

Solutions to EA-2(A) Examination Fall, 2007

Question 1

The outstanding balance of the shortfall amortization base for 2008 as of 1/1/2008 is equal to the product of the shortfall amortization charge and the shortfall amortization factor.

$$2008 \text{ shortfall amortization base} = \$45,000 \times 5.9982 = \$269,919$$

This represents the funding shortfall as of 1/1/2008. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned} \text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ \$269,919 &= \$1,400,000 - (\$1,140,000 - \text{Funding standard carryover balance}) \\ \text{Funding standard carryover balance} &= \$9,919 \end{aligned}$$

The smallest amount that satisfies the minimum funding standard for 2008 as of 1/1/2008 is equal to the target normal cost plus the shortfall amortization charge less the funding standard carryover balance. This is:

$$\$25,000 + \$45,000 - \$9,919 = \$60,081$$

Answer is B.

Note: Exam general condition 35 indicates that the smallest amount that satisfies the minimum funding standard includes a reduction to the minimum required contribution under IRC section 430(a) by the funding standard carryover balance.

Question 2

The smallest amount that satisfies the minimum funding standard for 2008 as of 1/1/2008 is equal to the target normal cost plus the shortfall amortization charge less the funding standard carryover balance (equal to the 12/31/2007 credit balance). This is:

$$\$38,000 + \$33,500 - \$7,550 = \$63,950$$

If the contribution for 2008 is deposited after 1/1/2008, it must be discounted with interest using the 2008 effective interest rate in order to be applied towards the required contribution. Since the contribution is deposited on 9/15/2009, it must be discounted (as required by IRC section 430(j)(2)) for 20½ months at the effective interest rate of 5.80%. Alternatively, the required \$63,950 is increased with the effective interest rate to 9/15/2009 in order to determine the smallest amount that satisfies the minimum funding standard.

$$\text{Minimum required contribution on 9/15/2009} = \$63,950 \times 1.058^{20.5/12} = \$70,416$$

Answer is B.

Question 3

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 cushion amount is:

$$\text{Cushion amount} = (50\% \times \$1,000,000) + (\$1,200,000 - \$1,000,000) = \$700,000$$

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

$$\$1,000,000 + \$80,000 + \$700,000 - \$915,000 = \$865,000$$

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:

$$\$1,500,000 + \$80,000 - \$915,000 = \$665,000$$

The larger of the deductible limit under IRC section 404(o)(2)(A) or under IRC section 404(o)(2)(B) is \$865,000.

Answer is C.

Note: It must be assumed in this question that the plan is not at-risk for 2008. It also is not clear whether the given at-risk funding target and target normal cost for IRC section 404 purposes is provided with or without regard to the 20% phase-in under IRC section 430(i)(5), or whether this phase-in even applies to IRC section 404 (there are no regulations regarding this issue, and since the plan actually is not at-risk, the phase-in may not actually apply under IRC section 404). It is assumed in this solution that the phrase “for IRC section 404 purposes” in the data implies that the phase-in has already been included if it is indeed necessary (in spite of exam general condition 47 which states that at-risk funding target and target normal cost is provided without the phase-in). Finally, note that the minimum required contribution can be deducted, if greater than the otherwise deductible limit. There is not enough information to calculate the minimum required contribution in this question, so the minimum can be ignored.

Question 4

The funding target is based upon the accrued benefit as of the valuation date.

$$AB_{1/1/2008} = \$2,000 \times 15 \text{ years of service} = \$30,000$$

Under IRC section 430(i)(1)(B), the at-risk funding target is determined by taking into account additional actuarial assumptions. The first of these is that for participants eligible to begin receiving benefits during the current year or any of the next 10 years (the 11 year period beginning on 1/1/2008), they must be assumed to retire at the earliest possible date. Smith will reach an early retirement age of 55 (with 25 years of service) on 1/1/2018, which falls within the 11-year period. So, it must be assumed that Smith will elect to receive \$30,000 per year beginning at age 55 (the plan provides for an unreduced benefit at early retirement).

The second additional actuarial assumption is that any participant eligible to retire during the 11-year period must be assumed to elect the most valuable optional benefit at that time. Since the question does not indicate any optional benefits, it must be assumed that the benefit is payable as a life annuity (exam general condition 7 states that the normal form of benefit is assumed to be a life annuity).

The present value of the benefits must be determined using the segmented interest rates (see IRC section 430(h)(2)(C)). The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. Since Smith is assumed to retire exactly 10 years after the valuation date, the segment 2 interest rate applies to the first 10 years of payments, and the segment 3 interest rate applies to each payment after that time.

Note that the annual accrued benefit of \$30,000 is equivalent to a monthly accrued benefit of \$2,500. Since the question does not state that benefits are payable annually, it must be assumed that they are payable monthly according to exam general condition 7. Therefore, $N_x^{(12)}$ must be determined at ages 55 and 65 for the segment 2 interest rate of 6% and at age 65 for the segment 3 interest rate of 7%. Recall from life contingencies:

$$N_x^{(12)} = N_x - \frac{11}{24} D_x$$

So,

$$N_{55@6\%}^{(12)} = N_{55@6\%} - \frac{11}{24} D_{55@6\%} = 601,124 - \left(\frac{11}{24} \times 44,586\right) = 580,689$$

$$N_{65@6\%}^{(12)} = N_{65@6\%} - \frac{11}{24} D_{65@6\%} = 265,833 - \left(\frac{11}{24} \times 23,980\right) = 254,842$$

$$N_{65@7\%}^{(12)} = N_{65@7\%} - \frac{11}{24} D_{65@7\%} = 223,488 - \left(\frac{11}{24} \times 20,568\right) = 214,061$$

Since there is no assumed pre-retirement mortality for funding, the present value prior to the assumed retirement age of 55 must be discounted using interest only. Again, note that payments made between ages 55 and 65 are valued using the second segment interest rate of 6%, and payments made on or after age 65 are valued using the third segment interest rate of 7%.

$$\begin{aligned}
 \text{At-risk funding target} &= 30,000 \times ([v_{@6\%}^{10} \times (N_{55@6\%}^{(12)} - N_{65@6\%}^{(12)}) / D_{55@6\%}] \\
 &\quad + [v_{@7\%}^{10} \times (N_{65@7\%}^{(12)} / D_{55@7\%})]) \\
 &= 30,000 \times ([0.558395 \times (580,689 - 254,842) / 44,586] \\
 &\quad + [0.508349 \times (214,061 / 42,007)]) \\
 &= 200,141
 \end{aligned}$$

Answer is B.

Question 5

Plans that have been at-risk for fewer than 5 consecutive years are subject to the transition rule of IRC section 430(i)(5) applicable to the funding target. Under this rule, the increase in the funding target is phased in at the rate of 20% per year that the plan has been at-risk. Since 2008 is the first year that the plan is at-risk, only 20% of the increase in the funding target attributable to the additional at-risk assumptions is added to the funding target without the at-risk assumptions. The transitional at-risk funding target for 2008 is:

$$\$12,000,000 + [20\% \times (\$12,400,000 - \$12,000,000)] = \$12,080,000$$

The funding shortfall under IRC section 430(c)(4) for 2008 is the excess of the funding target over the actuarial value of assets, reduced by the funding standard carryover balance. The funding standard carryover balance is equal to 0 since there is no credit balance as of 12/31/2007. The funding shortfall is:

$$\$12,080,000 - \$6,000,000 = \$6,080,000$$

This is the shortfall amortization base as of 1/1/2008 since there are no previous bases to reduce the funding shortfall.

Answer is B.

Question 6

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$12,000,000 - (\$11,000,000 - \$1,224,500) \\ &= \$2,224,500\end{aligned}$$

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned}\text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$800,000 + (\$2,224,500/5.9982) \\ &= \$1,170,861\end{aligned}$$

Since the \$10,000 contribution is deposited on 12/31/2008, it must be discounted (as required by IRC section 430(j)(2)) for 12 months at the effective interest rate of 5.70%.

$$\text{Value of 2008 contribution on 1/1/2008} = \$10,000 \times v_{5.7\%} = \$9,461$$

The contribution still due (to be paid by applying the funding standard carryover balance) is equal to \$1,161,400 (\$1,170,861 - \$9,461).

