard carryover balance and the prefunding balance). As of 1/1/2010, the funding shortfall was equal to $0 (funding target = $66,000, actuarial value of assets = $66,000, no funding standard carryover balance or prefunding balance). Therefore, there were no shortfall amortization bases in 2010.

Funding shortfall as of 1/1/2011 = 73,604 – (65,000 – 2,950) = 11,554

The funding shortfall is amortized over 7 years using the segment rates.

1/1/2011 shortfall amortization = 11,554 ÷ 5.9982 = 1,926

The minimum required contribution is equal to the sum of the target normal cost and the shortfall amortization installment.

1/1/2011 minimum required contribution = 3,465 + 1,926 = 5,391

The minimum required contribution can be reduced by the prefunding balance if the funded percentage (actuarial value of assets, reduced by the prefunding balance, divided by the funding target) for the prior year was at least 80%.

1/1/2010 funded percentage = 66,000/66,000 = 100%

The minimum required contribution can be reduced by the prefunding balance.

Smallest amount that satisfies minimum funding as of 1/1/2011 = 5,391 – 2,950 = 2,441

The contribution, X, is deposited on 4/15/2012. X must be equal to the required contribution, increased with interest using the 2011 plan effective rate.

$$X = 2,441 \times 1.065^{15.5/12} = 2,648$$

Answer is E.

Note: If the quarterly contribution requirement applies to this plan, then the contribution X would have to reflect the late interest due to late quarterly payments (since no quarterly payments were made). However, if the funded percentage for the prior year is at least 100% (taking into account both the prefunding balance and the funding standard carryover balance), then the plan is exempt from the quarterly contribution requirement. Since the funded percentage for this plan as of 1/1/2010 is 100%, there is no quarterly contribution requirement for 2011.

Question 12

The target normal cost is equal to the present value of the difference between the 12/31/2011 accrued benefit (taking into account the 3% expected salary increase for 2011) and the 1/1/2011 accrued benefit (ignoring the expected salary increase for 2011).

1/1/2011 accrued benefit = 4% × $100,000 × 9 years of service = $36,000
12/31/2011 accrued benefit = 4% × $100,000 × 1.03 × 10 years of service = $41,200

Note that the amendment in effect for 2011 was used (4% benefit formula).

In determining the present value, the segment interest rates must be used. Smith is 39 as of 1/1/2011. The segment 3 interest rate is applicable for all benefit payments which will not begin for more than 20 years, at age 65 (age 65 is the assumed retirement age provided for Smith).

$$\text{Target normal cost}_{1/1/2011} = (41,200 - 36,000) \times \ddot{a}^{(12)}_{65@7\%} \times v^{26}_{7\%}$$
$$= 5,200 \times 9.989 \times 0.172195 = 8,944$$

The funding target is equal to the present value of the 1/1/2011 accrued benefit.

$$\text{Funding target}_{1/1/2011} = 36,000 \times \ddot{a}^{(12)}_{65@7\%} \times v^{26}_{7\%} = 36,000 \times 9.989 \times 0.172195 = 61,922$$

The deductible limit for a single employer plan under IRC section 404(o)(2)(A) is equal to the sum of the funding target, the target normal cost, and the cushion amount, with the sum being reduced by the actuarial value of assets (unreduced by any credit balance items). The cushion amount under IRC section 404(o)(3)(A) is equal to the sum of 50% of the funding target plus the increase in the funding target if future compensation increases were taken into account.

In determining the cushion amount, IRC section 404(o)(4) provides a special rule for plans with no more than 100 participants. Under this rule, if there has been an amendment increasing benefits within the past two years, the amendment is ignored for HCEs. There is only 1 participant in this plan (Smith is the only participant). And Smith is an HCE, being the owner of the business. For purposes of the cushion amount, Smith's funding target must be determined based upon the old 2% formula (so his accrued benefit as of 1/1/2011 would be 18,000 – half of the actual accrued benefit).

Funding target under the 2% formula $= 18{,}000 \times 9.989 \times 0.172195 = 30{,}961$

The projected funding target based on assumed future compensation increases (and using the 2% formula) is:

Projected 1/1/2011 accrued benefit $= 2\% \times \$100{,}000 \times 1.03^{26} \times 9$ years of service
$$= 38{,}819$$

Projected funding target$_{1/1/2011} = 38{,}819 \times \ddot{a}^{(12)}_{65\,@\,7\%} \times v^{26}_{7\%}$
$$= 38{,}819 \times 9.989 \times 0.172195 = 66{,}771$$

Cushion amount $= (50\% \times 30{,}961) + (66{,}771 - 30{,}961) = 51{,}290$

The IRC section 404(o)(2)(A) deductible limit is:

$$8{,}944 + 61{,}922 + 51{,}290 - 50{,}000 = 72{,}156$$

For plans that are not at-risk, the deductible limit can be determined under IRC section 404(o)(2)(B), if that gives a larger result than the deductible limit under IRC section 404(o)(2)(A). The deductible limit under IRC section 404(o)(2)(B) is equal to the sum of the funding target and target normal cost, if each were determined as if the plan was at-risk, with the sum being reduced by the actuarial value of assets. The at-risk assumptions apply to plans where participants could elect to receive benefits earlier than the assumed retirement age, or can elect to receive more valuable benefits than the form assumed for funding the plan. The exam general conditions state that there are no optional forms of benefit and that the assumed retirement age is 65, with no other optional earlier ages at which benefits can be received. As a result, there is no difference between the at-risk assumptions and the not at-risk assumptions in this question.

The IRC section 404(o)(2)(B) deductible limit is:

$$8,944 + 61,922 - 50,000 = 20,866$$

The deductible limit is the larger of the IRC section 404(o)(2)(A) and 404(o)(2)(B) limits, which is 72,156.

Answer is B.

Notes: There are currently no regulations (proposed or otherwise) dealing with deductions under IRC section 404(o). Past application of the deduction limits under IRC section 404 has allowed for an interest adjustment from the valuation date to the last day of the plan year. Without regulations, it is not clear whether the 72,156 should be given interest to the end of the year (or even which interest rate to use – presumably the plan effective rate for the year). However, even if 72,156 is given interest at the plan effective rate (not known in this question, but between 5% and 7%) to the end of the year, the answer still falls within the same answer range. Additionally, without regulations it is unclear as to whether the actuarial value of assets should be reduced by the funding standard carryover balance, as it generally is under IRC section 430. Past application of the deduction limits under IRC section 404 has ignored any credit balance items, so it would follow that the funding standard carryover balance would be ignored. Reducing the assets by the funding standard carryover balance would result in an answer within the same answer range, so it is not an issue in this question.

Finally, the determination of Smith as an HCE in this question is an issue, because that determination is made under IRC section 414(q), which is covered on the EA-2B examination. Therefore, if no determination is made, and it is assumed that Smith is not an HCE, then the cushion amount would be based upon the new 4% benefit formula. In that case, the projected funding target based on assumed future compensation increases (and using the 4% formula) is:

Projected 1/1/2011 accrued benefit $= 4\% \times \$100,000 \times 1.03^{26} \times 9$ years of service
$$= 77,637$$

Projected funding target$_{1/1/2011} = 77,637 \times \ddot{a}^{(12)}_{65@7\%} \times v^{26}_{7\%}$
$$= 77,637 \times 9.989 \times 0.172195 = 133,540$$

Cushion amount $= (50\% \times 61,922) + (133,540 - 61,922) = 102,579$

The IRC section 404(o)(2)(A) deductible limit is:

$$8,944 + 61,922 + 102,579 - 50,000 = 123,445$$

This result is in answer range C, and credit was given for that answer as well.

Question 13

I. IRC section 432(e)(7)(B) states that failure to make a surcharge payment is subject to the delinquency rules of ERISA section 515, not subject to an excise tax for failure to meet minimum funding requirements under IRC section 4971. The statement is true.

II. IRC section 4971(g)(2)(B) states that upon failure to make a timely required contribution under a rehabilitation plan, there is a 100% excise tax. The statement is true.

III. IRC section 4971(g)(5) states that the IRS can waive the excise tax if the failure to make a timely contribution to a rehabilitation plan is due to reasonable cause, such as unanticipated and material market fluctuations. The statement is true.

Answer is D.

Question 14

The IRC section 415(b) limit is equal to the smaller of the dollar limit and the compensation limit. The compensation limit is 100% of the high consecutive 3-year average salary (with each year's salary not to exceed the salary limitation of IRC section 401(a)(17)), reduced by $1/10^{th}$ for each year of service with the employer less than 10 years.

Smith's 2009 salary of $300,000 was in excess of the IRC section 401(a)(17) compensation limit of $245,000 for that year. The 2009 salary must be limited to $245,000.

Smith has 10 years of service with the employer, so the IRC section 415(b) compensation limit is not reduced for years of service less than 10. The IRC section 415(b) compensation limit is:

$$\frac{\$125,000 + \$245,000 + \$167,000}{3} = \$179,000$$

The dollar limit for 2010 is equal to $195,000, payable for retirements between the ages of 62 and 65. This is reduced by 1/10 for each year of plan participation less than 10 years. Smith has 9 years of plan participation, so the dollar limit is:

$195,000 \times 9/10 = $175,500$

Smith is age 61 as of 12/31/2010, so the dollar limit is decreased actuarially (from age 62 to age 61) to the smaller of the actuarially decreased benefit using the plan actuarial equivalence (in this case, the early retirement factor), or the actuarially decreased benefit using 5% interest and the applicable mortality table (statutory assumptions). It can be assumed that there is no preretirement death benefit since none is mentioned, so the actuarial decrease includes a mortality adjustment from age 62 to age 61.

Dollar limit (plan early retirement factor) $= $175,500 \times 0.9235 = $162,074$

$$
\begin{aligned}
\text{Dollar limit (statutory assumptions)} &= \$175,500 \times \ddot{a}_{62}^{(12)} \times (D_{62}/D_{61}) \div \ddot{a}_{61}^{(12)} \\
&= \$175,500 \times (N_{62}^{(12)}/D_{62}) \times (D_{62}/D_{61}) \div (N_{61}^{(12)}/D_{61}) \\
&= \$175,500 \times (N_{62}^{(12)}/N_{61}^{(12)}) \\
&= \$162,303
\end{aligned}
$$

The IRC section 415(b) dollar limit for Smith is $162,074. This is the overall 415(b) limit since it is smaller than the compensation limit.

