Solutions to EA-2(F) Examination
Fall, 2015

Question 1

The target normal cost includes the amount of expected administrative expenses to be paid during the year (IRC section 430(b)). For 2016, this is at least $5,000.

The target normal cost must take into account any plan amendments adopted on or before the valuation date and effective during the plan year (Treasury Regulation 1.430(d)-1(d)). Each of the plan amendments under consideration have been adopted before the 2016 plan year and are effective for the plan year.

The target normal cost is equal to the present value of the difference between the end of year (12/31/2016) accrued benefit, taking into account the additional service for 2016 and any assumed 2016 salary increases, and the beginning of year (1/1/2016) accrued benefit, based only on salary history through 2015 and service through 2015.

Amendment I: This amendment freezes service used in the plan formula as of the end of 2015. Thus, the 12/31/2016 accrued benefit does not include any additional service for 2016; but it does include the 3% assumed salary increase for 2016. The end of year accrued benefit is larger that the beginning of year accrued benefit due to increased salary, so there is a target normal cost (in addition to the $5,000 for expenses).

Amendment II: This amendment freezes average compensation recognized under the plan formula as of the end of 2015. Thus, the 12/31/2016 accrued benefit includes any additional service for 2016; but it does not include the 3% assumed salary increase for 2016. The end of year accrued benefit is larger that the beginning of year accrued benefit due to increased service, so there is a target normal cost (in addition to the $5,000 for expenses).

Amendment III: This amendment freezes all benefit accruals as of the end of 2015. This has the effect of ignoring both any additional service for 2016 and the 3% assumed salary increase for 2016. The end of year accrued benefit is the same as the beginning of year accrued benefit, so there is no target normal cost, other than the $5,000 for expenses.

Only amendments I and II may result in a target normal cost greater than $5,000.

Answer is B.

Question 2

IRC section 430(j)(3)(A) requires that if there was a funding shortfall for the preceding year, quarterly contributions are required to be made for a plan year. There was a funding shortfall in 2015, so quarterly contributions are required to be made for the 2016 plan year. The amount of the quarterly contribution under IRC section 430(j)(3)(D) is equal to 25% of the smaller of 90% of the minimum required contribution for the current year or 100% of the minimum required contribution for the preceding year.

90% of 2016 minimum required contribution = 90% × $550,000 = $495,000

The quarterly contribution due on 4/15/2016 is equal to 25% of $495,000 (which is less than the 2015 minimum):

25% × $495,000 = $123,750

The $600,000 contribution for 2016 made on 6/1/2016 must be discounted to 1/1/2016 (the valuation date), generally using the effective interest rate of 6%. However, $123,750 of this is needed to pay for the 4/15/2016 quarterly contribution requirement. The contribution is late by 1½ months, and an additional 5 percentage points (for a total 11% rate) must be used to discount that portion of the $600,000 contribution for those 1½ months (and then discounted using 6% for the remaining period). The remaining $476,250 of the contribution is discounted using 6% for the entire 5 month period.

The present value of the $600,000 contribution as of 1/1/2016 is:

$$(\$123,750 \times v_{11\%}^{1.5/12} \times v_{6\%}^{3.5/12}) + (\$476,250 \times v_{6\%}^{5/12})$$
$$= (\$123,750 \times 0.987040 \times 0.983149) + (\$476,250 \times 0.976014) = \$584,915$$

There is an excess contribution of $34,915 ($584,915 – $550,000). The general conditions of the exam state that the employer elects to add excess contributions to the prefunding balance. This is done as of the first day of the following plan year (1/1/2017), and the excess contribution is increased with interest using the 2016 effective interest rate.

Addition to prefunding balance = $34,915 × 1.06 = $37,010

Answer is D.

Question 3

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), and are assumed to begin at hire age. Smith was hired at age 60 and will have 5 years of service at normal retirement age.

Projected benefit = $1,000 × 5 years of service = $5,000

The present value of benefits must be determined at entry age (age at hire). 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 general conditions for the exam state that there are no preretirement decrements). The commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>male</u> participant using 7% interest.

$$PVFB_{60} = \$5,000 \times \ddot{a}_{65}^{(12)} \times v^5 = \$5,000 \times \frac{N_{65}^{(12)}}{D_{65}} \times 0.712986$$

$$= \$5,000 \times (115,172/11,394) \times 0.712986 = \$36,035$$

The normal cost is equal to the PVFB amortized over the total years to retirement.

$$NC_{60} = PVFB_{60}/\ddot{a}_{\overline{5}|.07} = \$36,035/4.387211 = \$8,214$$

The accrued liability is equal to the accumulation of the past normal costs through Smith's current age on 1/1/2016 (1 year of accumulation from age 60 to 61).

$$AL_{61} = NC_{60} \times 1.07 = \$8,214 \times 1.07 = \$8,789$$

Answer is D.

Question 4

The minimum required contribution is equal to the normal cost plus the amortization of the various bases (note that the cost method is not provided, but this is clearly an immediate gain method because there are experience gain/loss bases). The remaining period of each amortization base established before 2016 is provided, and the outstanding balance of those bases must be amortized using the valuation interest rate.

The 2015 experience loss of $100,000 must be amortized beginning on 1/1/2016 over a period of 15 years. Generally, the increase in the liability due to a plan amendment is amortized over a period of 15 years. However, IRC section 431(b)(7)(G) provides that when the benefits provided by the amendment are payable over a period of less than 15 years from the effective date of the amendment, then the amortization period is shortened to the period of time that the increased benefits will be paid. In this question, the additional $30,000 of benefits is to be paid on 12/31/2016, one year from the amendment date. The $30,000 is amortized over 1 year, so it is recognized completely for the minimum required contribution.