This leaves a remaining funding standard carryover balance as of 1/1/2008 of \$63,100 (\$1,224,500 - \$1,161,400). This is increased with interest to 1/1/2009 using the plan asset rate of return for 2008 (see IRC section 430(f)(8)).

$$\text{Funding standard carryover balance}_{1/1/2009} = \$63,100 \times 1.0489 = \$66,186$$

Answer is C.

Question 7

For purposes of the final 3-year average salary, each salary must be limited to the IRC section 401(a)(17) compensation limit for the year paid. So, the 2007 salary of \$250,000 must be limited to the 401(a)(17) limit for 2007 of \$225,000, and the 2008 salary of \$280,000 must be limited to the 401(a)(17) limit for 2008 of \$230,000.

$$\text{3-year average salary} = \frac{170,000 + 225,000 + 230,000}{3} = 208,333$$

$$\text{Plan accrued benefit} = 10\% \times 208,333 \times 5 \text{ years of service} = 104,167$$

For purposes of IRC section 415, the accrued benefit must be limited to the smaller of the dollar limit or the compensation limit. The dollar limit for 2008 is assumed to be \$185,000. This must be reduced for years of plan participation less than 10. It is assumed that Smith entered the plan immediately upon employment (since there is no information to the contrary), so the IRC section 415 dollar limit is reduced for only 5 years of plan participation:

$$\text{415 dollar limit} = 185,000 \times \frac{5}{10} = 92,500$$

The compensation limit is equal to the high 3-year average compensation, which has already been determined as 208,333. This must be reduced for years of service less than 10. Smith has only 5 years of service.

$$\text{415 compensation limit} = 208,333 \times \frac{5}{10} = 104,167$$

The overall 415 limit is the smaller of the dollar limit or the compensation limit, which is 92,500. Since this is smaller than the plan accrued benefit, the accrued benefit must be limited to 92,500.

Answer is B.

Question 8

Any new shortfall amortization base is equal to the difference between the current funding shortfall and the outstanding balance of any existing shortfall amortization bases from prior years (see IRC section 430(c)(3)). Since shortfall amortization bases are amortized over 7 years (see IRC section 430(c)(2)(B)), there are 6 years left to amortize the 1/1/2008 shortfall amortization base.

The outstanding balance must be determined using the segmented interest rates (see IRC section 430(h)(2)(C)). The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. Since there are only 6 payments left to amortize the 1/1/2008 shortfall amortization base, only the first and second segment rates will be used. They are both 6%.

$$\begin{aligned}\text{Outstanding balance of 1/1/2008 shortfall amortization base on 1/1/2009} &= 185,000 \times \ddot{a}_{\overline{6}|6\%} \\ &= 185,000 \times 5.212364 \\ &= 964,287\end{aligned}$$

Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by the funding standard carryover balance and the prefunding balance). Since there is a 0 credit balance in the funding standard account as of 12/31/2007, there was no funding standard carryover balance as of 1/1/2008. And since the smallest amount to satisfy the minimum funding standard was contributed for 2008, there is no prefunding balance. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall}_{1/1/2009} &= \text{Funding target} - \text{Actuarial assets} \\ &= 11,000,000 - 10,500,000 \\ &= 500,000\end{aligned}$$

$$\text{New shortfall base as of 1/1/2009} = 500,000 - 964,287 = (464,287)$$

$$\begin{aligned}\text{Shortfall amortization charge as of 1/1/2009} &= 185,000 + (464,287)/\ddot{a}_{\overline{7}|6\%} \\ &= 185,000 - 78,462 \\ &= 106,538\end{aligned}$$

Answer is C.

Question 9

The investment gain or loss for 2007 is equal to the difference between the actual and the expected actuarial value of assets as of 1/1/2008. The expected actuarial value of assets is equal to the prior year (1/1/2007) actuarial value of assets, plus the contribution for 2007, less the benefit payments made in 2007, each increased by the valuation interest rate of 7% (pro-rated for a partial year, if necessary).

$$\begin{aligned}\text{Expected actuarial assets} &= (500,000 \times 1.07) + (100,000 \times 1.07^{4/12}) - (35,000 \times 1.07^{6/12}) \\ &= 601,077\end{aligned}$$

Since the actual value of the assets is less than the expected value, there is an investment loss.

$$\text{2007 investment loss} = 601,077 - 575,000 = 26,077$$

The total gain or loss for 2007 is equal to the difference between the actual and the expected unfunded accrued liability (UAL) as of 1/1/2008. The expected unfunded accrued liability is equal to the prior year (1/1/2007) unfunded accrued liability, plus the normal cost for 2007, less the contribution made in 2007, each increased by the valuation interest rate of 7% (pro-rated for the contribution made on 9/1/2007).

$$\text{Expected UAL} = [(550,000 - 500,000 + 100,000) \times 1.07] - (100,000 \times 1.07^{4/12}) = 58,219$$

$$\text{Actual UAL} = 700,000 - 575,000 = 125,000$$

Since the actual UAL is greater than the expected UAL, there is an actuarial loss.

$$\text{2007 actuarial loss} = 125,000 - 58,219 = 66,781$$

$$X = 26,077/66,781 = 0.3905, \text{ or } 39.05\%$$

Answer is D.

Note that simple interest can be used instead of compound interest.

Question 10

Smith is age 60 on 1/1/2008. The accrued benefit of \$9,250 per month, annualized to 111,000, must be reduced by 4.55% per year prior from age 62 to age 60, for a total reduction of 9.1%.

$$\text{Annual early retirement benefit} = 111,000 \times (1 - .091) = 100,899$$

For purposes of IRC section 415, the accrued benefit must be limited to the smaller of the dollar limit or the compensation limit. The dollar limit for 2008 is assumed to be \$185,000. This must be reduced for years of plan participation less than 10. Smith entered the plan on 1/1/2002 and has 6 years of participation in the plan, so the IRC section 415 dollar limit is reduced accordingly:

$$415 \text{ dollar limit} = 185,000 \times \frac{6}{10} = 111,000$$

In addition, the dollar limit must be reduced for retirement prior to age 62. The reduced dollar limit is the smaller of the benefit reduced using the plan's early retirement reduction factor, or the benefit reduced actuarially using the applicable interest rate and mortality table under IRC section 417(e)(3). The actuarial reduction from age 62 to age 60 is discounted on an interest only basis since there is no forfeiture upon pre-retirement death. The two reduced dollar limits are:

$$\text{Plan reduction} = 111,000 \times (1 - .091) = 100,899$$

$$\begin{aligned} \text{Actuarial reduction} &= 111,000 \times \ddot{a}_{62@5\%}^{(12)} \times v_{5\%}^2 \div \ddot{a}_{60@5\%}^{(12)} \\ &= 111,000 \times 12.67978 \times 0.907029 \div 13.25082 \\ &= 96,341 \end{aligned}$$

The dollar limit is then the smaller, which is 96,341.

The compensation limit is equal to the high 3-year average compensation, which is 150,000. This must be reduced for years of service less than 10. Smith has only 7 years of service.

$$415 \text{ compensation limit} = 150,000 \times \frac{7}{10} = 105,000$$

There is no adjustment to the compensation limit for retirement prior to age 62.

The overall 415 limit is the smaller of the dollar limit or the compensation limit, which equals 96,341. Since this is smaller than the plan accrued early retirement benefit, the accrued benefit must be limited to 96,341.

Answer is B.

Question 11

The smoothed value method described in section 3.15 of Revenue Procedure 2000-40 states that when a 5-year smoothing period is used, the market value of assets as of a valuation date is adjusted by 4/5 of the asset gain or loss from the prior year, 3/5 of the asset gain or loss from the second prior year, 2/5 of the asset gain or loss from the third prior year, and 1/5 of the asset gain or loss from the fourth prior year. Losses are added to and gains are subtracted from the market value of assets.

Similarly, when a 2-year smoothing period is used, the market value of assets as of a valuation date is adjusted by 1/2 of the asset gain or loss from the prior year. Again, losses are added to and gains are subtracted from the market value of assets.

Actuarial value of assets (AVA) under 5-year smoothing

$$\text{AVA} = 5,000,000 - \left(\frac{4}{5} \times 200,000\right) + \left(\frac{3}{5} \times 50,000\right) + \left(\frac{2}{5} \times 200,000\right) + \left(\frac{1}{5} \times 50,000\right) = 4,960,000$$

Actuarial value of assets (AVA) under 2-year smoothing

$$\text{AVA} = 5,000,000 - \left(\frac{1}{2} \times 200,000\right) = 4,900,000$$

The change in the actuarial value of assets under the two methods is:

$$4,960,000 - 4,900,000 = 60,000$$

Answer is C.