The annual benefit payable to Smith on 12/31/2010 is the smaller of the plan benefit ($180,000) or the IRC section 415(b) limit ($162,074). Therefore, Smith can be paid $162,074.

Answer is B.

Question 15

The experience gain or loss resulting from the termination of employment of a participant is equal to the difference between the actual liability with regard to the accrued benefit and the expected accrued liability under the actuarial cost method had the participant not terminated employment.

The accrued benefit for Smith as of 12/31/2010 is:

$1\% \times \$100,000 \times 9$ years of service $= \$9,000$

Smith is age 59 as of 1/1/2011. The present value of the accrued benefit as of 1/1/2011 is the actual liability, and is:

$\$9,000 \times \ddot{a}_{65}^{(12)} \times v^6 = \$9,000 \times 11.00 \times 0.704961 = \$69,791$

Under the entry age normal method, the normal cost is determined by first calculating the present value of future benefits at entry age (age at hire), and then amortizing that over the future years for the participant through retirement age. The accrued liability is then determined by accumulating the past normal cost payments to the participant's attained age. This must all be done as if the participant had not terminated employment, for purposes of the determination of the gain or loss.

Projected accrued benefit for Smith $= 1\% \times \$100,000 \times 1.03^6 \times 15$ years of service
$$= \$17,911$$

$\text{PVFB}_{50} = \$17,911 \times \ddot{a}_{65}^{(12)} \times v^{15} = \$17,911 \times 11.00 \times 0.417265 = \$82,210$

For purposes of amortizing, when there is a salary scale, the normal cost is determined as a level percentage of salary when the benefit formula is salary-based (unless the question states otherwise). So, an implicit interest rate must be used, taking into account both the interest rate of 6% and the salary scale of 3%. This implicit interest rate is:

$(1.06/1.03) - 1 = 0.029126$

$\text{NC}_{50} = \$82,210 \div \ddot{a}_{\overline{15}|.029126} = \$82,210 \div 12.363650 = \$6,649$

The actual normal cost at attained age (59) is equal to the normal cost at the entry age of 50, increased by the salary scale of 3% per year.

$\text{NC}_{59} = \$6,649 \times 1.03^9 = \$8,675$

The accrued liability is the accumulation of the past normal cost.

$$AL_{59} = \$8,675 \times \ddot{s}_{\overline{9}|.029126} = \$8,675 \times 10.417855 = \$90,375$$

The actual liability (present value of accrued benefit) is $69,791, and the expected liability (accrued liability) is $90,375. The difference is the experience gain (the actual liability is less than the expected liability, so there is a gain).

Gain = $90,375 - $69,791 = $20,584

Answer is B.

Question 16

The funding target is equal to the present value of the accrued benefit determined as of the first day of the plan year, using the segment interest rates.

The plan year is not the calendar year, but rather runs from July 1 through June 30. When the year is not the calendar year, the IRC section 401(a)(17) compensation limit is the limit in effect during the calendar year in which the plan year begins. Based upon that rule, the plan compensation and corresponding 401(a)(17) compensation limits are as follows:

Period	Salary	401(a)(17) limitation
7/1/05 – 6/30/06	230,000	210,000
7/1/06 – 6/30/07	215,000	220,000
7/1/07 – 6/30/08	230,000	225,000
7/1/08 – 6/30/09	210,000	230,000
7/1/09 – 6/30/10	250,000	245,000
7/1/10 – 6/30/11	200,000	245,000

The high consecutive 5-year average is an average of the salaries from 7/1/05 through 6/30/10.

$$7/1/2011 \text{ accrued benefit} = 6\% \times \frac{210,000 + 215,000 + 225,000 + 210,000 + 245,000}{5}$$
$$\times 10 \text{ years of service}$$
$$= 132,600$$

In determining the present value, the segment interest rates must be used. Smith is 50 as of 7/1/2011. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (through 6/30/2016), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (7/1/2016 through 6/30/2031), and the segment 3 interest rate is used for the remaining payments (7/1/2031 and later). Since Smith's first benefit payment will be at age 65 (the normal retirement age according to the general conditions of the exam) on 7/1/2026, the segment 2 interest rate of 6% is used to discount benefit payments made from 7/1/2026 through 6/30/2031, and the segment 3 interest rate of 6.5% is applicable for all benefit payments beginning 7/1/2031. The funding target is:

$$\text{Funding target}_{1/1/2011} = \$132,600 \times \left[\frac{N^{(12)}_{65\,@\,seg2} - N^{(12)}_{70\,@\,seg2}}{D_{65\,@\,seg2}} v^{15}_{seg2} + \frac{N^{(12)}_{70\,@\,seg3}}{D_{65\,@\,seg3}} v^{15}_{seg3} \right]$$

$$= \$132,600 \times \left[\frac{240,861 - 149,149}{20,965} v^{15}_{.06} + \frac{103,844}{15,440} v^{15}_{.065} \right]$$

$$= \$588,803$$

Answer is B.

Question 17

Smith's compensation must be limited to the IRC section 401(a)(17) maximum for each year. Treasury regulation 1.401(a)(17)-1(b)(3)(ii) indicates that for plans using compensation based on consecutive 12-month periods (as is the case here with the 36-month average), compensation for each 12-month period is limited to the annual compensation limit using the limit in effect as of the first day of the 12-month period. The 12-month periods representing the high consecutive 36-month period are 11/1/2007 – 10/31/2008, 11/1/2008 – 10/31/2009, and 11/1/2009 – 10/31/2010. Using the table provided with the exam, Smith's compensation history and limitation history is:

Period	Salary	401(a)(17) limitation
11/1/07 – 10/31/08	$(17,500 \times 2) + (19,000 \times 10) = 225,000$	225,000
11/1/08 – 10/31/09	$(19,000 \times 2) + (21,000 \times 10) = 248,000$	230,000
11/1/09 – 10/31/10	$(21,000 \times 2) + (22,500 \times 10) = 267,000$	245,000

Smith's high consecutive 36-month average compensation (limiting each year's salary to the IRC section 401(a)(17) maximum) is:

$$\frac{\$225,000 + \$230,000 + \$245,000}{36} = \$19,444$$

Answer is B.

Question 18

The minimum required contribution under IRC section 430(a)(1)(i) is equal to the sum of the target normal cost, the shortfall amortization charge, and the waiver amortization charge (if any waiver exists). The target normal cost is reduced by the mandatory employee contributions and increased by the expected plan expenses (Treasury regulation 1.430(d)-1(b)(1)(iii)).

There is no shortfall amortization base in 2011 because the actuarial value of assets ($34,100,000) exceeds the funding target ($33,900,000). As a result, the only liability of the plan is the target normal cost.

In addition, IRC section 430(a)(1)(ii) states that when the actuarial value of assets exceeds the funding target, then the minimum required contribution is reduced by the excess of the assets over the funding target.

The total mandatory contribution to be made for 2011 is $100,000 (1% of $10,000,000).

Minimum required contribution
= $1,615,000 - $100,000 + $104,000 – ($34,100,000 - $33,900,000) = $1,419,000

Answer is B.

Question 19

The accrued benefit for Smith as of 1/1/2011 is:

AB = 3% × $235,000 × 20 years of service = $141,000

The lump sum value of this benefit based upon plan equivalence (4.5% interest, applicable mortality table) is:

$$\text{Plan lump sum} = \$141,000 \times \ddot{a}^{(12)}_{65@4.5\%} = \$141,000 \times N^{(12)}_{65}/D_{65}$$
$$= \$141,000 \times 664,276/52,992 = \$1,767,492$$

IRC section 417(e)(3) requires that the lump sum payable under the plan (before application of the limitation of IRC section 415(b)) be no less than the lump sum equivalent of the accrued benefit using the applicable interest rate and applicable mortality table. The applicable interest rate is based on the segment rates. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (through 12/31/2015), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (1/1/2016 through 12/31/2030), and the segment 3 interest rate is used for the remaining payments (1/1/2031 and later). This lump sum is:

$$417(e)(3) \text{ lump sum} = \$141,000 \times \left[\frac{N^{(12)}_{65@seg1} - N^{(12)}_{70@seg1}}{D_{65@seg1}} + \frac{N^{(12)}_{70@seg2} - N^{(12)}_{85@seg2}}{D_{65@seg2}} + \frac{N^{(12)}_{85@seg3}}{D_{65@seg3}} \right]$$

$$= \$141,000 \times \left[\frac{466,449 - 298,073}{38,856} + \frac{142,952 - 17,266}{20,984} + \frac{7,491}{11,398} \right]$$

$$= \$1,548,203$$

This is less than the plan lump sum of $1,767,492, so there is no violation of IRC section 417(e)(3). However, it is possible that this lump sum could be limited under IRC section 415(b).

The IRC section 415(b) limit is equal to the smaller of the dollar limit and the compensation limit. The compensation limit is 100% of the high consecutive 3-year average salary (with each year's salary not to exceed the salary limitation of IRC section 401(a)(17)), reduced by 1/10 for each year of service with the employer less than 10 years.

Smith's high consecutive 3-year average salary is given to be $235,000. There is no reduction for service less than 10 years since Smith has 20 years of service.

The dollar limit for 2011 is assumed to be $200,000, payable for retirements between the ages of 62 and 65. This is reduced by 1/10 for each year of plan participation less than 10 years. The plan became effective on 1/1/2004, so Smith has only 7 years of plan participation. The reduced dollar limit for Smith is:

$200,000 × 7/10 = $140,000

The overall 415(b) limit for Smith is the dollar limit of $140,000.

For purposes of evaluating the lump sum proposed to be paid, the maximum lump sum payable under IRC section 415(b) is equal to the smallest of:

(1) The lump sum value of $140,000 paid as a life annuity, valued using plan equivalence
(2) The lump sum value of $140,000 paid as a life annuity, valued using 5.5% interest and the applicable mortality table
(3) 105% of the lump sum value of $140,000 paid as a life annuity, valued using the applicable interest rate and applicable mortality table

The 3rd option above is ignored for plans with no more than 100 participants, as is the case with this plan.