The **smallest amount that satisfies the minimum funding standard** is equal to the minimum required contribution, less the credit balance. The question is asking for this amount as of the end of the year, so everything is increased at the valuation interest rate of 7%.

$$X = (200,000 + \frac{800,000}{\ddot{a}_{\overline{8|}}} - \frac{300,000}{\ddot{a}_{\overline{13|}}} + \frac{195,000}{\ddot{a}_{\overline{14|}}} + \frac{100,000}{\ddot{a}_{\overline{15|}}} + 30,000 - 25,000) \times 1.07$$

$$= (200,000 + 125,210 - 33,547 + 20,839 + 10,261 + 30,000 - 25,000) \times 1.07$$

$$= 350,706$$

Answer is D.

Question 5

The normal cost under the unit credit cost method is equal to the present value of the increase in the accrued benefit for the current year. The accrued liability under the unit credit cost method is equal to the present value of the beginning of year accrued benefit.

The normal cost that is provided uses the pre-amendment $25 accrual rate. The accrual has been increased to $26, so the actual normal cost, reflecting the amendment is:

Normal cost $= 35,000 \times (26/25) = 36,400$

The accrued liability that is provided also uses the pre-amendment accrual rate. The actual accrued liability is:

Accrued liability $= 1,000,000 \times (26/25) = 1,040,000$

The increase in the accrued liability due to the plan amendment must be used to create a new 15-year amortization base.

New base $= 1,040,000 - 1,000,000 = 40,000$

The minimum required contribution is equal to the normal cost plus the amortization of the various bases. Other than the new base due to the plan amendment, the net amortization of the bases is 1,000.

The **smallest amount that satisfies the minimum funding standard** is equal to the minimum required contribution, less the credit balance. The question is asking for this amount as of the end of the year, so everything is increased at the valuation interest rate of 6%.

$$X = (36,400 + 1,000 + \frac{40,000}{\ddot{a}_{\overline{15|}}} - 500) \times 1.06 = (36,900 + 3,885) \times 1.06 = 43,232$$

Answer is D.

Question 6

The normal cost under the Aggregate cost method is equal to:

$$\frac{\text{Present value of future benefits - Actuarial value of assets (reduced by the credit balance)}}{\text{Temporary annuity}}$$

When the plan benefits are based upon compensation, the temporary annuity is equal to the ratio of the present value of future compensation to current compensation. There is no benefit formula provided in this question, and since the data provided includes the present value of future compensation and total compensation, it can be assumed that the benefit is compensation-based.

$$\text{Normal cost} = \frac{\$45,000,000 - (\$35,000,000 - \$50,000)}{\$25,000,000 / \$2,500,000} = \$1,005,000$$

The **smallest amount that satisfies the minimum funding standard** as of 12/31/2016 is equal to the normal cost, reduced by the credit balance, and increased with interest from the valuation date of 1/1/2016 to the last day of the year.

$$X = (\$1,005,000 - \$50,000) \times 1.06 = \$1,012,300$$

Answer is C.

Question 7

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 (orignially age 65 in this question, and changed to age 70 for the 1/1/2016 valuation).

Smith was hired at age 55 and is age 61 as of the valuation date, and will have 10 years of service at the old assumed retirement of 65, 15 years at the new assumed retirment age of 70.

First, the accrued liability must be determined using the old assumed retirement age of 65.

The present value of benefits must be determined at entry age (age at hire). The commutation functions can be used to determine that present value.

$$PVFB_{55} = \$45 \times 12 \times 10 \text{ years of service} \times \ddot{a}_{65}^{(12)} \times \frac{D_{65}}{D_{55}} = \$5,400 \times \frac{N_{65}^{(12)}}{D_{65}} \times \frac{D_{65}}{D_{55}}$$

$$= \$5,400 \times \frac{N_{65}^{(12)}}{D_{55}} = \$5,400 \times \frac{115,172}{23,710} = \$26,231$$

Note that the factors for $N_x^{(12)}$ are provided, and N_x is needed to determine the normal cost and accrued liability. Recall the approximation:

$$N_x^{(12)} = N_x - \tfrac{11}{24} D_x \qquad \rightarrow \qquad N_x = N_x^{(12)} + \tfrac{11}{24} D_x$$

So,

$$N_{55} = N_{55}^{(12)} + \tfrac{11}{24} D_{55} = 290,227 + \tfrac{11}{24} (23,710) = 301,094$$
$$N_{61} = N_{61}^{(12)} + \tfrac{11}{24} D_{61} = 168,534 + \tfrac{11}{24} (15,356) = 175,572$$
$$N_{65} = N_{65}^{(12)} + \tfrac{11}{24} D_{65} = 115,172 + \tfrac{11}{24} (11,394) = 120,394$$
$$N_{70} = N_{70}^{(12)} + \tfrac{11}{24} D_{70} = 67,909 + \tfrac{11}{24} (7,638) = 71,410$$

The normal cost is equal to the PVFB amortized over the total years to retirement.

$$NC_{old} = PVFB_{55} / \ddot{a}_{55:\overline{10|}} = \$26,231 / \left(\frac{N_{55} - N_{65}}{D_{55}} \right) = \$26,231 / \left(\frac{301,094 - 120,394}{23,710} \right) = \$3,442$$

The accrued liability is equal to the accumulation of the past normal costs through Smith's current age on 1/1/2016 (6 years of accumulation from age 55 to 61).

$$AL_{old} = NC_{old} \times \ddot{s}_{55:\overline{6}|} = \$3{,}442 \times \left(\frac{N_{55} - N_{61}}{D_{61}} \right)$$

$$= \$3{,}442 \times \left(\frac{301{,}094 - 175{,}572}{15{,}356} \right) = \$28{,}135$$

Next, the accrued liability must be determined using the new assumed retirement age of 70. Note that Smith will now have 15 years of service at the assumed retirement age. Since the plan provides suspension of benefits notices, the late retirment benefit includes additional service credits, but there is no actuarial increase in the age 65 accrued benefit.

$$PVFB_{55} = \$45 \times 12 \times 15 \text{ years of service} \times \ddot{a}_{70}^{(12)} \times \frac{D_{70}}{D_{55}}$$

$$= \$8{,}100 \times \frac{N_{70}^{(12)}}{D_{55}} = \$8{,}100 \times \frac{67{,}909}{23{,}710} = \$23{,}200$$

$$NC_{new} = PVFB_{55} / \ddot{a}_{55:\overline{15}|} = \$23{,}200 / \left(\frac{N_{55} - N_{70}}{D_{55}} \right) = \$23{,}200 / \left(\frac{301{,}094 - 71{,}410}{23{,}710} \right) = \$2{,}395$$

$$AL_{new} = NC_{new} \times \ddot{s}_{55:\overline{6}|} = \$2{,}395 \times \left(\frac{N_{55} - N_{61}}{D_{61}} \right)$$

$$= \$2{,}395 \times \left(\frac{301{,}094 - 175{,}572}{15{,}356} \right) = \$19{,}577$$

The decrease in the accrued liability due to the change in the assumed retirement age is:

$X = \$28{,}135 - \$19{,}577 = \$8{,}558$

Answer is D.