Note that in each case, the actuarial value of the assets must be within 20% of the market value of the assets. This is clearly the case since the market value is 5,000,000.

Question 12

IRC section 430(g)(2)(B) allows any single employer plan with 100 or fewer participants on each day of the prior year to use any day of the year as a valuation date.

The statement is false.

Answer is B.

Question 13

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$10,000,000 - (\$9,800,000 - \$500,000) \\ &= \$700,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$10,000,000 funding target exceeds the \$9,800,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)), as is the case in this question. So, the transition rule is not available, and the funding shortfall amortization base must be created.

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned}\text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$2,000,000 + (\$700,000/5.9982) \\ &= \$2,116,702\end{aligned}$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). This amount is:

$$\$2,116,702 - \$500,000 = \$1,616,702$$

Answer is C.

Question 14

The gain or loss due to a participant's retirement is equal to the difference between the accrued liability under the plan's cost method if they had not retired, and the actual liability (the present value of their accrued benefit).

Smith has retired at age 59. Although it is not explicitly stated that this is an early retirement age, the early retirement adjustment definition would imply that this is an acceptable early retirement age. The early retirement reduction for Smith is 28% ($4 \times 4\%$ plus $2 \times 6\%$). The determination of Smith's accrued benefit payable at age 65, early retirement benefit, and present value of the early retirement benefit are:

$$\text{Accrued benefit} = 1\% \times \frac{60,000 + 62,000 + 63,000}{3} \times 17 \text{ years of service} = 10,483$$

$$\text{Early retirement benefit} = 10,483 \times (1 - .28) = 7,548$$

$$\text{Present value} = 7,548 \times \ddot{a}_{59}^{(12)} = 84,990$$

The actuarial cost method is projected unit credit. The accrued liability under this cost method is equal to the present value of the "accrued benefit" at the beginning of the year (1/1/2008), where the "accrued benefit" is based upon projected compensation using the salary scale (projected through 2009, the year before the assumed retirement date of 1/1/2010). Note that the assumed retirement age is 61, so the "accrued benefit" must be reduced from age 65 to 61, an early retirement reduction of 16% ($4 \times 4\%$). Salary increases are assumed only through age 61.

$$\begin{aligned} \text{Projected "accrued benefit"} &= 1\% \times \frac{63,000 + (63,000 \times 1.03) + (63,000 \times 1.03^2)}{3} \\ &\quad \times 17 \text{ years of service} = 11,035 \end{aligned}$$

$$\text{Projected "accrued benefit" reduced for early retirement} = 11,035 \times (1 - .16) = 9,269$$

$$\text{Present value} = 9,269 \times \ddot{a}_{61}^{(12)} \times v^2 = 88,083$$

There is a gain since the actual liability is less than the expected liability under the cost method.

$$\text{Gain} = 88,083 - 84,990 = 3,093$$

Answer is B.

Question 15

When the pre-retirement valuation interest rate is changed, the outstanding balance of each amortization base in existence prior to the change must be re-amortized over the remaining period at the new interest rate. Since the interest rate has decreased from 7.5% to 7%, the amount of each amortization charge (credit) will decrease as well.

$$\text{Decrease from plan amendment base} = \frac{377,201}{\ddot{a}_{29|,075}} - \frac{377,201}{\ddot{a}_{29|,07}} = 30,000 - 28,713 = 1,287$$

$$\text{Decrease from actuarial gain base} = \frac{547,550}{\ddot{a}_{14|,075}} - \frac{547,550}{\ddot{a}_{14|,07}} = 60,000 - 58,514 = 1,486$$

The new 2007 loss is amortized over 15 years.

$$\text{Decrease from 2007 loss base} = \frac{100,000}{\ddot{a}_{15|,075}} - \frac{100,000}{\ddot{a}_{15|,07}} = 10,538 - 10,261 = 277$$

Note that the decreases from the plan amendment base and the 2007 loss base will decrease the required contribution for 2008 since they are charge bases, and the decrease from the actuarial gain base will increase the required contribution for 2008 since it is a credit base.

The increase in accrued liability due to the change in interest rate is amortized over 15 years. Since this base would not have been in existence had the interest rate not changed, the entire amortization of this base is an increase in the required contribution for 2008.

$$\text{Amortization of increase in accrued liability} = \frac{190,000}{\ddot{a}_{15|,07}} = 19,496$$

The minimum contribution also increases by the normal cost increase of \$20,000.

The total increase in the minimum required contribution for 2008 as of 1/1/2008 (the date that contribution X is to be made) is:

$$20,000 + 19,496 - 1,287 + 1,486 - 277 = 39,418$$

Answer is B.

Note that all amortization bases for multiemployer plans created in 2008 or later are amortized over a 15 year period.

Question 16

Assertion: There is no requirement under IRC section 431 to use the full yield curve or segmented interest rates as required under IRC section 430. The only requirement under IRC section 431(c)(3) is that actuarial assumptions must be reasonable. The assertion is false.

Reason: This is a true statement, and is indicated in IRC section 431(c)(3).

Answer is D.

Question 17

The deductible limit for a multiemployer plan is generally equal to the greater of the minimum funding requirement or the normal cost plus the limit adjustment under IRC section 404(a)(1)(A). The limit adjustment is equal to the smaller of the unamortized balance of the amortization bases or the 10-year amortization of the bases. Under the frozen initial liability cost method, there is generally only one amortization base (the initial unfunded liability), unless there have been plan amendments or actuarial assumption changes. Since there is no mention of such changes in this question, it can be assumed that the unfunded liability is all attributable to the initial unfunded liability.

The initial unfunded liability for multiemployer plans prior to 2008 was amortized over a 30-year period. So, since the plan was effective on 1/1/2005 (2 years ago), there must be 28 years left to amortize the base (for minimum funding purposes). And since the credit balance is 0, the minimum amortization payment has been made each year. The original base can be determined as follows:

$$\text{Original unfunded liability} = 800,000 \times \frac{\ddot{a}_{30|0.07}}{\ddot{a}_{28|0.07}} = 817,924$$

Since for minimum funding purposes the original unfunded liability is amortized over 30 years and for the limit adjustment it is amortized over 10 years, the normal cost plus limit adjustment is clearly larger than the minimum required contribution for 2007. The deductible limit is always determined as of the end of the fiscal year of the employer.

$$\begin{aligned}
\text{Normal cost plus limit adjustment} &= (200,000 + \frac{817,924}{\ddot{a}_{10|0.07}}) \times 1.07 \\
&= (200,000 + 108,835) \times 1.07 \\
&= 330,453
\end{aligned}$$

The full funding limitation must be determined. The ERISA full funding limitation (based upon the entry age normal cost method – see Revenue Ruling 81-13) is equal to the accrued liability plus normal cost, rolled forward with valuation interest to the end of the year, less the smaller of the actuarial or market value of the assets, rolled forward with valuation interest to the end of the year.

$$\text{ERISA full funding limit} = (1,000,000 + 100,000 - 450,000) \times 1.07 = 695,500$$

The overall full funding limitation is equal to the greater of the ERISA or the RPA'94 full funding limitation. Since the ERISA full funding limitation already exceeds the normal cost plus the limit adjustment, it is unnecessary to calculate the RPA'94 full funding limit as the full funding limit clearly does not apply.

So, the deductible limit for 2007 generally would equal \$330,453. However, if the unfunded current liability (140% of current liability less actuarial value of assets for multiemployer plans) under IRC section 404(a)(1)(D) is larger, that can be deducted. The current liability component must be increased with interest to the end of the year using the 6% current liability interest rate, and the assets are increased using the 7% valuation interest rate.

$$\text{UCL}_{12/31/2007} = [140\% \times (540,000 + 200,000) \times 1.06] - (500,000 \times 1.07) = 563,160$$

The deductible limit for 2007 is \$563,160.

The non-deductible contribution for 2007 is \$336,840 (900,000 – 563,160). Note that the contribution is not given interest for this purpose. In general, nondeductible contributions are subject to a 10% excise tax under IRC section 4972. However, to the extent that the contribution does not exceed the full funding limitation, the contribution is exempt from the excise tax (see IRC section 4972(c)(7)). Therefore, the amount of nondeductible contribution subject to the excise tax is only the contributions in excess of \$695,500.

$$\text{Excise tax} = 10\% \times (900,000 - 695,500) = 20,450$$

Answer is A.