The IRC section 415(b) lump sum valued using plan equivalence is:

$140,000 × $\ddot{a}^{(12)}_{65@4.5\%}$ = $140,000 × $N^{(12)}_{65}/D_{65}$ = $140,000 × 664,276/52,992 = $1,754,956

The IRC section 415(b) lump sum valued using 5.5% interest and the applicable mortality table is:

$140,000 × $\ddot{a}^{(12)}_{65@5.5\%}$ = $140,000 × $N^{(12)}_{65}/D_{65}$ = $140,000 × 328,451/ 28,534 = $1,611,521

The IRC section 415(b) maximum lump sum is the smaller of these lump sums, which is $1,611,521. This is less than the plan lump sum, and so the ultimate lump sum payable to Smith is $1,611,521.

Answer is C.

Question 20

The minimum required contribution is equal to the sum of the target normal cost and the amortization of the shortfall bases. The 2011 target normal cost is provided, but the shortfall amortization bases must be developed. There is no information provided for years prior to 2010, so it must be assumed that there were no shortfall amortization bases in existence prior to 2010 (since this cannot be otherwise determined).

The funding shortfall is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by both the pre-funding balance and the funding standard carryover balance).

The funding shortfall as of 1/1/2010 is:

Funding shortfall$_{1/1/2010}$ = 15,500,000 – (15,000,000 – 500,000) = 1,000,000

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the <u>total</u> pre-funding balance if the employer elects to use any part of it to reduce the minimum contribution requirement, but not reduced by the funding standard carryover balance) is at least as large as the funding target. That is not the case as of 1/1/2010 (the $15,500,000 funding target exceeds the $14,500,000 actuarial value of assets after being reduced by the prefunding balance). There is a transition rule available for 2010 under IRC section 430(c)(5)(B) under which the actuarial value of assets (reduced by the prefunding balance) can be compared to only 96% of the funding target for purposes of the exemption. This transition rule is not available if IRC section 412(l) – the additional funding charge – applied to the 2007 plan year (see IRC section 430(c)(5)(B)(iv)). That is not the case in this question, since the exam general conditions state that, unless otherwise indicated, the plan has never been subject to IRC section 412(l). So, applying the transition rule, 96% of the funding target is $14,880,000 (96% of $15,500,000), which still exceeds the actuarial value of the assets (reduced by the prefunding balance).

The new funding shortfall amortization base is required. The base is equal to the excess of 96% of the funding target over the actuarial value of the assets (reduced by both credit balance items).

2010 shortfall amortization base = 14,880,000 - (15,000,000 – 500,000) = 380,000

This is amortized over 7 years: 380,000 ÷ 5.9982 = 63,352

The funding shortfall as of 1/1/2011 is:

Funding shortfall$_{1/1/2011}$ = 16,750,000 – (17,000,000 – 600,000) = 350,000

For purposes of the exemption from creating a new shortfall base in 2011, the transition percentage no longer applies. Since the funding target less the actuarial value of the assets (reduced by the prefunding balance) is positive, a new shortfall base must be created for 2011. This base is equal to the 2011 funding shortfall, less the outstanding balance of the prior bases. The only prior base is the one from 2010, and the outstanding balance is based upon the segment rates in effect for 2011 (the same as for 2010 in this question). There are 6 years left to amortize the 2010 base.

Outstanding balance of 2010 shortfall base = 63,352 × 5.2932 = 335,335

2011 shortfall amortization base = 350,000 – 335,335 = 14,665

This is amortized over 7 years: 14,665 ÷ 5.9982 = 2,445

2011 minimum required contribution = 900,000 + 63,352 + 2,445 = 965,797

The smallest amount that satisfies the minimum funding standard for 2011 as of 1/1/2011 is equal to the minimum required contribution reduced by the prefunding balance:

965,797 – 600,000 = 365,797

Answer is D.

Question 21

The target normal cost is equal to the present value of the increase in the accrued benefit during the plan year. Under each of the scenarios, the accrued benefit for the target normal cost would be:

Scenario A: The general conditions state that accrued benefits are based upon the elapsed time method. So, the $30 per month accrual is earned for the first 7 months of the year, and the $40 per month accrual is earned for the last 5 months of the year. The 2011 accrual would be $34.17 ($[\frac{7}{12} \times \$30] + [\frac{5}{12} \times \$40]$).

Scenario B: The $30 per month accrual is earned for the first 7 months of the year, and nothing is earned for the last 5 months of the year. The 2011 accrual would be $17.50 ($\frac{7}{12} \times \$30$).

Scenario C: The $40 per month accrual is earned for the entire year, since past service is granted. Note that for participants who stop working prior to 8/1/2011, the accrued benefit is based upon the $30 formula, just as in the other two scenarios.

Scenario C provides the largest accrual for 2011, followed by Scenario A and finally Scenario B. That is the ranking of the target normal cost under each scenario.

Answer is C.

Question 22

The deductible limit for a single employer plan under IRC section 404(o)(2)(A) is equal to the sum of the funding target, the target normal cost, and the cushion amount, with the sum being reduced by the actuarial value of assets. The cushion amount under IRC section 404(o)(3)(A) is equal to the sum of 50% of the funding target plus the increase in the funding target if future compensation increases were taken into account. The plan is not at-risk, so the not at-risk numbers should be used.

Cushion amount $= (50\% \times 320{,}000) + (405{,}000 - 320{,}000) = 245{,}000$

The IRC section 404(o)(2)(A) deductible limit is:

$$60{,}000 + 320{,}000 + 245{,}000 - 300{,}000 = 325{,}000$$

For plans that are not at-risk, the deductible limit can be determined under IRC section 404(o)(2)(B), if that gives a larger result than the deductible limit under IRC section 404(o)(2)(A). The deductible limit under IRC section 404(o)(2)(B) is equal to the sum of the funding target and target normal cost, if each were determined as if the plan was at-risk, with the sum being reduced by the actuarial value of assets.

The IRC section 404(o)(2)(B) deductible limit is:

$$90{,}000 + 500{,}000 - 300{,}000 = 290{,}000$$

The deductible limit is the larger of the IRC section 404(o)(2)(A) and 404(o)(2)(B) limits, which is 325,000.

Answer is B.

Notes: There are currently no regulations (proposed or otherwise) dealing with deductions under IRC section 404(o). Past application of the deduction limits under IRC section 404 has allowed for an interest adjustment from the valuation date to the last day of the plan year. Without regulations, it is not clear whether the 325,000 should be given interest to the end of the year (or even which interest rate to use – presumably the plan effective rate for the year). However, even if 325,000 is given interest at the plan effective rate of 6% to the end of the year, the answer still falls within the same answer range.

Question 23

The minimum required contribution is equal to the sum of the target normal cost and the amortization of the shortfall bases. The 2011 target normal cost is provided, but the shortfall amortization base for 2011 must be developed. The only shortfall amortization base in existence prior to 2011 is the given 2010 base with a shortfall installment of $25,000.

The prefunding balance must be updated from 1/1/2010 to 1/1/2011. Any unused prefunding balance is increased using the actual asset rate of return for the year (6.67% from 2010, in this case).

$$\text{Prefunding balance}_{1/1/2011} = 187,500 \times 1.0667 = 200,006$$

There is a lump sum option under the terms of the plan, so the limitations of accelerated distributions under IRC section 430(d) would apply unless the prefunding balance is reduced to $190,000 (as required by IRC section 430(f)(3)), making the 1/1/2011 AFTAP 60%. Recall that the AFTAP is defined as the ratio of the actuarial value of assets (reduced by the prefunding and funding standard carryover balance) to the funding target, with both the numerator and denominator increased by amounts used to purchase annuities for the NHCEs during the past two years. The 1/1/2011 AFTAP, after the prefunding balance is reduced to $190,000, is:

$$\text{1/1/2011 AFTAP} = \frac{2,500,000 - 190,000}{3,850,000} = 60\%$$

The funding shortfall is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by both the prefunding balance and the funding standard carryover balance).

The funding shortfall as of 1/1/2011 is:

$$\text{Funding shortfall}_{1/1/2011} = 3,850,000 - (2,500,000 - 190,000) = 1,540,000$$

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the total pre-funding balance if the employer elects to use any part of it to reduce the minimum required contribution, which in this question the employer cannot do because the 2010 funding target attainment percentage is less than 80% -- see IRC section 430(f)(3)(C)) is at least as large as the funding target. That is not the case as of 1/1/2011 (the $3,850,000 funding target exceeds the $2,500,000 actuarial value of assets).

The new shortfall base that must be created for 2011 is equal to the 2011 funding shortfall, less the outstanding balance of the prior bases. The only prior base is the one from 2010, and the outstanding balance is based upon the segment rates in effect for 2011. There are 6 years left to amortize the 2010 base.

Outstanding balance of 2010 shortfall base = 25,000 × 5.2932 = 132,330

2011 shortfall amortization base = 1,540,000 − 132,330 = 1,407,670

This is amortized over 7 years: 1,407,670 ÷ 5.9982 = 234,682

2011 minimum required contribution = 300,000 + 25,000 + 234,682 = 559,682

The smallest amount that satisfies the minimum funding standard for 2011 as of 1/1/2011 is generally equal to the minimum required contribution reduced by the prefunding balance. However, since the prefunding balance is not allowed to be used to reduce the 2011 minimum, the smallest amount that satisfies the minimum funding standard for 2011 as of 1/1/2011 is equal to $559,682

Answer is C.

Note: The determination of an AFTAP and the corresponding deemed reduction in the prefunding balance in certain situations under IRC section 436 are not part of the EA-2A exam syllabus. Therefore, if this question were solved without reduction to the prefunding balance, the results would be as follows.

Funding shortfall$_{1/1/2011}$ = 3,850,000 − (2,500,000 − 200,006) = 1,550,006

2011 shortfall amortization base = 1,550,006 − 132,330 = 1,417,676

This is amortized over 7 years: 1,417,676 ÷ 5.9982 = 236,350

2011 minimum required contribution = 300,000 + 25,000 + 236,350 = 561,350

This falls in answer range D. Credit was given for answer choice D as well as choice C.