Question 8

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.

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:

$$80,000 + 1,000,000 + 700,000 - 800,000 = 980,000$$

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:

$$90,000 + 1,300,000 - 800,000 = 590,000$$

The deductible limit is the larger of the IRC section 404(o)(2)(A) and 404(o)(2)(B) limits, which is 980,000.

Answer is E.

Note: Without regulations for IRC section 404(o), it is unclear as to whether the deductible limit is determined as of the valuation date, or as of the close of the employer's fiscal year (which has traditionally been when the deductible limit is determined). In this question, if 980,000 is increased using the 4.5% effective interest rate to 12/31/2016, the result is 1,024,100. This is in the same answer range. Also note that it is given that there have always been more than 500 participants. The cushion amount is adjusted in certain cases for HCEs if the plan has no more than 100 participants, and that exception does not apply to this question.

Question 9

The method described in this question for determining the actuarial value of assets is the method described in Revenue Notice 2009-22. Section III.A. of that notice states that the assumed rate of return must be the actuary's best estimate of the anticipated annual rate of return on plan assets from the valuation date until all benefits are expected to be paid. That requirement makes it an actuarial assumption, not a part of the cost method.

The statement is true.

Answer is A.

Question 10

IRC section 430(f)(8) states that for any funding balances not applied to reduce the minimum required contribution for the prior plan year, the funding balances are adjusted with interest using the actual asset rate of return for that prior year.

The statement is true.

Answer is A.

Question 11

Treasury regulation 1.430(d)-1(c)(1)(ii) describes rules dealing with the allocation of the accrued benefit for purposes of the target normal cost. Regulation 1.430(d)-1(c)(1)(ii)(B) states that to the extent that a benefit is based upon a participant's accrued benefit, the target normal cost is based upon the increase in the accrued benefit during the year. However, to the extent that a benefit is based upon something other than the participant's accrued benefit, regulation 1.430(d)-1(c)(1)(ii)(D) provides that the benefit used to determine the target normal cost is the increase in the proportionate benefit attributable to the participant's increase in service during the plan year (with proportionate being a ratio of the participant's current years of service to the participant's years of service at the time the benefit is expected to be payable). Example 3 of regulation 1.430(d)-1(f)(9) provides a clear example of this concept.

In this question, the death benefit is equal to the greater of the annual accrued benefit or $10,000. Once the accrued benefit exceeds $10,000, the death benefit would be completely a function of the accrued benefit. It is necessary to calculate the accrued benefit, both as of 1/1/2016 and 12/31/2016.

For purposes of the target normal cost, when determining the accrued benefit at the end of the year, any assumed salary increases are taken into account. Therefore, the projected salary for 2016 is $63,000 ($60,000 × 1.05).

1/1/2016 accrued benefit = 1% × $60,000 × 10 years of service = $6,000

$$12/31/2016 \text{ accrued benefit} = 1\% \times \frac{(\$60,000 \times 4) + \$63,000}{5} \times 11 \text{ years of service}$$
$$= \$6,666$$

2016 increase in accrued benefit = $6,666 - $6,000 = $666

This is the 2016 increase in the death benefit attributable to the accrued benefit. However, since the actual death benefit would be $10,000, the excess death benefit must be allocated proportionately both at the beginning and end of the year in order to find the 2016 change in the death benefit with regard to benefits not related to the accrued benefit.

As of 1/1/2016, the death benefit in excess of the accrued benefit is $4,000 ($10,000 - $6,000). As of that date, Smith has 10 years of service out of a total 14 years (to age 64, the assumed age at death) over which the benefit might be paid.

Allocable excess death benefit on 1/1/2016 = $4,000 × (10/14) = $2,857

As of 12/31/2016, the death benefit in excess of the accrued benefit is $3,334 ($10,000 - $6,666). As of that date, Smith has 11 years of service out of a total 14 years (to age 64) over which the benefit might be paid.

Allocable excess death benefit on 12/31/2016 = $3,334 × (11/14) = $2,620

During 2016, the allocable excess death benefit decreases by $237 ($2,857 - $2,620).

The death benefit used to determine the 2016 target normal cost is equal to the increase in the accrued benefit for 2016 ($666) plus the increase in the allocable death benefit in excess of the accrued benefit (a decrease of $237).

$X = $666 - $237 = $429

Answer is A.

Question 12

The asset valuation method described in this question is the smoothed value method that is detailed in Revenue Procedure 2000-40. The actuarial value of assets under this method is equal to the current market value of assets, adjusted by adding a percentage of past year losses and subtracting a percentage of past year gains, with a smoothing period of no more than 5 years. This question uses a 5-year smoothing period.

The adjustment to the current (1/1/2016) market value of assets is equal to $\frac{4}{5}$ of the prior year (2015) gain/loss, $\frac{3}{5}$ of the 2014 gain/loss, $\frac{2}{5}$ of the 2013 gain/loss, and $\frac{1}{5}$ of the 2012 gain/loss.

The smoothed value of assets as of 1/1/2016 is:

$50,000,000 - (\frac{4}{5} \times \$9,250,000) + (\frac{3}{5} \times \$550,000)$
$\quad - (\frac{2}{5} \times \$4,500,000) - (\frac{1}{5} \times \$7,250,000) = \$39,680,000$

In no event can the actuarial value of assets exceed 120% of the market value of assets, or be less than 80% of the current market value of assets. 80% of $50,000,000 is $40,000,000. The 1/1/2016 actuarial value of assets cannot be less than that amount.