Question 18

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. The target normal cost is equal to the present value of the increase in the accrued benefit during the plan year, determined by comparing the end of year accrued benefit including an assumed salary increase for the year to the beginning of year accrued benefit determined without the salary increase.

$$AB_{1/1/2008} = 2\% \times \$100,000 \times 15 \text{ years of service} = \$30,000$$

$$AB_{12/31/2008} = 2\% \times \$100,000 \times 1.05 \times 16 \text{ years of service} = \$33,600$$

$$2008 \text{ accrued benefit increase for target normal cost} = \$33,600 - \$30,000 = \$3,600$$

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. The plan participant is age 45 on 1/1/2008, so the first benefit payment at age 65 (exam general condition 6 states that the normal retirement age is 65 and general condition 18 states that, unless otherwise specified, the assumed retirement age is the normal retirement age) is made on the first day of the 21st year from 1/1/2008. The segment 3 interest rate of 7% is used to value the target normal cost since all payments will be made more than 20 years from the valuation date.

$$\text{Target normal cost}_{1/1/2008} = \$3,600 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{20} = \$3,600 \times 8.00 \times 0.258419 = \$7,442$$

The funding target is equal to the present value of the beginning of year accrued benefit.

$$\text{Funding target}_{1/1/2008} = \$30,000 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{20} = \$30,000 \times 8.00 \times 0.258419 = \$62,021$$

Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned} \text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$62,021 - (\$60,000 - \$5,000) \\ &= \$7,021 \end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$62,021 funding target exceeds the \$60,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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 exam general condition 36 states that, unless otherwise indicated, the additional funding charge has never applied. So, applying the transition rule, 92% of the funding target is \$57,059, which is less than the actuarial value of the assets, and the new funding shortfall amortization base does not need to be created.

The minimum required contribution as of 1/1/2008 is:

$$\text{Minimum}_{1/1/2008} = \text{Target normal cost} = \$7,442$$

Answer is B.

Question 19

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.

The target normal cost is equal to the present value of the increase in the accrued benefit during the plan year, determined by comparing the end of year accrued benefit including an assumed salary increase for the year to the beginning of year accrued benefit determined without the salary increase.

$$AB_{1/1/2008} = 2\% \times \$60,000 \times 15 \text{ years of service} = \$18,000$$

$$AB_{12/31/2008} = 2\% \times \$60,000 \times 1.05 \times 16 \text{ years of service} = \$20,160$$

$$\text{2008 accrued benefit increase for target normal cost} = \$20,160 - \$18,000 = \$2,160$$

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. The plan participant is age 45 on 1/1/2008, so the first benefit payment at age 65 (exam general condition 6 states that the normal retirement age is 65 and general condition 18 states that, unless otherwise specified, the assumed retirement age is the normal retirement age) is made on the first day of the 21st year from 1/1/2008. The segment 3 interest rate of 7% is used to value the target normal cost since all payments will be made more than 20 years from the valuation date.

$$\text{Target normal cost}_{1/1/2008} = \$2,160 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{20} = \$2,160 \times 8.00 \times 0.258419 = \$4,465$$

The funding target is equal to the present value of the beginning of year accrued benefit.

$$\text{Funding target}_{1/1/2008} = \$18,000 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{20} = \$18,000 \times 8.00 \times 0.258419 = \$37,212$$

The funding target determined taking into account future salary increases would assume 20 years of future salary increases (since the participant is age 45 on 1/1/2008). That would increase the funding target by a factor of 1.05^{20} .

$$\text{Funding target with future salary increases}_{1/1/2008} = \$37,212 \times 1.05^{20} = \$98,735$$

$$\text{Cushion amount} = (50\% \times \$37,212) + (\$98,735 - \$37,212) = \$80,129$$

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

$$\$37,212 + \$4,465 + \$80,129 - \$40,000 = \$81,806$$

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 funding target and target normal cost are the same as the not-at-risk amounts because the sole participant is not within 11 years of the earliest retirement age (see IRC section 430(i)(1)(B)).

$$\text{The IRC section 404(o)(2)(B) deductible limit is: } \$37,212 + \$4,465 - \$40,000 = \$1,677$$

The larger of the deductible limit under IRC section 404(o)(2)(A) or under IRC section 404(o)(2)(B) is \$81,806.

Answer is D.

Note that the minimum required contribution under IRC section 430 can be deducted under IRC section 404(o)(1)(B), if larger than the otherwise deductible limit. The minimum required contribution is equal to the sum of the target normal cost and the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account.

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$37,212 - (\$40,000 - \$1,000) = \$0\end{aligned}$$

Therefore, the minimum required contribution would generally be equal to the target normal cost of \$4,465 under IRC section 430(a)(1). However, the minimum is limited under IRC section 430(a)(2) when the actuarial value of the assets (reduced by the credit balance items) exceeds the funding target. In this case, the minimum required contribution is equal to the target normal cost less the actuarial value of the assets (reduced by the funding standard carryover balance), making the minimum \$2,677 $((40,000 - 1,000) - 37,212)$. This is clearly smaller than the otherwise deductible limit, and would have no effect on the deductible limit.

Question 20

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. The target normal cost is equal to the present value of the increase in the accrued benefit during the plan year, determined by comparing the end of year accrued benefit including an assumed salary increase for the year to the beginning of year accrued benefit determined without the salary increase.

$$AB_{1/1/2008} = 2\% \times \$80,000 \times 11 \text{ years of service} = \$17,600$$

$$AB_{12/31/2008} = 2\% \times \$80,000 \times 1.05 \times 12 \text{ years of service} = \$20,160$$

$$2008 \text{ accrued benefit increase for target normal cost} = \$20,160 - \$17,600 = \$2,560$$

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. The plan participant is age 40 on 1/1/2008, so the first benefit payment at age 65 (exam general condition 6 states that the normal retirement age is 65 and general condition 18 states that, unless otherwise specified, the assumed retirement age is the normal retirement age) is made on the first day of the 26th year from 1/1/2008. The segment 3 interest rate of 7% is used to value the target normal cost since all payments will be made more than 20 years from the valuation date.

$$\text{Target normal cost}_{1/1/2008} = \$2,560 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{25} = \$2,560 \times 8.00 \times 0.184249 = \$3,773$$

The funding target is equal to the present value of the beginning of year accrued benefit.

$$\text{Funding target}_{1/1/2008} = \$17,600 \times \ddot{a}_{65@7\%}^{(12)} \times v_{7\%}^{25} = \$17,600 \times 8.00 \times 0.184249 = \$25,942$$

Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned} \text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$25,942 - (\$28,000 - \$1,000) \\ &= \$0 \end{aligned}$$

So, there is no new funding shortfall base.

The minimum required contribution under IRC section 430(a)(1) is equal to the funding target of \$3,773, since there is no shortfall amortization base. However, in the case where the actuarial value of assets (reduced by the credit balance items) exceeds the funding target, IRC section 430(a)(2) allows the minimum required contribution to be reduced to the difference (not less than 0) between the target normal cost and the excess of the actuarial value of assets (reduced by the credit balance items) over the funding target. This minimum is:

$$\$3,773 - [(\$28,000 - \$1,000) - \$25,942] = \$2,715$$

Answer is B.

Question 21

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned} \text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$1,000,000 - (\$900,000 - \$10,000) = \$110,000 \end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$1,000,000 funding target exceeds the \$900,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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 exam general condition 36 states that, unless otherwise indicated, the additional funding charge has never applied. So, applying the transition rule, 92% of the funding target is \$920,000, which still exceeds the actuarial value of the assets, so the new funding shortfall amortization base is required.

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned} \text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$100,000 + (\$110,000/5.9982) = \$118,339 \end{aligned}$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). This amount is:

$$\$118,339 - \$10,000 = \$108,339$$

In order to compare this to the contribution made on 12/31/2008, it must be increased with interest using the plan effective rate for 2008. The smallest amount that satisfies minimum funding standard as of 12/31/2008 is:

$$\$108,339 \times 1.0575 = \$114,568$$

The excess of the contribution for 2008 over the smallest amount that satisfies minimum funding standard as of 12/31/2008 is:

$$\$200,000 - \$114,568 = \$85,432$$

Answer is C.