Question 24

There is no gain or loss with regard to the certain benefit, as that is paid regardless of death. So the gain or loss is based upon the life portion of the annuity, which would begin at age 75. The gain (loss) is the excess of the expected liability over the actual liability.

The expected liability as of 1/1/2012 is equal to the present value of the life portion of the benefit at age 65, increased with interest for one year from age 65 to age 66 (1/1/2011 to 1/1/2012). Note that it is not necessary to increase this present value with mortality since that is already taken into account in the calculation of the present value on 1/1/2011. Smith and Jones are the same age, so their $1,000 per year benefits can be combined to $2,000.

$$\text{Expected liability}_{1/1/2012} = \$2,000 \times (N_{75}/D_{65}) \times 1.07$$
$$= \$2,000 \times (33,380/10,000) \times 1.07$$
$$= \$7,143$$

The actual liability as of 1/1/2012 is equal to the present value of the life portion of Jones' benefit (Smith is ignored due to death). The actual liability must reflect the fact that Jones did not die during 2011, so the actual liability can be calculated by taking the present value as of 1/1/2011, and increasing it with interest and the mortality decrement ($p_{65} = 1 - q_{65} = 1 - 0.010 = 0.990$).

$$\text{Actual liability}_{1/1/2012} = \$1,000 \times (N_{75}/D_{65}) \times 1.07 \div p_{65}$$
$$= \$1,000 \times (33,380/10,000) \times 1.07 \div 0.990$$
$$= \$3,608$$

Experience gain = $7,143 - $3,608 = $3,535

Answer is A.

Question 25

Assertion: The study note "Assessment and Selection of Actuarial Assumptions" states that the availability of significant postretirement medical benefits should be taken into account when determining rates of retirement (see page 21 of the study note). Therefore, the assertion is false.

Reason: Revenue Ruling 81-137 requires separate funding for separate plans. As a result, the cost of benefits from the postretirement medical plan would not be included as a liability of the pension benefit portion of the plan. The reason is true.

Answer is D.

Question 26

The monthly accrued benefit for Smith as of 1/1/2011 is:

AB = $100 × 15 years of service = $1,500

The lump sum is determined using the applicable interest rate and applicable mortality table. The applicable interest rate is based on the segment rates. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (through 12/31/2015), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (1/1/2016 through 12/31/2030), and the segment 3 interest rate is used for the remaining payments (1/1/2031 and later). Smith is age 45 on 1/1/2011, so the initial payment would be at age 65 (assumed retirement age under the general conditions of the exam). Therefore, only the segment 3 rate of 7% is used.

$$\text{Lump sum} = \$1,500 \times 12 \times \left[\frac{N^{(12)}_{65\,@\,seg3}}{D_{65\,@\,seg3}} v^{20}_{@\,7\%} \right]$$
$$= \$1,500 \times 12 \times (116,222/11,387) \times 0.258419$$
$$= \$47,476$$

Answer is B.

Note that the effects of IRC section 415 have been ignored since Smith's benefit is clearly far below those limitations.

Question 27

The frozen initial liability cost method consists of a normal cost and various amortization charges and credits. The amortization bases generally consist only of an initial accrued liability determined under the entry age normal method (generally amortized over 30 years for plans effective prior to 2008). The initial accrued liability from 1/1/1983 is given to be $5,000,000.

The normal cost under the frozen initial liability cost method is equal to:

$$\frac{\text{Present value of future benefits - Actuarial value of assets - Unfunded liability}}{\text{Temporary annuity}}$$

The actuarial value of assets is not reduced by the credit balance for purposes of the normal cost determination.

The unfunded liability has not been provided; however, it can be determined using the balance equation:

Unfunded liability = Outstanding balance – Credit balance

The outstanding balance of an amortization base is the amount remaining as of the current valuation date. The initial liability of $5,000,000 was established on 1/1/1983, and is being amortized over 30 years. There are 2 years left to amortize it as of 1/1/2011.

$$\text{Outstanding balance} = \$5,000,000 \times \frac{\ddot{a}_{\overline{2|}}}{\ddot{a}_{\overline{30|}}} = \$5,000,000 \times \frac{1.934579}{13.277674} = \$728,508$$

Unfunded liability = $728,508 – 400,000 = $328,508

The temporary annuity is equal to the present value of future compensation to total compensation:

Temporary annuity = 80,000,000/8,000,000 = 10

The normal cost is equal to:

$$\frac{\$35,000,000 - 30,000,000 - 328,508}{10} = \$467,149$$

The minimum required contribution as of 1/1/2011 is equal to the normal cost plus the amortization charges.

$$\text{Minimum required contribution} = \$467,149 + \frac{\$5,000,000}{\ddot{a}_{\overline{30|}}}$$
$$= \$467,149 + 376,572 = \$843,721$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution less the credit balance.

Smallest amount that satisfies the minimum $= \$843,721 - 400,000 = \$443,721$

The contribution, X, is deposited on 12/31/2011, so this must be increased with interest to the end of the year.

$X = \$443,721 \times 1.07 = \$474,781$

Answer is C.

Question 28

The average value method under IRC section 430(g)(3)(B), Treasury regulation 1.430(g)-1(c)(2), and Revenue Notice 2009-22 allows for averaging of fair market and adjusted fair market values for up to 25 months ending on the valuation date. The asset method being used in this question averages the fair market value on the valuation date with the adjusted fair market value from the previous 2 valuation dates.

The adjusted fair market value from a particular valuation date is the fair market value on that date, adjusted for all contributions, benefit payments and administrative expenses that occurred between that valuation date and the current valuation date, and further adjusted for expected earnings based upon the actuary's best estimate of the asset rate of return for the year. If this expected rate of return is larger than the segment 3 interest rate, then the segment 3 interest rate is used. In this question, the segment 3 interest rate of 7% is used to determine the expected earnings (the assumed rate of 7.5% is larger). The benefit payments are made on the last day of the year, so they do not have an impact on the expected earnings.

The expected earnings for each year are:

2009: $2,100,000 \times .07 = 147,000$
2010: $2,200,000 \times .07 = 154,000$

In order to determine the actuarial value of assets as of 1/1/2011, the adjusted fair market values from 1/1/2009 and 1/1/2010 must be determined.

1/1/2009 adjusted fair market value $= 2,100,000 + (147,000 + 154,000)$
$$- (50,000 + 50,000)$$
$$= 2,301,000$$
1/1/2010 adjusted fair market value $= 2,200,000 + 154,000 - 50,000 = 2,304,000$
1/1/2011 actuarial value $= (2,301,000 + 2,304,000 + 1,900,000)/3 = 2,168,333$

Under IRC section 430(g)(3)(B)(iii), the actuarial value cannot be more than 110% of the market value of the assets. 110% of 1,900,000 is equal to 2,090,000, so that is the actuarial value of assets under the new asset valuation method under consideration.

The asset value has an impact on the funding shortfall (funding target less actuarial value of assets, with the assets reduced by the funding standard carryover balance and prefunding balance). The funding shortfall under each method is:

Funding shortfall$_{old} = 2,100,000 - (1,900,000 - 12,000) = 212,000$
Funding shortfall$_{new} = 2,100,000 - (2,090,000 - 12,000) = 22,000$

Under the new method, the funding shortfall decreases by 190,000 (212,000 – 22,000). The funding shortfall is amortized over 7 years, so the minimum required contribution decreases by:

$190,000/5.9982 = 31,676$

Answer is D.

Question 29

I.   This statement is true, and is described in IRC section 430(h)(1).

II. The rules for selection of actuarial assumptions are similar for multiemployer plans under IRC section 431(c)(3) to those for single employer plans. This statement is false.

III. There is no such rule requiring use of a preretirement mortality assumption for plans with more than 50 participants. This statement is false.

Answer is B.

Question 30

It is necessary to determine the key employees before the top heavy ratio can be determined. The key employee determination is done for the prior year; in this question, the determination is made for 2010. There are 3 ways that an employee can be a key employee under IRC section 416(i)(1).

(1) 5% owner (own more than 5%)
(2) 1% owner (own more than 1%) and earn more than $150,000
(3) Officer with annual salary in excess of $130,000 (indexed to $160,000 for 2010)

Employee 1 is a 5% owner, and thus a key employee for 2011.
Employee 3 is a 1% owner and earned $180,000 in 2010, and thus a key employee for 2011.
Employee 2 is an officer, but did not earn more than $160,000 in 2010. Employee 2 is not a key employee.

The top heavy ratio for 2011 is equal to the ratio of the present value of the accrued benefit as of the 2010 valuation date for the key employees to a similar present value for all employees (IRC section 416(g)). Rollovers from a plan of another employer are not included (IRC section 416(g)(4)(A)). In addition, the present value of former key employees (employees who were key in a prior year but not in the current year) are completely excluded from the top heavy ratio (IRC section 416(g)(4)(B)).

As a result, employee 2 should be excluded from the top heavy ratio, and the rollover benefits for employee 4 should be excluded from the present value of accrued benefits.

$$2011 \text{ top heavy ratio} = \frac{450,000 + 200,000}{450,000 + 200,000 + (100,000 - 75,000) + 400,000} = 0.6047$$

Answer is D.

Question 31

The minimum required contribution is equal to the sum of the target normal cost (including the cost of plan-related expenses that are expected to be paid from the plan for the year) and the amortization of the shortfall bases. The 2011 target normal cost and plan-related expenses are provided, but the shortfall amortization base for 2011 must be developed. There are no prior shortfall amortization bases.

The funding shortfall is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by both the pre-funding balance and the funding standard carryover balance).

The funding shortfall as of 1/1/2011 is:

Funding shortfall$_{1/1/2011}$ = 5,200,000 – (5,500,000 – 200,000 – 500,000) = 400,000

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the total pre-funding balance if the employer elects to use any part of it to reduce the minimum required contribution, which in this question the employer elects to do) is at least as large as the funding target. That is not the case as of 1/1/2011 (the $5,200,000 funding target exceeds the $5,000,000 actuarial value of assets, after being reduced by the prefunding balance). A shortfall amortization base must be created, equal to the $400,000 funding shortfall.