The actuarial value of assets as of 1/1/2016 is $40,000,000.

Answer is B.

Question 13

The funding target for a plan participant is equal to the present value as of the valuation date of the benefit accrued as of the first day of the plan year.

<u>Smith's</u> 1/1/2016 accrued benefit = 2% × $50,000 × 10 years of service = $10,000

Smith is 5 years from retirement age 65, so the segment 2 interest rate of 6% is used to discount retirement benefits paid from age 65 through age 80, and the segment 3 interest rate of 7% is used to discount benefits paid at age 80 and later. 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 general conditions for the exam state that there are no preretirement decrements). The commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>female</u> participant using 6% and 7% interest.

$$
\begin{aligned}
\text{Funding target} &= \$10,000 \times \left[\frac{N^{(12)}_{65@6\%} - N^{(12)}_{80@6\%}}{D_{65@6\%}} v^5_{6\%} + \frac{N^{(12)}_{80@7\%}}{D_{65@7\%}} v^5_{7\%} \right] \\
&= \$10,000 \times \left[\frac{241{,}929 - 47{,}181}{21{,}225}(0.747258) + \frac{21{,}161}{11{,}529}(0.712986) \right] \\
&= \$81{,}650
\end{aligned}
$$

<u>Jones</u> is retired at age 65 with an annual benefit of $10,000. The segment 1 interest rate of 5% is used to discount retirement benefits paid from age 65 through age 70, the segment 2 interest rate of 6% is used to discount benefits paid from age 70 through age 85, and the segment 3 interest rate of 7% is used to discount benefits paid at age 85 and later. The commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>female</u> participant using 5%, 6% and 7% interest.

$$
\begin{aligned}
\text{Funding target} &= \$10,000 \times \left[\frac{N^{(12)}_{65@5\%} - N^{(12)}_{70@5\%}}{D_{65@5\%}} + \frac{N^{(12)}_{70@6\%} - N^{(12)}_{85@6\%}}{D_{65@6\%}} + \frac{N^{(12)}_{85@7\%}}{D_{65@7\%}} \right] \\
&= \$10,000 \times \left[\frac{488{,}388 - 317{,}693}{39{,}304} + \frac{151{,}747 - 21{,}426}{21{,}225} + \frac{9{,}259}{11{,}529} \right] \\
&= \$112{,}860
\end{aligned}
$$

Total funding target = $81,650 + $112,860 = $194,510

Answer is B.

Question 14

The attained age normal (AAN) cost method consists of a normal cost and various amortization charges and credits. Generally, there is only an initial amortization base equal to the initial accrued liability using the unit credit cost method. That is $70,000 as of the plan effective date of 1/1/2007. The base is amortized over 30 years because the plan was effective prior to PPA (prior to 1/1/2008).

The normal cost under the attained age normal cost method is equal to:

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

Note that the actuarial value of assets is not reduced by the credit balance for purposes of the normal cost calculation under the AAN cost method.

When the plan benefits are based upon compensation, the temporary annuity is equal to the ratio of the present value of future compensation to current compensation. There is no benefit formula provided in this question, and since the data provided includes the present value of future compensation and total compensation, it can be assumed that the benefit is compensation-based.

$$\text{Normal cost} = \frac{\$815,000 - \$350,000 - UL}{\$2,000,000 / \$175,000} = \$40,000 \qquad \rightarrow \qquad UL = \$7,857$$

The balance equation states that the unfunded liability is equal to the outstanding balance of the amortization bases less the credit balance in the funding standard account. The outstanding balance of the initial $70,000 base can be determined as of 1/1/2016 (there are 21 years remaining at that point to pay off the base).

$$\text{Outstanding balance as of } 1/1/2016 = \$70,000 \times \frac{\ddot{a}_{\overline{21|}}}{\ddot{a}_{\overline{30|}}} = \$59,825$$

Using the balance equation:

$$\$7,857 = \$59,825 - \text{Credit balance} \qquad \rightarrow \qquad \text{Credit balance} = \$51,968$$

Note that the credit balance as of 1/1/2016 is the same as the credit balance as of 12/31/2015.

Answer is B.

Question 15

There are two full funding limits that are used relative to the deduction limit:

1. The ERISA full funding limit, which uses the accrued liability and normal cost under the entry age normal method when entry age normal is the cost method (Revenue Ruling 81-13).

2. The RPA'94 full funding limit, which uses current liability rather than the entry age normal accrued liability and normal cost.

The statement is true because the ERISA portion of the full funding limit (which is based on a cost method) <u>does</u> use the plan's same funding method as used for minimum funding purposes. Note that if the cost method had been a spread gain method (such as Aggregate, or Frozen Initial Liability), then the statement would have been false (Revenue Ruling 81-13 requires the use of the accrued liability and normal cost under the entry age normal method for the ERISA full funding limit in the case of a spread gain method being used for minimum funding).

Answer is A.

Question 16

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 prior two 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 that segment 3 interest rate is used. In this question, the assumed rate of return for 2015 of 7% is larger than the segment 3 rate of 5% for that year, so the segment 3 rate of 5% is used to determine the expected earnings for 2015.

The actual earnings for 2015 are:

$$3,825,000 - (3,500,000 + 100,000 - 350,000 - 25,000) = 600,000$$

The expected earnings for 2015 are:

$$[3,500,000 \times .05] + [100,000 \times (1.05^{8/12} - 1] = 178,306$$

Note that the benefit payments and administrative expenses occurred at the end of the year, so there are no expected earnings associated with those transactions. There is also a 2015 contribution of \$100,000 deposited on 4/30/2015, which gets 8 months of assumed interest.

The actual earnings exceed the expected earnings for 2015 by 421,694 (600,000 – 178,306). So, there is an asset gain in 2015 of 421,694.

In 2014 there was an asset loss of \$70,000 because the actual asset return was \$70,000 less than the expected asset return.