Question 22

A plan is in at-risk status under the rules of IRC section 430(i)(4) if the funding target attainment percentage for the prior year (determined on the prior year valuation date without the at-risk assumptions) is less than 80% (70% under a transition rule for 2009) and the funding target attainment percentage for the prior year using the at-risk assumptions is less than 70%. Plans with 500 or fewer participants on each day of the prior year are exempt from the at-risk status (see IRC section 430(i)(6)).

The funding target attainment percentage (FTAP) under IRC section 430(d)(2) is equal to the ratio of the actuarial value of assets reduced by the funding standard carryover balance and the prefunding balance to the funding target. The FTAP as of 1/1/2008 using the at-risk assumptions is:

$$\frac{770,000 - 60,000}{1,000,000} = 71\%$$

The plan is not at-risk for 2009 because the FTAP calculated for 2008 using the at-risk assumptions is not less than 70%.

The statement is false.

Answer is B.

Question 23

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date.

The payments made in years 1 and 5 (on the first day of those years) must be discounted using the segment 1 interest rate of 5%, and the payment made in year 9 (on the first day of the year) must be discounted using the segment 2 interest rate of 6%. The present value of the payments on 1/1/2008 is:

$$PV = 1,000 + (5,000 \times v_{5\%}^4) + (19,500 \times v_{6\%}^8) = 1,000 + 4,114 + 12,235 = 17,349$$

This present value is equivalent to the present value determined using an effective interest rate, i . The equation of value reflecting this interest rate is:

$$17,349 = 1,000 + (5,000 \times v_i^4) + (19,500 \times v_i^8)$$

Let $x = v_i^4$. Then,

$$17,349 = 1,000 + (5,000 \times x) + (19,500 \times x^2)$$
$$19,500x^2 + 5,000x - 16,349 = 0$$

Recall the quadratic formula:

$$\text{For an equation in the form } ax^2 + bx - c = 0, x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$\text{Applying the given equation, } x = \frac{-5,000 \pm \sqrt{5,000^2 - (4 \times 19,500 \times (-16,349))}}{2 \times 19,500}$$
$$= 0.796374 \text{ or } -1.052784$$

Only the positive value makes any sense, so let $x = 0.796374$.

$$0.796374 = v_i^4 \quad \Rightarrow \quad v = 0.944668 \quad \Rightarrow \quad i = 0.058573, \text{ or } 5.8573\%$$

Answer is D.

Note that an alternative, although less mathematically oriented method of solving this problem without using the quadratic formula would be to use the endpoints of the answer ranges once the equation of value has been determined. This method will not give an exact answer, but will identify the correct answer range. Using the endpoints of answer range D,

$$\text{For } i = 5.70\%: 1,000 + (5,000 \times v_{5.70\%}^4) + (19,500 \times v_{5.70\%}^8) = 17,521$$

$$\text{For } i = 5.95\%: 1,000 + (5,000 \times v_{5.95\%}^4) + (19,500 \times v_{5.95\%}^8) = 17,248$$

Since the first substitution gives a result larger than the present value of 17,349 and the second substitution gives a result smaller than the present value, it is now known that the correct effective rate of interest is between the two interest rates, and the answer is choice D.

Question 24

The rules governing the top heavy minimum requirements when a defined benefit and defined contribution plan are in a mandatory aggregation group are covered in IRS regulation 1.416-1, Q&A M-12.

- I. The top heavy minimum allocation provided in a profit sharing plan that is in a mandatory aggregation group with a defined benefit plan is 5%, not 3%. If the plans had not been required to be aggregated, then the top heavy minimum allocation in the profit sharing plan alone is only 3%. The statement is false.
- II. The use of comparability in the determination of the top heavy minimum benefit is allowed. The statement is true.
- III. A floor offset method of providing the top heavy minimum benefit is allowed. The statement is true.

Answer is C.

Question 25

- I. Generally under IRC sections 431(b)(2)(B)(ii) and 431(b)(3)(B)(i), the charges and credit attributable to the change in liability attributable to plan amendments are amortized over 15 years. However, it is possible that the employer could obtain an extension of the amortization period under IRC section 431(d) for a period of 5 or 10 years, bringing the amortization period to 20 or 25 years. The statement is false. Note that although there is an exam general condition (number 37) that states that no extensions of amortization periods have been granted, the general condition should be ignored for questions of this type where an absolute statement is being asked, rather than a specific situation.

Another IRC section that could make this statement false is IRC section 431(b)(7)(G) which states that if there is a plan amendment providing short term benefits (payable for a period of less than 15 years rather than a life annuity), then the amortization of that plan amendment would be over the shorter period of time that the benefits are to be paid.

- II. There is no longer an alternative minimum funding standard under IRC section 431 for years after 2007. The statement is true.
- III. Each individual actuarial assumption must be reasonable under IRC section 431(c)(3)(A). The statement is true.

Answer is C.

Question 26

Assertion: IRC section 430(h)(4) requires that the probability of electing alternative forms of benefit (including lump sums) be taken into account in the determination of the minimum funding requirement. The assertion is false.

Reason: The interest rate subsidy inherent in lump sum distributions must be taken into account, again as required by IRS section 430(h)(4). The reason is false.

Answer is E.

Question 27

A plan is in at-risk status under the rules of IRC section 430(i)(4) if the funding target attainment percentage (FTAP) for the prior year (determined on the prior year valuation date without the at-risk assumptions) is less than 80% (70% under a transition rule for 2009) and the FTAP for the prior year using the at-risk assumptions is less than 70%. Plans with 500 or fewer participants on each day of the prior year are exempt from the at-risk status (see IRC section 430(i)(6)).

Since the 2008 FTAP without regard to the at-risk assumptions is not less than 70%, the plan is not at-risk for 2009.

Answer is B.

Question 28

A new amortization base is created under the unit credit cost method when there is a plan amendment that increases or decreases the unfunded liability under the plan. This new base is equal to the difference between the actual unfunded accrued liability and the expected unfunded liability. The expected unfunded liability can be determined using the balance equation:

$$\begin{aligned}\text{Unfunded liability} &= \text{Outstanding balance} - \text{Credit balance} \\ &= (15,000 + 110,000) - 60,000 \\ &= 65,000\end{aligned}$$

The actual unfunded accrued liability is equal to the accrued liability reflecting the plan amendment, less the actuarial value of the assets.

$$\text{Actual unfunded accrued liability} = 9,710,000 - 9,238,000 = 472,000$$

The loss due to the increase in the unfunded liability is:

$$472,000 - 65,000 = 407,000$$

This is amortized over 15 years under IRC section 431(b)(2)(B)(ii).

$$\text{Amortization of plan amendment loss} = \frac{407,000}{\ddot{a}_{\overline{15}|}} = 41,763$$

Answer is D.

Question 29

The outstanding balance of the amortization bases as of 1/1/2008 is equal to the outstanding balance of the pre-2007 bases plus the present value of the future amortization of the new experience loss and assumption change bases in 2008. New bases in 2008 are amortized over a 15-year period under IRC section 431(b).

$$\text{Outstanding balance} = 404,600 + (6,770 \times \ddot{a}_{\overline{15}|}) + (8,180 \times \ddot{a}_{\overline{15}|}) = 550,295$$

Under the entry age normal funding method, the unfunded liability is equal to the unfunded accrued liability (accrued liability less actuarial value of the assets). Recall the balance equation:

$$\text{Unfunded liability} = \text{Outstanding balance} - \text{Credit balance}$$

$$\text{Accrued liability} - \text{Actuarial assets} = \text{Outstanding balance} - \text{Credit balance}$$

$$\text{Accrued liability} - 991,600 = 550,295 - 75,500$$

$$\text{Accrued liability} = 1,466,395$$

Answer is B.

Question 30

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$5,000,000 - (\$4,200,000 - \$125,000) \\ &= \$925,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$5,000,000 funding target exceeds the \$4,200,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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 exam general condition 36 states that, unless otherwise indicated, the additional funding charge has never applied. So, applying the transition rule, 92% of the funding target is \$4,600,000, which still exceeds the actuarial value of the assets, so the new funding shortfall amortization base is required.

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned}\text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$200,000 + (\$925,000/5.9982) \\ &= \$354,213\end{aligned}$$

The minimum required contribution can be reduced by the funding standard carryover balance in order to determine the smallest contribution that satisfies the minimum funding standard. This is:

$$\$354,213 - \$125,000 = \$229,213$$

Answer is C.