The shortfall amortization base is amortized over 7 years: 400,000/5.9982 = 66,687

Minimum required contribution$_{1/1/2011}$ = (350,000 + 27,500) + 66,687 = 444,187

X = 444,187 – 200,000 – 150,000 = 94,187

Answer is E.

Question 32

The funding target is equal to the present value of the benefit accrued as of the first day of the year. The general conditions of the exam state that it is assumed that retirement occurs at age 65, unless other information is provided. Therefore, for the not at-risk funding target, it is assumed that retirement will occur at age 65.

The present value is based on the segment rates. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (through 12/31/2015), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (1/1/2016 through 12/31/2030), and the segment 3 interest rate is used for the remaining payments (1/1/2031 and later). Smith is age 55 on the 1/1/2011 valuation date. The first payment to Smith will occur at age 65 on 1/1/2021. The segment 2 rate applies to the first 10 years of payments (from age 65 through 75) and the segment 3 rate applies to the remaining payments (from age 75 and later).

$$\text{Not at-risk funding target} = \$10,000 \times \left[\frac{N^{(12)}_{65@\,seg2} - N^{(12)}_{75@\,seg2}}{D_{55@\,seg2}} + \frac{N^{(12)}_{75@\,seg3}}{D_{55@\,seg3}} \right]$$

$$= \$10,000 \times \left[\frac{231,910 - 81,453}{39,470} + \frac{38,046}{23,550} \right] = \$54,275$$

The at-risk funding target must be determined assuming that Smith retires at the earliest retirement age. However, since Smith is eligible to retire during the current year, it is assumed that Smith retires on the last day of the year (IRC section 430(i)(1)(B)(i)). Therefore, the first payment will occur at age 56. The segment 1 rate will apply to the first 4 years of payments (from age 56 through 60), the segment 2 rate applies to the next 15 years of payments (from age 60 through 75) and the segment 3 rate applies to the remaining payments (from age 75 and later).

The early retirement benefit (with respect to the accrued benefit) at age 56 is equal to the accrued benefit, reduced by 3% per year for 9 years.

Early retirement benefit = $10,000 × [1 – (3% × 9)] = $7,300

$$\text{At-risk funding target} = \$7,300 \times \left[\frac{N^{(12)}_{56@\,seg1} - N^{(12)}_{60@\,seg1}}{D_{55@\,seg1}} + \frac{N^{(12)}_{60@\,seg2} - N^{(12)}_{75@\,seg2}}{D_{55@\,seg2}} + \frac{N^{(12)}_{75@\,seg3}}{D_{55@\,seg3}} \right]$$

$$= \$7,300 \times \left[\frac{919,914 - 691,251}{66,478} + \frac{356,431 - 81,453}{39,470} + \frac{38,046}{23,550} \right]$$

$$= \$87,760$$

The at-risk funding target must include a load, because the plan has been at-risk in at least 2 of the past 4 years. The load is equal to 4% of the <u>not at-risk</u> funding target plus $700 per participant (in this case just Smith since we are looking for the funding target just for Smith). See IRC section 430(i)(1)(C).

Load = (4% × $54,275) + $700 = $2,871

At-risk funding target with load = $87,760 + $2,871 = $90,631

Difference between at-risk and not at-risk funding target = $90,631 - $54,275 = $36,356

Answer is C.

Question 33

The deductible limit for a single employer plan under IRC section 404(o)(2)(A) is equal to the sum of the funding target, the target normal cost, and the cushion amount, with the sum being reduced by the actuarial value of assets. The cushion amount under IRC section 404(o)(3)(A) is equal to the sum of 50% of the funding target and the increase in the funding target if future compensation increases were taken into account. For benefits that are not salary based, instead of taking future salary increases into account, assumed increases in future benefits are based upon the history of plan amendments increasing benefits during the past 6 years.

Assertion: Information is not provided as far as whether Plan A utilizes a salary scale, or whether there have been any amendments to Plan B. The general conditions of the exam state that there are no assumed salary increases, and that the plan has never been amended. Therefore, the cushion amount for each plan should be the same, resulting in the same deductible limit for each plan. The assertion is false.

Reason: This statement is true, because only the plan amendment history would have an impact on the cushion amount for Plan B.

Answer is D.

Question 34

A plan is at-risk for a year if **all** of the following are true:

1. The plan has more than 500 participants on any day of the preceding year
2. The funding target attainment percentage (FTAP) for the preceding plan year, determined as if the plan was not at-risk, is less than 80%, and
3. The funding target attainment percentage for the preceding plan year, determined as if the plan was at-risk, is less than 70%.

It must be determined whether the plan is at-risk for the years 2013, 2014, and 2015. The first requirement is satisfied for each year since there were 600 participants (more than 500) in each year.

The FTAP is equal to the ratio of the actuarial value of the assets (reduced by the funding standard carryover balance and the prefunding balance) to the not at-risk funding target. The FTAPs for 2012 through 2014 are:

$$2012 \text{ FTAP} = \frac{940{,}000}{1{,}000{,}000} = 94\%$$

$$2013 \text{ FTAP} = \frac{900{,}000}{1{,}200{,}000} = 75\%$$

$$2014 \text{ FTAP} = \frac{880{,}000}{1{,}150{,}000} = 76.52\%$$

The FTAPs determined using the funding target if the plan was at-risk for each of the years 2012 through 2014 are

$$2012 \text{ "at-risk" FTAP} = \frac{940{,}000}{1{,}300{,}000} = 72.31\%$$

$$2013 \text{ "at-risk" FTAP} = \frac{900{,}000}{1{,}500{,}000} = 60\%$$

$$2014 \text{ "at-risk" FTAP} = \frac{880{,}000}{1{,}450{,}000} = 60.69\%:$$

Therefore, the plan is not at-risk for 2013 (the 2012 FTAP is not less than 80%), but is at-risk for 2014 and 2015 (each of the three requirements is satisfied).

The 2015 target normal cost using at-risk assumptions is $40,000. There is no load under IRC section 430(i)(1)(C) added to this because the plan has not been at-risk in at least 2 of the previous 4 years (it was only at-risk in 2014). However, there is a phase-in under IRC section 430(i)(5) due to the fact that the plan has been at-risk for less than 5 consecutive years (this is the second year that it has been at-risk). Therefore, the target normal cost for 2015 is equal to 40% of the at-risk target normal cost plus 60% of the not at-risk target normal cost.

2015 target normal cost = (40% × $40,000) + (60% × $33,000) = $35,800

Answer is B.

Question 35

The liability for a participant under the unit credit method is equal to the present value of the benefit accrued as of the first day of the plan year. Smith has 10 years of service as of 1/1/2011.

Monthly accrued benefit$_{1/1/2011}$ = \$40 × 10 years of service = \$400

When there are retirement rates, the present value of the accrued benefit is determined for each possible retirement age, and each present value is multiplied by the probability of retirement at that age. The present values are then summed.

Under the old assumptions, the probabilities of retirement are:

Age 55 = 10%
Age 62 = 90% × 25% = 22.5%
Age 65 = 90% × 75% = 67.5%

Under the new assumptions, the probabilities of retirement are:

Age 62 = 30%
Age 65 = 70%

Smith is currently age 55. The liability under each set of assumptions is:

$$\text{Liability}_{old} = \$400 \times 12 \times [(\ddot{a}_{55}^{(12)} \times 10\%) + (\ddot{a}_{62}^{(12)} \times v^7 \times 22.5\%) + (\ddot{a}_{65}^{(12)} \times v^{10} \times 67.5\%)]$$
$$= \$4,800 \times [(11.10 \times 10\%) + (9.86 \times 0.6028 \times 22.5\%)$$
$$+ (9.25 \times 0.4852 \times 67.5\%)]$$
$$= \$26,289$$

$$\text{Liability}_{new} = \$400 \times 12 \times [(\ddot{a}_{62}^{(12)} \times v^7 \times 30\%) + (\ddot{a}_{65}^{(12)} \times v^{10} \times 70\%)]$$
$$= \$4,800 \times [(10.59 \times 0.6028 \times 30\%) + (10.05 \times 0.4852 \times 70\%)]$$
$$= \$25,577$$

Decrease = \$26,289 - \$25,577 = \$712

Answer is B.

Question 36

The quarterly contribution requirement under IRC section 430(j)(3)(D) is equal to 25% of the smaller of the minimum required contribution for the prior plan year or 90% of the minimum required contribution for the current plan year. Therefore, the quarterly contribution requirement for 2011 is:

$25\% \times \min\{100{,}000; 90\% \text{ of } 125{,}000\} = 25{,}000$

The prefunding balance can be used to pay for all or part of the quarterly contribution requirement, provided the funding target attainment percentage for the prior year (determined without regard to the funding standard carryover balance) is at least 80% (IRC section 430(f)(3)(C)). This is the case with regard to the 2010 funding target attainment percentage because it is given to be 90%, and there is no funding standard carryover balance.

As of 1/1/2010, there was no prefunding balance. However, the contribution for 2010 exceeded the minimum required contribution, and the general conditions of the exam state that unless you are told otherwise, the plan sponsor elects to apply any excess contributions to the prefunding balance.

The 2010 contribution must be discounted to the 1/1/2010 valuation date using the 2010 plan effective rate in order to determine the amount of the excess contribution.

2010 excess contribution $= (125{,}000 \div 1.07^{9.5/12}) - 100{,}000 = 18{,}481$

Any addition to the prefunding balance is made as of the first day of the plan year following the excess contribution, and the excess contribution is increased with interest using the plan effective rate for the year of the excess contribution (IRC section 430(f)(6)(B)(ii)).

Prefunding balance$_{1/1/2011} = 18{,}481 \times 1.07 = 19{,}775$

The prefunding balance is increased using the 2011 plan effective rate to the 4/15/2011 quarterly due date in order to apply it towards the required quarterly contribution.