There is also a receivable contribution for 2015 of \$350,000 made on 9/15/2016. There are no expected earnings with regard to this contribution, but it must be included in the actuarial value of assets for the 1/1/2016 valuation since it is a receivable for 2015. It must be discounted with interest at the 2015 plan effective rate of 4.5% for 8½ months, from the date contributed to 1/1/2016.

1/1/2016 present value of 2015 receivable contribution $= 350,000 \times v_{4.5\%}^{8.5/12} = 339,256$

1/1/2016 fair market value (including 2015 receivable contribution)
$$= 3,825,000 + 339,256 = 4,164,256$$

The actuarial value of assets is equal to the current (1/1/2016) market value of assets less $\frac{2}{3}$ of the prior year (2015) gain, plus $\frac{1}{3}$ of the 2014 loss.

Actuarial value of assets$_{1/1/2016} = 4,164,256 - (\frac{2}{3} \times 421,694) + (\frac{1}{3} \times 70,000) = 3,906,460$

Under IRC section 430(g)(3)(B)(iii), the actuarial value of assets cannot be less than 90% of the market value of the assets (including receivable contributions). 90% of 4,164,256 is equal to 3,747,830.

The 1/1/2015 actuarial value of assets is equal to $3,906,460.

Answer is D.

Question 17

IRC section 412(c)(5)(A) requires that the application for a waiver of minimum funding be submitted to the Secretary of the Treasury no later than 2½ months after the end of the plan year. For the 2016 plan year, that would be March 15, 2017. The actual filing date of 4/1/2017 is late, so no waiver of minimum funding may be granted for the 2016 year.

The statement is true.

Answer is A.

Question 18

IRC section 430(j)(3)(A) requires that if there was a funding shortfall for the preceding year, then quarterly contributions are required to be made for a plan year. There was a funding shortfall in 2015 (the funding target of $680,000 exceeds the actuarial value of assets reduced by the funding balance), so quarterly contributions are required to be made for the 2016 plan year. The amount of the quarterly contribution under IRC section 430(j)(3)(D) is equal to 25% of the smaller of 90% of the minimum required contribution for the current year or 100% of the minimum required contribution for the preceding year.

90% of 2016 minimum required contribution = 90% × $120,000 = $108,000
100% of 2015 minimum required contribution = $96,000

The quarterly contribution due on 4/15/2016 is equal to 25% of the 2015 minimum required contribution:

25% × $96,000 = $24,000

A plan is subject to liquidity requirements if it is subject to the quarterly contribution requirement and had more than 100 participants on any day of the prior year (IRC section 430(j)(4)(B)). The liquidity requirement applies to this plan.

The liquidity shortfall under IRC section 430(j)(4)(E)(i) is equal to the base amount (three times the adjusted disbursements) less the value of the plan's liquid assets. The liquidity shortfall is determined as of the end of a plan quarter (3/31/2016 in this question).

The adjusted disbursements is equal to the total disbursements during the 12 month period ending on the date the liquidity shortfall is being determined (from 4/1/2015 through 3/31/2016 in this question) reduced by a "percentage" of the non-recurring disbursements (lump sum payments and purchases of annuities). The "percentage" is equal to the plan's funding target attainment percentage (FTAP) for the current plan year. See IRC section 430(j)(4)(E)(iv).

The FTAP under IRC section 430(d)(2) is equal to the ratio of the actuarial value of assets (reduced by the funding balances) to the funding target.

$FTAP_{1/1/2016}$ = 445,000/700,000 = 0.6357, or 63.57%

The total disbursements from 4/1/2015 through 3/31/2016 are equal to the sum of the expenses, lump sum payments, and annuity payments from 1/1/2015 through 3/31/2016, less the payments made from 1/1/2015 through 3/31/2015, plus the $200,000 of annuity purchases made between 10/1/2015 and 12/31/2015.

Total disbursements$_{3/31/2016}$
$$= (\$7,700 + \$25,000 + \$104,000) - (\$900 + \$2,000 + \$15,000) + \$200,000$$
$$= \$318,800$$

Adjusted disbursements$_{3/31/2016}$ = $318,800 – [63.57% × (($25,000 - $2,000) + $200,000)]
$$= \$177,039$$

Liquidity shortfall$_{3/31/2016}$ = (3 × $177,039) – $505,000 = $26,117

The liquidity shortfall is larger than the quarterly contribution required on 4/15/2016.

$X = \$26,117$

Answer is B.

The official solution is technically incorrect. However, that was the accepted solution for purposes of the exam grading (in general, law changes effective after May 31, 2015 would be disregarded for purposes of the November, 2015 exam). Final regulation 1.430(j)-1(e)(2), which was issued in September of 2015 and generally effective for plan years beginning in 2016, changed the definition of adjusted disbursements from the proposed regulations. In the revised definition, for purposes of the reduction due to a "percentage" of the non-recurring disbursements (lump sum payments and purchases of annuities), that percentage (when the 12 month period ending on the date the liquidity shortfall is being determined does not coincide with a plan year) is the FTAP in effect during the plan year in which the non-recurring disbursement occurred. So, in this question, the FTAP for 2015 must be determined:

FTAP$_{1/1/2015}$ = (420,000 – 10,000)/680,000 = 0.6029, or 60.29%

The correct adjusted disbursement and liquidity shortfall amounts are:

Adjusted disbursements$_{3/31/2016}$
$$= \$318,800 - [60.29\% \times (\$5,000 + \$6,000 + \$6,000 + \$200,000)]$$
$$- [63.57\% \times \$6,000]$$
$$= \$184,157$$

Liquidity shortfall$_{3/31/2016}$ = (3 × $184,157) – $505,000 = $47,471

That should have resulted in a correct answer of choice D.

Question 19

If a lump sum is offered under an early retirement window program, it would be important to consider the assumed retirement age assumption, in addition to the probability of electing a lump sum. The statement is false.

Answer is B.