Question 31

The gain or loss due to the death of a retired participant is equal to the difference between the actual liability and the expected liability had the participant not died. In either event, the certain portion of the benefit is to be paid, so there is no gain or loss with regard to the certain payments.

The actual liability with regard to the payments after the 10-year certain period is 0 (there is no survivor benefit with respect to the form of annuity that was elected by Smith). The gain is equal to the expected value of the payments that would have begun 10 years after the date of retirement.

The present value as of 1/1/2007 of the portion of Smith's annuity beginning on 1/1/2012 is:

$$\$1,250 \times 12 \times \frac{N_{65}^{(12)}}{D_{60}} = \$108,058$$

Since this is a deferred annuity, no payments were made in 2007. The expected liability as of the end of 2007 is just equal to the present value as of 1/1/2007 increased with interest to the end of the year. Note that no mortality adjustment needs to be made since the mortality was already taken into account in determining the present value as of the first day of 2007.

The expected liability as of 12/31/2007 is: $\$108,058 \times 1.07 = \$115,622$

The gain is equal to the expected liability of \$115,622.

Answer is D.

Question 32

- I. Under-funded plans (those where the prior year actuarial value of assets reduced by the prefunding balance are less than 80% of the prior year funding target) cannot use the funding standard carryover balance or prefunding balance to reduce the current year's minimum required contribution (see IRC section 430(f)(3)(C)). The statement is true.
- II. Actuarial value of assets under IRC section 430 must be within 10% above or below the market value of the assets (see IRC section 430(g)(3)(B)(iii)). The statement is true.
- III. The segmented interest rates must be used under IRC section 430(h)(2)(C) to determine the plan's funding target. As an option, the plan may elect to use the full bond yield curve under IRC section 430(h)(2)(D)(ii). In either case, a single interest rate may not be used. The statement is false.

Answer is A.

Question 33

There are three possible retirement ages under the retirement rates assumption – 63, 64, or 65. Smith is 53 years old on 1/1/2008, and will have 10, 11 and 12 years of future service, respectively, at each of the possible assumed retirement ages. The final three-year average salary at each assumed retirement age is:

$$\text{Age 63: } \frac{17,000 \times (1.03^8 + 1.03^9 + 1.03^{10})}{3} = 22,188$$

$$\text{Age 64: } \frac{17,000 \times (1.03^9 + 1.03^{10} + 1.03^{11})}{3} = 22,853$$

$$\text{Age 65: } \frac{17,000 \times (1.03^{10} + 1.03^{11} + 1.03^{12})}{3} = 23,539$$

The projected retirement benefit at each assumed retirement age (with an early retirement reduction for the assumed retirement age 63 since Smith would have fewer than 25 years of service) is:

$$\text{Age 63: } 2\% \times 22,188 \times 24 \text{ years of service} \times [1 - (.05 \times 2 \text{ years})] = 9,585$$

$$\text{Age 63: } 2\% \times 22,853 \times 25 \text{ years of service} = 11,427$$

$$\text{Age 63: } 2\% \times 23,539 \times 26 \text{ years of service} = 12,240$$

Using the retirement rates assumed as of 1/1/2008, 25% of all retirements are assumed to occur at age 63, 37.5% of all retirements are assumed to occur at age 64 (75% × 50%), and 37.5% of all retirements are assumed to occur at age 65 (75% × 50%). Under this assumption, the present value of future benefits can be calculated as being equal to the sum of the present value of the projected retirement benefit at each possible retirement age, adjusted for the probability of retirement at that age.

$$\begin{aligned} \text{PVFB} &= (9,585 \times \ddot{a}_{63}^{(12)} \times v^{10} \times 25\%) + (11,427 \times \ddot{a}_{64}^{(12)} \times v^{11} \times 37.5\%) \\ &\quad + (12,240 \times \ddot{a}_{65}^{(12)} \times v^{12} \times 37.5\%) \\ &= (9,585 \times 12.36 \times 0.508349 \times 25\%) + (11,427 \times 11.49 \times 0.475093 \times 37.5\%) \\ &\quad + (12,240 \times 10.60 \times 0.444012 \times 37.5\%) \\ &= 15,056 + 23,392 + 21,603 \\ &= 60,051 \end{aligned}$$

Answer is C.

Question 34

There are three possible retirement ages under the retirement rates assumption – 55, 62, or 65. Smith is 49 years old on 1/1/2008, and has 23 years of past service, which is used to determine the accrued liability.

The monthly accrued retirement benefit at each assumed retirement age (with an early retirement reduction for the assumed retirement ages 55 and 62) is:

$$\text{Age 55: } 35 \times 23 \text{ years of service} \times [1 - (\frac{1}{180} \times 60 \text{ months}) - (\frac{1}{360} \times 60 \text{ months})] = 402.50$$

$$\text{Age 63: } 35 \times 23 \text{ years of service} \times [1 - (\frac{1}{180} \times 36 \text{ months})] = 644$$

$$\text{Age 65: } 35 \times 23 \text{ years of service} = 805$$

Using the retirement rates assumed as of 1/1/2008, 40% of all retirements are assumed to occur at age 55, 48% of all retirements are assumed to occur at age 62 (60% × 80%), and 12% of all retirements are assumed to occur at age 65 (60% × 20%). Under this assumption, the accrued liability can be calculated as being equal to the sum of the present value of the accrued benefit at each possible retirement age, adjusted for the probability of retirement at that age.

$$\begin{aligned} \text{AL} &= (402.50 \times 12 \times \ddot{a}_{55}^{(12)} \times v^6 \times 40\%) + (644 \times 12 \times \ddot{a}_{62}^{(12)} \times v^{13} \times 48\%) \\ &\quad + (805 \times 12 \times \ddot{a}_{65}^{(12)} \times v^{16} \times 12\%) \\ &= (402.50 \times 12 \times 13.66 \times 0.666342 \times 40\%) + (644 \times 12 \times 12.85 \times 0.414964 \times 48\%) \\ &\quad + (805 \times 12 \times 10.50 \times 0.338735 \times 12\%) \\ &= 17,586 + 19,780 + 4,123 \\ &= 41,489 \end{aligned}$$

Answer is B.

Question 35

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$1,050,000 - (\$990,000 - \$10,000) \\ &= \$70,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$1,050,000 funding target exceeds the \$990,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)), as is the case in this question. So, the transition rule is not available, and the funding shortfall amortization base must be created.

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned}\text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$49,000 + (\$70,000/5.9982) \\ &= \$60,670\end{aligned}$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). This amount is:

$$\$60,670 - \$10,000 = \$50,670$$

Answer is D.

Question 36

- I. The funding standard carryover balance may be applied to reduce the minimum required contribution provided the ratio of the prior year actuarial assets (reduced by the prefunding balance) to the prior year funding target (without regard to at-risk additional assumptions) is at least 80% (see IRC section 430(f)(3)(C)). This ratio as of 1/1/2008 is:

$$580,000/600,000 = 96.67\%$$

The remaining funding standard carryover balance can be applied to reduce the minimum required contribution for 2009. The statement is true.

- II. A plan with 500 or fewer participants on each day of the prior year is not considered to be at-risk for the current year (see IRC section 430(i)(6)). Since the plan has always had fewer than 500 participants, the plan is not at-risk for 2009. The statement is false.
- III. A plan is exempt from creating a shortfall amortization base if the actuarial value of assets (reduced by only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, but not reduced by the funding standard carryover balance) is at least as large as the funding target. That is not the case in this question because the actuarial value of the assets (580,000) is less than the funding target (600,000). There is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)), as is the case in this question. So, the transition rule is not available, and the funding shortfall amortization base must be created. The statement is true.

Answer is B.

Question 37

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$1,050,000 - (\$990,000 - \$5,000) \\ &= \$65,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$1,050,000 funding target exceeds the \$990,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)). The additional funding charge under IRC section 412(l) did not apply in 2007. So, the transition rule is available, and the shortfall base does not need to be created since 92% of the funding target (\$966,000) is less than the actuarial value of assets (\$990,000).

The minimum required contribution as of 1/1/2008 is:

$$\text{Minimum}_{1/1/2008} = \text{Target normal cost} = \$49,000$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). This amount is:

$$\$49,000 - \$5,000 = \$44,000$$

Answer is A.