Prefunding balance$_{1415/2011} = 19{,}775 \times 1.07^{3.5/12} = 20{,}169$

The remaining contribution due on 4/15/2011 (X) $= 25{,}000 - 20{,}169 = 4{,}831$
The contribution due on 7/15/2011 (Y) $= 25{,}000$

$X + Y = 4{,}831 + 25{,}000 = 29{,}831$

Answer is A.

Question 37

A plan is exempt (under IRC section 430(c)(5)) from establishing a new shortfall amortization base in 2010 if 96% of the funding target is no greater than the actuarial value of assets, reduced by the prefunding balance (but only if the employer elects to use at least part of the prefunding balance to pay for the minimum required contribution). It is given that the employer did not elect to apply any of the prefunding balance to the minimum required contribution, so this determination is made without regard to the prefunding balance.

96% of funding target = 96% × 10,000 = 9,600

No shortfall base is required for 2010 because 96% of the funding target (9,600) is less than the actuarial value of assets (9,700).

The statement is true.

Answer is A.

Question 38

The deductible limit for a single employer plan under IRC section 404(o)(2)(A) is equal to the sum of the funding target, the target normal cost, and the cushion amount, with the sum being reduced by the actuarial value of assets. The cushion amount under IRC section 404(o)(3)(A) is equal to the sum of 50% of the funding target plus the increase in the funding target if future compensation increases were taken into account. Since the plan is not at-risk (general condition of the exam, since the question does not state at-risk status), the funding target ($220,000) and target normal cost ($15,000) without regard to the at-risk assumptions are used.

Treasury regulation 1.404(a)-14(d)(2)(i) states that for purposes of the deductible limit under IRC section 404(a)(1), the actuarial value of assets are reduced by contributions that have not yet been deducted.

The cushion amount is:

$$\text{Cushion amount} = (50\% \times \$220,000) + (\$280,000 - \$220,000) = \$170,000$$

The IRC section 404(o)(2)(A) deductible limit is:

$$\$15,000 + \$220,000 + \$170,000 - (\$240,000 - \$12,000) = \$177,000$$

For plans that are not at-risk, the deductible limit can be determined under IRC section 404(o)(2)(B), if that gives a larger result than the deductible limit under IRC section 404(o)(2)(A). The deductible limit under IRC section 404(o)(2)(B) is equal to the sum of the funding target and target normal cost, if each were determined as if the plan was at-risk, with the sum being reduced by the actuarial value of assets. These are the target normal cost and funding target using at-risk assumptions.

The IRC section 404(o)(2)(B) deductible limit is:

$$\$17,000 + \$235,000 - (\$240,000 - \$12,000) = \$24,000$$

The deductible limit is the larger of the IRC section 404(o)(2)(A) and 404(o)(2)(B) limits, which is $177,000.

Answer is C.

Note 1: There are currently no regulations (proposed or otherwise) dealing with deductions under IRC section 404(o). Past application of the deduction limits under IRC section 404 has allowed for an interest adjustment from the valuation date to the earlier of last day of the plan year or the last day of the fiscal year. Without updated regulations, it is not clear whether the $177,000 should be given interest to the end of the year (or even which interest rate to use – presumably the plan effective rate for the year). However, even if $177,000 is given interest at the plan effective rate to the end of the year, the answer still falls within the same answer range.

Note 2: It is not clear whether Treasury regulation 1.404(a)-14(d)(2)(i) has applicability to IRC section 404(o), although it likely does. Given the lack of clarity in the regulations, the Joint Board has also given credit for the answer determined if the actuarial value of assets had not been reduced by the contribution not yet deducted. This results in a deductible limit of:

$$\$15,000 + \$220,000 + \$170,000 - \$240,000 = \$165,000$$

In that case, the answer would be B.

Question 39

The funding target is equal to the present value of the 1/1/2011 accrued benefit. Smith has 30 years of service.

1/1/2011 accrued benefit = 1.5% × $100,000 × 30 years of service = $45,000

It is assumed that there is a 25% chance that Smith will retire at age 62 with a reduced accrued benefit (since Smith has at least 20 years of service) and a 75% chance of retirement at age 65.

In determining the present value, the segment interest rates must be used. Smith is 60 as of 1/1/2011. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (2011 through 2015), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (2016 through 2030), and the segment 3 interest rate is used for the remaining payments (2031 and later).

If Smith retires at age 62, the applicable early retirement factor is 0.82 (1 − (6% × 3 yrs)).

$$\text{Funding target}_{1/1/2011} = \{25\% \times \$45,000 \times 0.82$$

$$\times \left[\frac{N^{(12)}_{62@4\%} - N^{(12)}_{65@4\%}}{D_{62@4\%}} v^2_{4\%} + \frac{N^{(12)}_{65@6\%} - N^{(12)}_{80@6\%}}{D_{62@6\%}} v^2_{6\%} + \frac{N^{(12)}_{80@8\%}}{D_{62@8\%}} v^2_{8\%} \right] \}$$

$$+ \{75\% \times \$45,000 \times \left[\frac{N^{(12)}_{65@6\%} - N^{(12)}_{80@6\%}}{D_{65@6\%}} v^5_{6\%} + \frac{N^{(12)}_{80@8\%}}{D_{65@8\%}} v^5_{8\%} \right] \}$$

$$= \{25\% \times \$45,000 \times 0.82$$

$$\times \left[\frac{55,610 - 43,270}{4,460} v^2_{4\%} + \frac{21,570 - 3,530}{2,480} v^2_{6\%} + \frac{1,590}{1,390} v^2_{8\%} \right] \}$$

$$+ \{75\% \times \$45,000 \times \left[\frac{21,570 - 3,530}{2,030} v^5_{6\%} + \frac{1,590}{1,100} v^5_{8\%} \right] \}$$

$$= \$92,367 + \$257,324 = \$349,691$$

Answer is B.

Question 40

The funding shortfall is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by the prefunding balance and the funding standard carryover balance). Note that there is no funding standard carryover balance (the plan was effective after 2007) and no prefunding balance (the 2009 minimum required contribution was waived, and the minimum required contribution was deposited in 2010, resulting in no prefunding).

The funding shortfall as of 1/1/2011 is: $300,000 – $280,000 = $20,000

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the total pre-funding balance if the employer elects to use any part of it to reduce the minimum contribution requirement, but not reduced by the funding standard carryover balance) is at least as large as the funding target. That is not the case as of 1/1/2011, and a new shortfall amortization base must be created. The base is equal to the excess of the funding target over the actuarial value of the assets (reduced by both credit balance items – in this question there are none), less the outstanding balance of the prior shortfall and waived deficiency amortization bases.

The outstanding balance of the 1/1/2010 shortfall amortization base must be determined using the segment interest rates used for the 2011 valuation (see IRC section 430(h)(2)(C)). However, the 7-year amortization of the base is determined using the 2010 segment rates.

Amortization of 1/1/2010 shortfall amortization base = $9,000 ÷ 5.9253 = $1,519

Outstanding balance of 1/1/2010 shortfall amortization base (6 years remaining to amortize) on 1/1/2011 = $1,519 × 5.2932 = $8,040

The 2009 waived deficiency is amortized over 5 years beginning on 1/1/2010.

Amortization of 1/1/2009 waived deficiency base = $40,000 ÷ 4.6228 = $8,653

Outstanding balance of waived deficiency base (4 years remaining to amortize) on 1/1/2011 = $8,653 × $\ddot{a}_{\overline{4}|5\%}$ = $8,653 × 3.7232 = $32,217

2011 shortfall amortization base = $20,000 - $8,040 - $32,217 = ($20,257)

Amortization of 1/1/2011 shortfall amortization base = ($20,257) ÷ 5.9982 = ($3,377)

The total amortization of the 2010 and 2011 shortfall amortization bases is:

1,519 – 3,377 = ($1,858)

When the net shortfall amortization installment is less than or equal to zero, the shortfall installment for the year is set to 0 (but the bases continue to be maintained in future years). See IRC section 430(c)(1).

The waived amortization base still continues to be amortized.

The minimum required contribution is equal to the sum of the target normal cost and the amortization of the shortfall and waived deficiency amortization bases. The net shortfall installment has been set to 0, so only the amortization of the waived deficiency base is considered.

$$\text{Minimum}_{1/1/2011} = \text{Target normal cost} + \text{Amortization of bases}$$
$$= \$30,000 + \$8,653 = \$38,653$$

Answer is D.

Question 41

The funding standard carryover balance is increased from 1/1/2010 to 1/1/2011 using the actual asset rate of return for 2010 (IRC section 430(f)(8)). There was a 20% loss on the assets in 2010, so the funding standard carryover balance is adjusted by a factor of 0.80 (100% - 20%).

Funding standard carryover balance$_{1/1/2011}$ = 480,000 × 0.80 = 384,000

The funding shortfall as of 1/1/2011 is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by the pre-funding balance and the funding standard carryover balance).

Funding shortfall$_{1/1/2011}$ = 6,920,000 – (5,600,000 – 384,000 – 50,000) = 1,754,000

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the <u>total</u> pre-funding balance if the employer elects to use any part of it to reduce the minimum contribution requirement, but not reduced by the funding standard carryover balance) is at least as large as the funding target. The funding target of 6,920,000 is larger than the actuarial value of assets (5,600,000) even before any reduction for the prefunding balance, so a new shortfall amortization base must be created. The base is equal to the funding shortfall, less the outstanding balance of the prior shortfall amortization bases.

The outstanding balance of the 1/1/2009 and 1/1/2010 shortfall amortization bases must be determined using the segment interest rates used for the 2011 valuation (see IRC section 430(h)(2)(C)). However, the 7-year amortization of each base is determined using the segment rates in effect for the year the base was created. In this question, the segment rates are the same for all years.

Amortization of 1/1/2009 shortfall amortization base = 1,330,000 ÷ 5.9982 = 221,733
Amortization of 1/1/2010 shortfall amortization base = 200,000 ÷ 5.9982 = 33,343

Outstanding balance of 1/1/2009 shortfall amortization base (5 years remaining to amortize) on 1/1/2011 = 221,733 × 4.5459 = 1,007,976
Outstanding balance of 1/1/2010 shortfall amortization base (6 years remaining to amortize) on 1/1/2011 = 33,343 × 5.2932 = 176,491

2011 shortfall amortization base = 1,754,000 – 1,007,976 – 176,491 = 569,533
Amortization of 1/1/2011 shortfall amortization base = 569,533 ÷ 5.9982 = 94,951

Shortfall amortization charge$_{1/1/2011}$ = 221,733 + 33,343 + 94,951 = 350,027

Answer is B.