Question 20

The minimum required contribution is equal to the normal cost plus the amortization charges of the various bases less the amortization credits of the various bases (note that the cost method is not provided, but this is clearly an immediate gain method because the 2015 experience gain is provided). The 2015 experience gain is amortized over a 15-year period. The amortization of gains is used to reduce the minimum required contribution.

Minimum required contribution$_{1/1/2016}$

$$= \$150,000 + \$1,030,000 - \$150,000 - \frac{\$95,000}{\ddot{a}_{\overline{15|}}} = \$1,020,643$$

The credit balance as of the close of 2016 is equal to the credit balance as of 12/31/2015 rolled forward with interest for one year, plus the $600,000 contribution for 2016 made on 9/1/2016, rolled forward with 4 months of interest to the end of 2016, minus the minimum required contribution increased with interest to the end of 2016.

$$CB_{12/31/2016} = (\$1,350,000 \times 1.0625) + (\$600,000 \times 1.0625^{4/12}) - (\$1,020,643 \times 1.0625)$$
$$= \$962,190$$

Answer is D.

Question 21

HATFA requires that the segment rates be adjusted using the 25-year average of the segment rates for the period ending on 9/30 of the calendar year prior to the first day of the current plan year. In this question, the plan year begins on 11/1/2016, and the 9/30 in the prior calendar year would be 9/30/2015. These rates are also limited by a permissible corridor, subject to a phase-in.

The statement is true.

Answer is A.

Question 22

The accrued liability under the projected unit credit cost method is equal to the present value of the benefit accrued to date, based upon salary projected to retirement. The retirement benefit of 60% is pro-rated over the first 30 years of service. Smith has 10 years of past service and will have only 20 years of service at age 65, so the 60% benefit at retirement age 65 is reduced by a fraction of 20/30, to a benefit of only 40% of final 3-year average salary. Note that under the general conditions of the exam, it can be assumed that normal retirement age is 65.

Smith's 2015 salary is $250,000, and must be projected to retirement for purposes of the final 3-year average salary.

Final year projected salary = $250,000 \times 1.03^{10} = \$335,979$
Second final year projected salary = $250,000 \times 1.03^{9} = \$326,193$
Third final year projected salary = $250,000 \times 1.03^{8} = \$316,693$

Each of those salaries exceeds the 2016 IRC section 401(a)(17) salary limit of $265,000, so the final projected 3-year average salary is equal to $265,000.

Projected normal retirement benefit = $40\% \times \$265,000 = \$106,000$

The "projected" benefit accrued as of 1/1/2016 is equal to 10/20 of this projected normal retirement benefit (while the question does not specifically state how the benefit is accrued, flat benefit formulas of this type can be assumed to accrued pro-rata).

1/1/2016 "projected" accrued benefit = $106,000 \times (10/20) = \$53,000$

The commutation functions used to determine the accrued liability are found in the tables of supplementary factors provided with the examination, for a <u>male</u> participant using 6% interest. It can be assumed that there are no pre-retirement decrements based upon the exam general conditions.

$$\text{Accrued liability} = \$53,000 \times \ddot{a}_{65}^{(12)} \times v^{10} = \$53,000 \times \frac{N_{65}^{(12)}}{D_{65}} \times 0.558395$$

$$= \$53,000 \times \frac{228,812}{20,977} \times 0.558395 = \$322,814$$

Answer is B.

Question 23

IRC section 430(a)(1) states that if the actuarial value of assets (reduced by the funding balances) is less than the funding target, then the minimum required contribution is equal to the target normal cost plus the shortfall amortization charge plus the waiver amortization charge. The statement is true.

Answer is A.

Question 24

Quarterly contribution installments for 2016 are due on 4/15/2016, 7/15/2016, 10/15/2016, and 1/15/2017 (see IRC section 430(j)(3)(C)(ii)). A plan sponsor may elect to apply a funding balance (adjusted with interest at the plan effective rate to the due date of the installment) to pay for the quarterly contribution requirement under Treasury regulation 1.430(j)-1(c)(4).

Total available funding balance as of 1/1/2016 = $25,000 + $520,000 = $545,000

Total available funding balance as of 4/15/2016 = $545,000 \times 1.05^{3.5/12} = $552,811
Remaining funding balance as of 4/15/2016 = $552,811 - $200,000 = $352,811

Total available funding balance as of 7/15/2016 = $352,811 \times 1.05^{3/12} = $357,141
Remaining funding balance as of 7/15/2016 = $357,141 - $200,000 = $157,141

Total available funding balance as of 10/15/2016 = $157,141 \times 1.05^{3/12} = $159,069
Remaining funding balance as of 10/15/2016 = $159,069 - $200,000 = $0

There is a deficit of $40,931 ($200,000 - $159,069) as of 10/15/2016. That is the amount needed to be contributed in the amount of $X to satisfy the 10/15/2016 quarterly contribution requirement.

Answer is A.

Question 25

IRC section 4971(a)(1) requires the payment of a 10% excise tax on all unpaid minimum required contributions for a single employer plan. IRC section 430(j)(2) requires the discounting of contributions paid after the valuation date with interest using the plan's effective rate for the year from the date paid to the valuation date. Contributions can be paid up until 8½ months after the end of the plan year in order to satisfy minimum funding. (Note that according to the general conditions of the exam, the valuation date is assumed to be the first day of the plan year.) $Y only includes the discounted contributions mad by the end of the plan year, not by the 8½ month minimum funding period. Under the definitions of $X and $Y described in this question, $X minus $Y may not reflect the unpaid minimum required contribution. The statement is false.

Answer is B.

Question 26

The Frozen Initial Liability cost method consists of a normal cost and various amortization bases, resulting in unfunded liabilities. For purposes of determining the normal cost, the present value of future normal cost is amortized. That present value of future normal cost is determined as follows:

PVFNC = Present value of future benefits (PVFB)
     –   Unfunded liability (UL) – Actuarial value of assets (AVA)

It is given that the PVFB is equal to $500,000, and the PVFNC is equal to $200,000, so the sum of the UL and AVA must be equal to $300,000.