Question 38

The statement is a direct quote, as applied to the 2008 plan year, from IRC section 430(i)(1)(B)(i). The statement is true.

Answer is A.

Question 39

The unused portion of either a funding standard carryover balance or a prefunding balance must be adjusted to the next year using the actual asset rate of return for the current year (see IRC section 430(f)(8)). So, the unused portion of the 1/1/2008 funding standard carryover balance must be adjusted from 1/1/2008 to 1/1/2009 using the 2008 asset rate of return, not the plan effective rate. The statement is false.

Answer is B.

Question 40

The funding target is equal to the present value of the beginning of year accrued benefit, which is \$1,750 per month.

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. Smith has elected to receive a 10-year certain only annuity beginning on 1/1/2006, so there are 8 payments remaining on 1/1/2008. The segment 1 interest rate is used for the first 5 years of payments, and the segment 2 interest rate is used for the last 3 years of payments.

The transition rules under IRC section 430(h)(2)(G) provide that for 2008, the transitional segment interest rates are equal to $\frac{1}{3}$ of the segment interest rate plus $\frac{2}{3}$ of the current liability interest rate. Therefore, the transitional segment 1 and segment 2 interest rates are:

$$\text{Transitional segment 1 interest rate} = (\frac{1}{3} \times 5\%) + (\frac{2}{3} \times 5.78\%) = 5.52\%$$

$$\text{Transitional segment 2 interest rate} = (\frac{1}{3} \times 6\%) + (\frac{2}{3} \times 5.78\%) = 5.8533\%$$

$$\begin{aligned} \text{Funding target}_{1/1/2008} &= \$1,750 \times 12 \times [\ddot{a}_{\overline{5}|@5.52\%}^{(12)} + (\ddot{a}_{\overline{3}|@5.8533\%}^{(12)} \times v_{5.8533\%}^5)] \\ &= \$21,000 \times [4.394507 + 2.080168] = \$135,968 \end{aligned}$$

Answer is A.

Note that in order to determine the values of $\ddot{a}_{\overline{5}|@5.52\%}^{(12)}$ and $\ddot{a}_{\overline{3}|@5.8533\%}^{(12)}$ it is easiest to convert the annual effective rate of interest to a monthly effective rate, determine the present value of the annuity based upon monthly payments, and then divide the result by 12 in order to annualize the factor. So,

$$\text{For } i = 5.52\%, \frac{i^{(12)}}{12} = 1.0552^{1/12} - 1 = 0.4487566\%$$

$$\ddot{a}_{\overline{5}|@5.52\%}^{(12)} = \ddot{a}_{\overline{60}|0.004487566} / 12 = 4.394507$$

$$\text{For } i = 5.8533\%, \frac{i^{(12)}}{12} = 1.058533^{1/12} - 1 = 0.4751585\%$$

$$\ddot{a}_{\overline{3}|@5.8533\%}^{(12)} = \ddot{a}_{\overline{36}|0.004751585} / 12 = 2.764525$$

Question 41

A plan is at-risk under IRC section 430(i)(4) if the funding target attainment percentage (FTAP) for the prior year determined without regard to the at-risk assumptions is less than 80% and the FTAP for the prior year determined with the at-risk assumptions is less than 70%. Transition percentages apply to the not-at-risk FTAP for 2008 through 2010, but those do not apply to this question since the years for which at-risk status is being determined are all after 2010.

Based upon the data provided, the FTAP without regard to the at-risk assumptions is less than 80% in each year. The FTAP with regard to the at-risk assumptions is less than 70% in each year other than 2012. So, the plan is at-risk in 2011, 2012, and 2014. Only the first two statements are true.

Answer is A.

Note that it must be assumed that the plan has more than 500 participants (plans with 500 or fewer participants are not at-risk under IRC section 430(i)(6)).

Question 42

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$5,500,000 - (\$5,000,000 - \$100,000) \\ &= \$600,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$5,500,000 funding target exceeds the \$5,000,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)), as is the case in this question. So, the transition rule is not available, and the funding shortfall amortization base must be created.

The minimum required contribution as of 1/1/2008 is:

$$\begin{aligned}\text{Minimum}_{1/1/2008} &= \text{Target normal cost} + \text{Amortization of funding shortfall} \\ &= \$200,000 + (\$600,000/5.9982) \\ &= \$300,030\end{aligned}$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). Since the contribution is to be made on 12/31/2008, the difference must be increased using the plan effective interest rate for 2008 (see IRC section 430(j)(2)). This amount is:

$$(\$300,030 - \$100,000) \times 1.0575 = \$211,532$$

Answer is C.

Question 43

As of 1/1/2007, both Smith (age 70) and the beneficiary (age 67) are alive. The present value of future benefits payable as of 1/1/2007 is:

$$\begin{aligned}PVFB_{1/1/2007} &= 100,000 \ddot{a}_{70} + [50,000 \times (\ddot{a}_{67} - \ddot{a}_{67:70})] \\ &= (100,000 \times 7.60) + [50,000 \times (8.30 - 6.10)] \\ &= 870,000\end{aligned}$$

The benefit payable on 1/1/2007 is \$100,000. The expected PVFB on 1/1/2008 is equal to the PVFB on 1/1/2007, reduced by the 1/1/2007 payment, increased with interest at 7% (no mortality adjustment is needed since the probability of death is already included in the annuities used to determine the PVFB as of 1/1/2007).

$$\text{Expected PVFB}_{1/1/2008} = (870,000 - 100,000) \times 1.07 = 823,900$$

If the beneficiary dies during the 2007, then the actual PVFB on 1/1/2008 is:

$$100,000 \ddot{a}_{71} = 100,000 \times 7.40 = 740,000$$

The mortality gain (X) would be equal to the difference between the expected PVFB and the actual PVFB:

$$X = 823,900 - 740,000 = 83,900$$

If Smith dies during the 2007, then the actual PVFB on 1/1/2008 is:

$$50,000 \ddot{a}_{68} = 50,000 \times 8.10 = 405,000$$

The mortality gain (Y) would be equal to the difference between the expected PVFB and the actual PVFB:

$$Y = 823,900 - 405,000 = 418,900$$

$$X + Y = 83,900 + 418,900 = 502,800$$

Answer is B.

Question 44

IRC section 430(i)(1)(B) provides for additional actuarial assumptions that must be used to determine the funding target for at-risk plans. For participants who are within 11 years (including the current year) of reaching the earliest retirement age under the plan, the assumed retirement age must be that earliest retirement age. In addition, the benefit funded at the assumed retirement age must be the one that results in the highest present value.

The statement is false for two reasons. First, any participant who is more than 11 years from the earliest retirement age may be funded assuming retirement at an age later than the earliest retirement age. Second, the form of benefit funded is not necessarily the joint and survivor benefit if that does not produce the largest present value (generally this is considered the most valuable, but there are exceptions).

Answer is B.

Question 45

The balance equation can be used to determine the unfunded liability prior to establishing any new amortization bases for 2008.

$$\begin{aligned}\text{Unfunded liability} &= \text{Outstanding balance} - \text{Credit balance} \\ &= 45,900 - 3,000 \\ &= 42,900\end{aligned}$$

The actual unfunded accrued liability as of 1/1/2008 before reflecting the plan amendment is:

$$\text{UAL}_{1/1/2008} = \text{Accrued liability} - \text{Actuarial assets} = 270,000 - 250,000 = 20,000$$

The 2007 gain is the difference between the expected unfunded liability (the unfunded liability prior to establishing new bases for 2008) and the actual unfunded accrued liability.

$$\text{2007 gain} = 42,900 - 20,000 = 22,900$$

A new amortization base must be created due to the plan amendment reflecting the increase in the accrued liability. The amendment increases both the accrued liability and normal cost by 10%.

$$\text{Plan amendment base effective 1/1/2008} = 10\% \times 270,000 = 27,000$$

$$\text{Normal cost after plan amendment} = 110\% \times 22,000 = 24,200$$

The new amortization bases (2007 gain and plan amendment bases) are amortized over 15 years under IRC sections 431(b)(2) and (3).