Question 42

I.   IRC section 430(f)(3)(C) states that the funding standard carryover balance and the prefunding balance cannot be used to reduce the minimum required contribution if, as of the prior year valuation date, the ratio of the actuarial value of assets (reduced only by the prefunding balance and <u>not</u> the funding standard carryover balance) to the funding target is less than 80%. As of 1/1/2010, this ratio is:

$$(1,000,000 - 150,000)/1,000,000 = 85\%$$

The funding standard carryover balance and the prefunding balance can be used to reduce the minimum required contribution for 2011. The statement is true.

II.   IRC section 430(j)(3)(A) states that if a plan has a funding shortfall for the preceding plan year, then the quarterly contribution requirement applies. A plan has a funding shortfall under IRC section 430(c)(4) if the funding target exceeds the actuarial value of assets (reduced by both the funding standard carryover balance and the prefunding balance).

As of 1/1/2010, the funding target is $1,000,000. The actuarial value of assets reduced by the funding standard carryover balance and the prefunding balance is $750,000 ($1,000,000 – 100,000 – 150,000). The plan had a funding shortfall as of 1/1/2010, so it is subject to quarterly contribution requirements for 2011. The statement is true.

III.   Funding shortfall$_{1/1/2011}$ = $1,250,000 – ($1,250,000 – 100,000 – 300,000)
$$= \$400,000$$

The statement is false.

Answer is A.

Question 43

Under IRC section 417(e)(3), the segment rates are phased in over the 5-year period from 2008 through 2012. In 2011, the phase-in is equal to 80% of the segment rate plus 20% of the 30-year Treasury rate.

The lookback month is 3 months, so the rates from October, 2010 are to be used.

The phased-in rates from October, 2010 are:

Segment 1 = (80% × 5%) + (20% × 4%) = 4.8%
Segment 2 = (80% × 6%) + (20% × 4%) = 5.6%
Segment 3 = (80% × 7%) + (20% × 4%) = 6.4%

Smith is age 45 as of 1/1/2011. All annuity payments would begin at age 65 (20 years from now), so only the segment 3 interest rate is used to value the lump sum.

Lump sum = $2,500 × 12 × $\ddot{a}^{(12)}_{65@6.4\%}$ $v^{20}_{@6.4\%}$ = $30,000 × 10.53 × 0.289179 = 91,352

Answer is B.

Question 44

The accrued liability under the entry age normal funding method is equal to the accumulated value as of the valuation date of the prior normal costs. The normal costs are based upon the <u>projected</u> benefit at assumed retirement age. There is an assumption for retirement at ages 62 and 65 (50% probabilty of retirement at each age), so the projected retirement benefit must be determined at each age. The early retirement adjustment must be made for retirement at age 62.

Projected benefit at age 65: 185×17 years of service $= \$3,145$
Projected benefit at age 62: 185×14 years of service $\times [1 - (3\% \times 3 \text{ years})] = \$2,356.90$

The present value of benefits must be determined at entry age (age at hire). Smith was hired at age 48. Note that the discount for years prior to normal retirement age is based on interest only because there is no mention of any preretirement decrements. The present value includes the probability of retirement at each age.

$$\begin{aligned}
PVFB_{48} &= [50\% \times 3,145 \times 12 \times \ddot{a}_{65}^{(12)} \times v^{17}] + [50\% \times 2,356.90 \times 12 \times \ddot{a}_{62}^{(12)} \times v^{14}] \\
&= [18,870 \times N_{65}^{(12)} / D_{65} \times 0.316574] + [14,141.40 \times N_{62}^{(12)} / D_{62} \times 0.387817] \\
&= 60,971 + 59,466 = 120,437
\end{aligned}$$

The normal cost is equal to the PVFB amortized over the total years to retirement. Since there are two possible retirement ages, a weighted average (based upon probability of retirement) of the amortization factors for the two ages is used.

$$NC = PVFB/(.5\,\ddot{a}_{\overline{17|}} + .5\,\ddot{a}_{\overline{14|}}) = 120,437/(5.223324 + 4.678825) = 12,163$$

The accrued liability is equal to the accumulation of the past normal costs to Smith's current age on 1/1/2011 (9 years of accumulation from age 48 to 57).

$$AL = NC \times \ddot{s}_{\overline{9|}} = 12,163 \times 12.816445 = 155,886$$

Answer is C.

Question 45

The funding target is equal to the present value of the benefit accrued as of the first day of the plan year. Smith retired in 2009 with a benefit payable as a 10-year certain and life annuity. As of 1/1/2011, there are 8 years left on the certain period, so the form of benefit is an 8-year certain and life.

In determining the present value, the segment interest rates must be used. Smith is 67 as of 1/1/2011. The segment 1 interest rate is used for payments made within the first 5 years of the valuation date (2011 through 2015), the segment 2 interest rate is used for payments made within the next 15 years of the valuation date (2016 through 2030), and the segment 3 interest rate is used for the remaining payments (2031 and later).

The 8-year certain annuity is provided based upon the segment rates (6.53). The remaining payments are discounted based upon the segment 2 rate (years 9 through 20) and segment 3 rate.

$$\text{Funding target}_{1/1/2011} = \$1,000 \times 12 \times \left\{6.53 + \left[\frac{N^{(12)}_{75@6\%} - N^{(12)}_{87@6\%}}{D_{67@6\%}} + \frac{N^{(12)}_{87@7\%}}{D_{67@7\%}}\right]\right\}$$

$$= \$12,000 \times \left\{6.53 + \left[\frac{81,019 - 11,214}{18,277} + \frac{4,792}{9,743}\right]\right\}$$

$$= \$130,093$$

Answer is C.

Question 46

The average value method under IRC section 430(g)(3)(B), Treasury regulation 1.430(g)-1(c)(2), and Revenue Notice 2009-22 allows for averaging of fair market and adjusted fair market values for up to 25 months ending on the valuation date. The asset method being used in this question averages the fair market value on the valuation date (1/1/2011) with the adjusted fair market value from the previous valuation date (1/1/2010).

The adjusted fair market value from a particular valuation date is the fair market value on that date, adjusted for all contributions, benefit payments and administrative expenses that occurred between that valuation date and the current valuation date, and further adjusted for expected earnings based upon the actuary's best estimate of the asset rate of return for the year. However, if this expected rate of return is larger than the segment 3 interest rate, then the segment 3 interest rate is used. In this question, the segment 3 interest rate of 7% is used to determine the expected earnings (the expected rate of return of 8% is larger than this).

In addition, the receivable contribution for the prior year must be included in the beginning asset value. That receivable contribution is interest adjusted from the date of contribution to the beginning of the year in which it was contributed using the plan effective rate for the year <u>for which</u> it was contributed (the prior year plan effective rate). Note that the only receivable contribution is for the 2010 plan year, so it must be included in both the 1/1/2011 market value of assets and the adjusted assets from 1/1/2010.

The expected earnings for 2010 are:
$$(580,000 \times .07) + (50,000 \times .035) - [(50,000 + 35,000) \times .035] = 39,375$$

Note the use of simple interest in the determination of the expected earnings. The regulations do not require simple or compound interest, so either method is acceptable (although using compound interest would result in a slightly different numerical answer – but within the same answer range).

2010 receivable contribution as of $1/1/2011 = 150,000 \div 1.06^{8/12} = 144,285$
1/1/2010 adjusted fair market value
$$= 580,000 + 50,000 - 50,000 - 35,000 + 39,375 + 144,285 = 728,660$$
1/1/2011 fair market value (with receivable contribution) $= 795,000 + 144,285 = 939,285$
1/1/2011 actuarial value $= (728,660 + 939,285)/2 = 833,973$

Under IRC section 430(g)(3)(B)(iii), the actuarial value cannot be less than 90% of the market value of the assets (including the interest-adjusted receivable contribution). 90% of 939,285 is 845,357, so that is the actuarial value of assets.

Answer is C.

Question 47

The deductible limit for a single employer plan under IRC section 404(o)(2)(A) is equal to the sum of the funding target, the target normal cost, and the cushion amount, with the sum being reduced by the actuarial value of assets. The cushion amount under IRC section 404(o)(3)(A) is equal to the sum of 50% of the funding target plus the increase in the funding target if future compensation increases were taken into account. For plans that do not base benefits on compensation, the increase in the funding target is based upon the average of the benefit increases provided under the plan over the last 6 years.

It is not known whether the benefit formula is salary based or not. However, if it is assumed that it is not salary based, then the cushion amount would simply be equal to 50% of the funding target.

The IRC section 404(o)(2)(A) deductible limit is:

$$\$90,000 + \$1,600,000 + (50\% \times \$1,600,000) - \$1,760,000 = \$730,000$$

For plans that are not at-risk, the deductible limit can be determined under IRC section 404(o)(2)(B), if that gives a larger result than the deductible limit under IRC section 404(o)(2)(A). The plan is not at-risk because there are fewer than 500 participants. However, since the statement is simply stating a lower limit of $720,000 as the deductible limit, it is already clear (regardless of whether the plan benefit is compensation based or the plan is at-risk) that the deductible limit must be at least $730,000. The statement is true.

Answer is A.

Question 48

The average value method under IRC section 430(g)(3)(B), Treasury regulation 1.430(g)-1(c)(2), and Revenue Notice 2009-22 allows for averaging of fair market and adjusted fair market values for up to 25 months ending on the valuation date. The asset method being used in this question averages the fair market value on the valuation date (1/1/2011) with the adjusted fair market value from the previous two valuation dates (1/1/2009 and 1/1/2010).

The adjusted fair market value from a particular valuation date is the fair market value on that date, adjusted for all contributions, benefit payments and administrative expenses that occurred between that valuation date and the current valuation date, and further adjusted for expected earnings based upon the actuary's best estimate of the asset rate of return for the year. However, if this expected rate of return is larger than the segment 3 interest rate, then the segment 3 interest rate is used. In this question, the segment 3 interest rate for 2009 of 6% is used to determine the expected earnings (the expected rate of return of 7% is larger than this). For 2010, the expected earnings is based on the expected rate of return (since the segment 3 rate for 2010 of 8% is larger than the expected rate of return).