When a plan is amended to increase benefits, the UL is increased by the amount that the accrued liability under the Entry Age Normal cost method increases. In this question, that amount is $20,000. The AVA does not change due to the plan amendment, so after the plan amendment, the sum of the UL and AVA increases by $20,000, to $320,000.

In addition, it is given that the amendment increases benefits by 10%, so the PVFB must also increase by 10% (there are no inactive participants, so all participants receive the 10% benefit increase). The PVFB increases to $550,000.

The PVFNC after the amendment is:

$X = $550,000 - $320,000 = $230,000

Answer is C.

Question 27

The minimum required contribution under the Entry Age Normal cost method is equal to the normal cost plus the amortization charges of the various bases less the amortization credits of the various bases.

Minimum required contribution$_{1/1/2016}$

$$= \$26,000 + \$75,000 - \$40,000 = \$61,000$$

The credit balance as of the close of 2016 is equal to the credit balance as of 12/31/2015 rolled forward with interest for one year, plus the $51,000 contribution for 2016 made on 9/1/2016, rolled forward with 4 months of interest to the end of 2016, plus the $20,000 contribution for 2016 made on 1/15/2017 (this does not receive any interest or get any discounting as contributions to a multiemployer plan made after the end of the plan year but within the 8½ month minimum funding period are deemed to have been made as of the last day of the plan year), minus the minimum required contribution increased with interest to the end of 2016.

$$CB_{12/31/2016} = (\$19,000 \times 1.07) + (\$51,000 \times 1.0625^{4/12}) + \$20,000 - (\$61,000 \times 1.07)$$
$$= \$27,223$$

Answer is D.

Question 28

When a plan participant dies, the gain or loss is equal to the difference between the actual liability and the expected liability (if they had not died and the accrued liability was determined under the cost method).

Smith has died at age 66, one year after retiring at age 65 with a monthly benefit of $1,000.

The remaining 9 years of certain payments are made regardless of Smith's death, so the gain due to the death is equal to the expected accrued liability with regard to the life portion of the benefit (the payments that would have been made at age 75 and later). The actual liability with regard to those payments is $0.

Under the Unit Credit cost method, the accrued liability is the present value of the benefit accrued as of beginning of the year (the $1,000 per month benefit). The gain as of 1/1/2016 is really the gain based upon the 2015 plan experience. So, the expected liability can be determined by calculating the present value of the life only portion of the accrued benefit as of 1/1/2016, and multiplying by the probability that Smith survived between ages 65 and 66.

The commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>male</u> participant using 6% interest. The probability p_{65} is not provided in the data for this question, so it must be derived from the commutation functions.

Recall that:

$$\frac{D_{x+1}}{D_x} = vp_x$$

So, $\dfrac{D_{66}}{D_{65}} = vp_{65}$ $\quad\rightarrow\quad$ $\dfrac{19{,}601}{20{,}977} = 1.06 \times p_{65}$ $\quad\rightarrow\quad$ $p_{65} = 0.990469$

$$\text{Gain} = \$1{,}000 \times 12 \times \frac{N_{75}^{(12)}}{D_{66}} \times p_{65} = \$12{,}000 \times \frac{78{,}491}{19{,}601} \times 0.990469 = \$47{,}595$$

Answer is D.

Question 29

The accrued liability under the projected unit credit cost method is equal to the present value of the benefit accrued as of the first day of the plan year, and the normal cost is equal to the present value of the increase in the accrued benefit due to increased service during the year, based upon salary projected to retirement. Note that under the general conditions of the exam, it can be assumed that normal retirement age is 65.

Smith's 2015 salary is $60,000, and must be projected to retirement for purposes of the final 3-year average salary. Smith is age 58 as of 1/1/2016, so salary will be projected for 5, 6, and 7 years.

$$\text{Final 3-year average salary} = \$60,000 \times \frac{1.03^5 + 1.03^6 + 1.03^7}{3} = \$71,664$$

Smith has 31 years of service as of 1/1/2016, and the benefit formula limits service to 30 years. Smith has no normal cost because the accrued benefit does not increase during 2016 due to Smith's service.

1/1/2016 "projected" accrued benefit = 1% × $71,664 × 30 years of service = $21,499

The commutation functions used to determine the accrued liability are found in the tables of supplementary factors provided with the examination, for a <u>female</u> participant using 6% interest. It can be assumed that there are no pre-retirement decrements based upon the exam general conditions.

$$\text{Accrued liability} = \$21,499 \times \ddot{a}_{65}^{(12)} \times v^7 = \$21,499 \times \frac{N_{65}^{(12)}}{D_{65}} \times 0.665057$$

$$= \$21,499 \times \frac{241,929}{21,225} \times 0.665057 = \$162,974$$

$X (the accrued liability) = $162,974 and $Y (the normal cost) = $0.

So, $X + $Y = $162,974

Answer is B.

Question 30

IRC section 430(f)(3) allows a plan sponsor to elect to apply part or all of a funding balance in order to reduce the employer contribution needed to satisfy the minimum required contribution. In this question, the plan sponsor elects to apply $20,000 of the $50,000 funding standard carryover balance for 2015.

IRC section 430(f)(8) states that any unused funding balance is increased/decreased using the actual asset rate of return for the year. The remaining funding standard carryover balance must be increased from 1/1/2015 to 1/1/2016 using the 2015 asset rate of return of 10%.

$Y = ($50,000 - $20,000) \times 1.1 = $33,000$

Contributions made after the valuation date must be discounted from the date paid to the valuation date using the plan effective rate for the year (IRC section 430(j)(2)). The $300,000 contribution for 2015, made on 7/1/2016, must be discounted for 18 months using the 2015 plan effective rate of 6%.

PV of 7/1/2016 contribution $= $300,000/(1.06^{18/12}) = $274,892$

With a minimum required contribution of only $250,000, there is an excess contribution of $24,892 ($274,892 - $250,000). IRC section 430(f)(6)(B) allows the employer to elect to increase the prefunding balance by any excess contribution. The general conditions of the exam state that the employer makes this election. This excess contribution is added to the prefunding balance as of the first day of the next year (1/1/2016), and is increased with interest using the plan effective rate for the plan year for which the excess contribution is made.