The minimum required contribution for 2008 as of 1/1/2008 is:

$$\begin{aligned}\text{Normal cost} + \text{amortization of bases} &= 24,200 + 9,000 + 27,000/\ddot{a}_{\overline{15}|} - 22,900/\ddot{a}_{\overline{15}|} \\ &= 24,200 + 9,000 + 2,771 - 2,350 \\ &= 33,621\end{aligned}$$

The smallest amount that satisfies the minimum funding standard for 2008 is equal to the minimum required contribution reduced by the credit balance, rolled forward with interest to 12/31/2008 since the contribution is to be made on the last day of the year.

$$X = (33,621 - 3,000) \times 1.07 = 32,764$$

Since there is enough information to determine the ERISA full funding limit, it should be calculated. The ERISA full funding limitation is equal to the accrued liability plus normal cost, rolled forward with valuation interest to the end of the year, less the smaller of the actuarial or market value of the assets (reduced by the credit balance), rolled forward with valuation interest to the end of the year.

$$\begin{aligned} \text{ERISA FFL} &= [(270,000 + 22,000) \times 110\% - (250,000 - 3,000)] \times 1.07 \\ &= 79,394 \end{aligned}$$

There is not enough information to determine the RPA'94 full funding limitation, but since the minimum required contribution is less than the ERISA full funding limitation, the RPA'94 full funding limitation will not have any impact. The minimum required contribution is \$32,764.

Answer is B.

Question 46

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$115,000 - (\$107,000 - \$2,000) \\ &= \$10,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$115,000 funding target exceeds the \$107,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)). The additional funding charge under IRC section 412(l) did not apply in 2007. So, the transition rule is available, and the shortfall base does not need to be created since 92% of the funding target (\$105,800) is less than the actuarial value of assets (\$107,000).

The minimum required contribution as of 1/1/2008 is:

$$\text{Minimum}_{1/1/2008} = \text{Target normal cost} = \$12,250$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). Since the contribution is to be made on 12/31/2008, the difference must be increased using the plan effective interest rate for 2008 (see IRC section 430(j)(2)). This amount is:

$$(\$12,250 - \$2,000) \times 1.06 = \$10,865$$

Answer is B.

Question 47

A plan is at-risk under IRC section 430(i)(4) if the funding target attainment percentage (FTAP) for the prior year determined without regard to the at-risk assumptions is less than 80% and the FTAP for the prior year determined with the at-risk assumptions is less than 70%. Transition percentages apply to the not-at-risk FTAP for 2008 through 2010 such that the FTAP threshold for 2008 to be used to determine whether the plan is at-risk for 2009 is 70% (rather than 80%).

A plan is not at-risk under IRC section 430(i)(6) if it had 500 or fewer participants on each day of the prior year. This is not the case for each of the given plans.

The FTAP under IRC section 430(d)(2) is equal to the ratio of the actuarial value of assets (reduced by the funding standard carryover balance and prefunding balance) to the funding target. The FTAPs with and without the at-risk assumptions for each plan are:

$$\text{Plan X: FTAP without at-risk assumptions} = \frac{(74,000 - 12,000)}{112,000} = 55.36\%$$

$$\text{FTAP with at-risk assumptions} = \frac{(74,000 - 12,000)}{125,000} = 49.60\%$$

$$\text{Plan Y: FTAP without at-risk assumptions} = \frac{85,000}{106,000} = 80.19\%$$

$$\text{FTAP with at-risk assumptions} = \frac{85,000}{124,000} = 68.55\%$$

$$\text{Plan Z: FTAP without at-risk assumptions} = \frac{(64,000 - 4,000)}{95,000} = 63.16\%$$

$$\text{FTAP with at-risk assumptions} = \frac{(64,000 - 4,000)}{118,000} = 50.85\%$$

The FTAP for Plan Y without the at-risk assumptions is above the threshold (normally 80%, but 70% for 2009), so Plan Y is not considered to be at-risk for 2009 (note that it is irrelevant that the FTAP with the at-risk assumptions is below the 70% threshold – both FTAPs must be below their respective thresholds for the plan to be considered at-risk).

Both FTAPs for plans X and Z are below the respective thresholds, and are at-risk for 2009.

Answer is B.

Question 48

The minimum required contribution for 2008 is equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$64,000 - (\$60,000 - \$12,000) \\ &= \$16,000\end{aligned}$$

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 only the prefunding balance to the extent it is used to reduce the current year's minimum required contribution, 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 1/1/2008 (the \$64,000 funding target exceeds the \$60,000 actuarial value of assets). However, there is a transition rule available for 2008 under IRC section 430(c)(5)(B) under which the actuarial value of assets can be compared to only 92% 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)). The additional funding charge under IRC section 412(l) did not apply in 2007. So, the transition rule is available, and the shortfall base does not need to be created since 92% of the funding target (\$58,880) is less than the actuarial value of assets (\$60,000).

The minimum required contribution as of 1/1/2008 is:

$$\text{Minimum}_{1/1/2008} = \text{Target normal cost} = \$21,000$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). Since the contribution is to be made on 12/31/2008, the difference must be increased using the plan effective interest rate for 2008 (see IRC section 430(j)(2)). This amount is:

$$(\$21,000 - \$12,000) \times 1.06 = \$9,540$$

Answer is A.

Question 49

Plans in critical status must not pay lump sums or other accelerated benefit payments under IRC section 432(f)(2). This is not true for plans that are Seriously Endangered, which must follow the operational rules of IRC section 432(d).

The statement is false.

Answer is B.

Question 50

The minimum required contribution for 2008 is generally equal to the target normal cost plus the amortization of the funding shortfall. Under IRC section 430(c)(4), the funding shortfall is equal to the excess (if any) of the funding target over the actuarial value of the plan assets (reduced by any credit balances). The only credit balance that could exist as of 1/1/2008 is a funding standard carryover balance equal to the credit balance remaining from the 12/31/2007 funding standard account. Using the information provided in the question,

$$\begin{aligned}\text{Funding shortfall} &= \text{Funding target} - (\text{Actuarial assets} - \text{Funding standard carryover balance}) \\ &= \$1,650,000 - (\$1,680,000 - \$20,000) = \$0\end{aligned}$$

There is no shortfall amortization base to be created for 2008. The minimum required contribution under IRC section 430(a)(1) is equal to the funding target of \$44,800. However, in the case where the actuarial value of assets (reduced by the credit balance items) exceeds the funding target, IRC section 430(a)(2) allows the minimum required contribution to be reduced to the difference (not less than 0) between the target normal cost and the excess of the actuarial value of assets (reduced by the credit balance items) over the funding target. This minimum is:

$$\$44,800 - [(\$1,680,000 - 20,000) - \$1,650,000] = \$34,800$$

The smallest amount that satisfies the minimum funding standard is equal to the minimum required contribution, reduced by the funding standard carryover balance (see exam general condition 35). Since the contribution is to be made on 12/31/2008, the difference must be increased using the plan effective interest rate for 2008 (see IRC section 430(j)(2)). This amount is:

$$(\$34,800 - \$20,000) \times 1.0575 = \$15,651$$

Answer is A.

Question 51

The funding target is equal to the present value of the beginning of year accrued benefit. For the 100 active participants, the annual accrued benefit as of 1/1/2008 is:

$$\$10 \times 12 \times 20 \text{ years of service} \times 100 \text{ participants} = \$240,000$$

The present value is determined based upon the segmented interest rates. The segment 1 interest rate applies to payments that are made within 5 years of the valuation date, the segment 2 interest rate applies to payments that are made more than 5 years and no more than 20 years from the valuation date, and the segment 3 interest rate applies to payments made more than 20 years from the valuation date. Each participant will retire in 15 years at age 65, so the first 5 years of payments will be made between ages 65 and 70 (between 15 and 20 years from 1/1/2008) and must be valued using the segment 2 interest rate. The segment 3 interest rate is used for the remaining payments beginning at age 70.

The funding target for the active participants is:

$$\begin{aligned} \text{Funding target}_{1/1/2008} &= \$240,000 \times \left(\left[\frac{N_{65@6\%}^{(12)} - N_{70@6\%}^{(12)}}{D_{65@6\%}} \times v_{@6\%}^{15} \right] + \left[\frac{N_{70@7\%}^{(12)}}{D_{65@7\%}} \times v_{@7\%}^{15} \right] \right) \\ &= \$240,000 \times \left(\left[\frac{2,052 - 1,220}{199} \times 0.417265 \right] + \left[\frac{593}{108} \times 0.362446 \right] \right) \\ &= \$896,314 \end{aligned}$$

The total funding target includes the inactive participants.

$$\text{Total funding target} = \$896,314 + \$750,000 = \$1,646,314$$

Answer is B.