The expected earnings for 2009 and 2010 are:

2009 expected earnings $= (1,700,000 \times .06) + (62,000 \times .03) - (31,000 \times .03) = 102,930$
2010 expected earnings
$$= (2,500,000 \times .07) + (66,000 \times .035) - (33,000 \times .035) = 176,155$$

Note the use of simple interest in the determination of the expected earnings. The regulations do not require simple or compound interest, so either method is acceptable (although using compound interest would result in a slightly different numerical answer – but within the same answer range).

1/1/2009 adjusted fair market value
$$= 1,700,000 + (62,000 + 66,000) - (31,000 + 33,000) + (102,930 + 176,155)$$
$$= 2.043,085$$
1/1/2010 adjusted fair market value
$$= 2,500,000 + 66,000 - 33,000 + 176,155 = 2,709,155$$

1/1/2011 actuarial value $= (2,043,085 + 2,709,155 + 2,450,000)/3 = 2,400,747$

Under IRC section 430(g)(3)(B)(iii), the actuarial value must be within 10% of the market value of the assets. That is the case in this question,

Answer is C.

Question 49

The accrued liability under the entry age normal funding method is equal to the accumulated value of the prior normal costs (as of the valuation date). The normal costs are based upon the <u>projected</u> benefit at assumed retirement age (65 in this question, per the general conditions of the exam). The 3% salary scale is incorporated into the determination of the projected benefit. Smith is age 50 as of the valuation date, so the 2010 salary must be projected 15 years to obtain the projected final salary.

Final salary = $100,000 \times 1.03^{15} = \$155,796$
Projected benefit = $50\% \times \$155,796 = \$77,898$

The present value of benefits must be determined at entry age (age at hire). Smith was hired at age 33. Note that the discount for years prior to normal retirement age is based on interest only because there is no mention of any preretirement decrements.

$\text{PVFB}_{33} = \$77,898 \times \ddot{a}_{65}^{(12)} \times v^{32} = \$77,898 \times 11.3119 \times 0.154957 = \$136,544$

The normal cost is equal to the PVFB amortized over the total years to retirement. Since there is a salary scale, and the normal cost must be determined as a level percentage of salary (per the general conditions of the exam), an implicit interest rate is used incorporating both the 6% interest rate and the 3% salary scale.

Implicit interest rate for amortizing = $(1.06/1.03) - 1 = .029126$, or 2.9126%

$\text{NC}_{33} = \text{PVFB}_{33} / \ddot{a}_{\overline{32}|.029126} = \$136,544 / 21.234340 = \$6,430$

The normal cost as of 1/1/2011 (when Smith is age 50) is equal to the normal cost at age 33, increased by 3% per year (since the normal cost increases by the same percentage as does the salary).

$\text{NC}_{50} = \text{NC}_{33} \times 1.03^{17} = \$6,430 \times 1.652848 = \$10,628$

The accrued liability is equal to the accumulation of the past normal costs to Smith's current age on 1/1/2011 (17 years of accumulation from age 33 to 50). This accumulation also uses the implicit interest rate.

$\text{AL}_{50} = \text{NC}_{50} \times \ddot{s}_{\overline{17}|.029126} = \$10,628 \times 22.230738 = \$236,268$

Answer is D.

Question 50

The minimum required contribution is equal to the sum of the target normal cost and the amortization of the shortfall bases. The 2010 target normal cost is provided, but the shortfall amortization base for 2010 must be developed. There are no prior shortfall amortization bases.

The funding shortfall is equal to the excess, if any, of the funding target over the actuarial value of the assets (reduced by both the prefunding balance and the funding standard carryover balance).

The funding shortfall as of 1/1/2010 is:

Funding shortfall$_{1/1/2010}$ = 850,000 – 636,000 = 214,000

There is an exemption from creating a new shortfall amortization base under IRC section 430(c)(5) in cases where the actuarial value of assets (reduced by the <u>total</u> prefunding balance if the employer elects to use any part of it to reduce the minimum contribution requirement, but not reduced by the funding standard carryover balance) is at least as large as the funding target. That is not the case as of 1/1/2010 (the $850,000 funding target exceeds the $636,000 actuarial value of assets – there is no prefunding balance). There is a transition rule available for 2010 under IRC section 430(c)(5)(B) under which the actuarial value of assets (reduced by the prefunding balance) can be compared to only 96% of the funding target for purposes of the exemption. This transition rule is not available if IRC section 412(l) – the additional funding charge – applied to the 2007 plan year (see IRC section 430(c)(5)(B)(iv)). That is not the case in this question, since the exam general conditions state that, unless otherwise indicated, the plan has never been subject to IRC section 412(l). So, applying the transition rule, 96% of the funding target is $816,000 (96% of $850,000), which still exceeds the actuarial value of the assets (reduced by the prefunding balance), so the new funding shortfall amortization base is required. The base is equal to the excess of 96% of the funding target over the actuarial value of the assets (reduced by both credit balance items).

2010 shortfall amortization base = 816,000 - 636,000 = 180,000

The shortfall amortization base is amortized over 7 years: 180,000/5.9982 = 30,009

Minimum required contribution$_{1/1/2010}$ = 100,000 + 30,009 = 130,009

The 2010 contribution of 200,000 exceeds the minimum required contribution by 69,991. The general conditions of the exam state that, unless you are told otherwise, it is to be assumed that the employer elects to increase the prefunding balance by any excess contribution. Under IRC section 430(f)(6), additions to the prefunding balance are increased using the plan effective rate for the year of the excess contribution to the next valuation date.

Prefunding balance$_{1/1/2011}$ = 69,991 × 1.06 = 74,190

The outstanding balance of the 1/1/2010 shortfall amortization base must be determined using the segment interest rates used for the 2011 valuation (see IRC section 430(h)(2)(C)). In this question, the segment rates and resulting amortization factors are the same for both 2010 and 2011.

Outstanding balance of 1/1/2010 shortfall amortization base (6 years remaining to amortize) on 1/1/2011 = 30,009 × 5.2932 = 158,844

Consider option 1. The plan sponsor elects to reduce the prefunding balance to 0. The funding shortfall for 2011 is:

Funding shortfall$_{1/1/2011}$ = 986,800 – 902,000 = 84,800

The plan is not exempt from creating a new shortfall base for 2011 because there is a positive funding shortfall. The new shortfall base is equal to the funding shortfall less the outstanding balance of the 2010 shortfall base.

2011 shortfall amortization base = 84,800 – 158,844 = (74,044)

The 2011 shortfall amortization base (which is negative) is amortized over 7 years.

Amortization of 2011 shortfall base = (74,044)/5.9982 = (12,344)

Minimum required contribution$_{1/1/2011}$ = 120,000 + 30,009 – 12,344 = 137,665

There is no funding standard carryover or prefunding balance, so that is also the smallest amount that satisfies the minimum funding standard under option 1.

X = 137,665

Consider option 2. The plan sponsor does not elect to reduce any of the prefunding balance. The funding shortfall for 2011 (reducing the assets by the prefunding balance) is:

Funding shortfall$_{1/1/2011}$ = 986,800 – (902,000 – 74,190) = 158,990

The plan is not exempt from creating a new shortfall base for 2011 because there is a positive funding shortfall. The new shortfall base is equal to the funding shortfall less the outstanding balance of the 2010 shortfall base.

2011 shortfall amortization base = 158,990 – 158,844 = 146

The 2011 shortfall amortization base is amortized over 7 years.

Amortization of 2011 shortfall base = 146/5.9982 = 24

Minimum required contribution$_{1/1/2011}$ = 120,000 + 30,009 + 24 = 150,033

In order to determine the smallest amount that satisfies the minimum funding standard, the minimum required contribution is reduced by the prefunding balance, if allowed. Under IRC section 430(f)(3)(C), the prefunding balance cannot be used to reduce the minimum required contribution unless the ratio of the actuarial value of assets to the funding target for the prior year was at least 80%. For 2010, this ratio is:

636,000/850,000 = 74.9%

The prefunding balance cannot be used to reduce the minimum required contribution for 2011.

Y = 150,033

X – Y = 137,665 – 150,033 = (12,368)

Answer is B.

Question 51

The minimum required contribution under the entry age normal cost method is equal to the normal cost plus the amortization of the bases. In the first year of the cost method, the initial amortization base is equal to the accrued liability, and it is amortized over a 15 year period.

$$\text{Minimum required contribution}_{1/1/2010} = 200{,}000 + \frac{1{,}000{,}000}{\ddot{a}_{\overline{15}|}}$$

$$= 200{,}000 + 102{,}612 = 302{,}612$$

The credit balance in the funding standard account as of 12/31/2010 is equal to the excess of the 350,000 contributed on 12/31/2010 over the minimum required contribution for 2010 (increased with interest from 1/1 to 12/31).

$$\text{Credit balance}_{12/31/2010} = 350{,}000 - (302{,}612 \times 1.07) = 26{,}205$$

The 2010 experience gain or loss must be determined. This is equal to the difference between the expected unfunded accrued liability and the actual unfunded accrued liability.

Expected UAL = [(1,000,000 + 200,000) × 1.07] – 350,000 = 934,000
Actual UAL = 1,184,000 – 350,000 = 834,000

2010 experience gain = 934,000 – 834,000 = 100,000

The experience gain is amortized over 15 years.

$$\text{Minimum required contribution}_{1/1/2011} = 220{,}000 + 102{,}612 - \frac{100{,}000}{\ddot{a}_{\overline{15}|}}$$

$$= 220{,}000 + 102{,}612 - 10{,}261 = 312{,}351$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution less the credit balance.

X = (312,351 – 26,205) × 1.07 = 306,176

Answer is E.

Question 52

Both the assertion and the reason are true, and the reason is a correct explanation of the assertion. This is discussed in the study note "Assessment and Selection of Actuarial Assumptions" on page 21.

Answer is A.