Addition to prefunding balance as of 1/1/2016 = $24,892 \times 1.06 = $26,386

It was unnecessary for the employer to elect to use $20,000 of the funding standard carryover balance to pay for the minimum required contribution because there was an excess contribution made. The $20,000 is therefore added to the prefunding balance, and increased with interest using the asset rate of return (which would have been used had the balance remained as part of the funding standard carryover balance). See Treasury regulation 1.430(f)-1(b)(3)(iii).

$X = 1/1/2016 prefunding balance = $26,386 + ($20,000 \times 1.1) = $48,386

$X - $Y = $48,386 – $33,000 = $15,386

Answer is B.

Question 31

The minimum required contribution is equal to the target normal cost plus the amortization of the shortfall amortization bases.

The plan is at-risk in 2016. A load applies to the target normal cost and the funding target if the plan was at-risk in at least two of the past four years (IRC sections 430(i)(1)(A)(ii) and 430(i)(2)(B)). The plan was at risk in 2015, but not prior to that year. Therefore, there is no load (the current 2016 year does not count as one of the two prior years).

In addition, there is a phase-in on the target normal cost and the funding target because the plan has not been at-risk for at least 5 consecutive years (IRC section 430(i)(5)). The phased-in funding target for 2016 is equal to 60% of the not at-risk funding target plus 40% of the at-risk funding target. Note that the plan has been at-risk for 2 consecutive years, so this is the second year of the phase-in.

Target normal cost = ($1,200,000 × 40%) + ($1,000,000 × 60%) = $1,080,000

Funding target = ($18,000,000 × 40%) + ($15,000,000 × 60%) = $16,200,000

The funding shortfall for 2016 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). There are no funding balances in this question.

The funding shortfall as of 1/1/2016 is:

$16,200,000 – $10,000,000 = $6,200,000

The new 2016 shortfall base is equal to the funding shortfall, less the outstanding balance of the prior shortfall amortization bases.

2016 shortfall amortization base = $6,200,000 – $4,000,000 = $2,200,000

2016 shortfall installment for new base = $2,200,000/5.9982 = $366,777

Note that the 7-year amortization factor of 5.9982 was provided in a table with the exam as the factor when the segment rates are (5%, 6%, 7%).

$X = $1,080,000 + $1,500,000 + $366,777 = $2,946,777

Answer is B.

Question 32

When a plan is at-risk, participants who reach their earliest possible retirement age in either the current year, or any of the following 10 years, must be assumed to retire at the earliest possible retirement age. For those who could elect to retire in the current plan year, they are assumed to retire on the last day of the plan year. See IRC section 430(i)(1)(B)(i).

The plan has an early retirement age of 55. Smith will attain age 55 on 1/1/2017, Jones will attain age 55 on 1/1/2022, Brown will attain age 55 on 1/1/2027, and Green will attain age 55 on 1/1/2032. The current year and the next 10 plan years include the years 2016 through 2026. Therefore, only Smith and Jones must be assumed to retire at age 55, for a total of 2 participants.

Answer is C.

Question 33

The funding target for a plan participant is equal to the present value as of the valuation date of the benefit accrued as of the first day of the plan year. As of 1/1/2015, Smith is age 37 with 7 years of service. Only the segment 3 interest rate of 7% is used to determine the present value, because Smith has more than 20 years before reaching the assumed retirement age of 65 (retirement age 65 is a general condition of the exam).

1/1/2015 accrued benefit = 9% × $161,000 × 7 years of service = $101,430

The limitation of IRC section 415 must be considered with regard to the accrued benefit. Smith entered the plan on 1/1/2011 and has only four years of plan participation as of 1/1/2015. The IRC section 415 dollar limit for 2015 is $210,000. This is reduced when years of plan participation are less than 10, as is the case for Smith.

1/1/2015 IRC section 415 dollar limit = $\frac{4}{10}$ × $210,000 = $84,000

The accrued benefit for Smith must be limited to $84,000.

It can be assumed that there are no pre-retirement decrements based upon the exam general conditions.

$$\text{Funding target}_{1/1/2015} = \$84{,}000 \times \ddot{a}_{65}^{(12)} \times v_{7\%}^{28}$$
$$= \$84{,}000 \times 10.11 \times 0.150402 = \$127{,}728$$

Answer is C.

Question 34

The unpaid minimum required contribution for 2015 that can be considered for the 2015 waiver is equal to the minimum required contribution for 2015 as of the 1/1/2015 valuation date less the 2015 contribution deposited on 12/31/2015 and discounted at the 2015 plan effective rate to 1/1/2015.

1/1/2015 value of 2015 contribution = $20,000 ÷ 1.04 = $19,231

2015 waived funding deficiency = $40,000 - $19,231 = $20,769

This waived deficiency is amortized under IRC section 430(e) over a period of 5 years, beginning with 2016. The amortization is based upon the <u>2015</u> segment rates (the year in which the deficiency was waived). The segment 1 rate applies to the first 4 payments (from 1/1/2016 through 1/1/2019) and the segment 2 rate applies to the final payment on 1/1/2020. Note the use of an annuity-immediate because the first payment is on 1/1/2016, one year after the waived deficiency is created.

$$\text{Amortization of 2015 waived deficiency} = \frac{\$20,769}{a_{\overline{4}|3\%} + v^5_{4\%}} = \$4,576$$

Answer is B.

Question 35

The minimum required contribution under the unit credit cost method is equal to the normal cost plus the amortization charges of the various bases less the amortization credits of the various bases. The 2015 experience loss is amortized over a 15-year period as a charge base.

Minimum required contribution$_{1/1/2016}$

$$= \$40,000 + \$160,000 - \$100,000 + \frac{\$80,000}{\ddot{a}_{\overline{15}|}} = \$108,654$$

The **<u>smallest amount that satisfies the minimum funding standard</u>** is equal to the minimum required contribution, reduced by the credit balance.

$X = \$108,654 - \$50,000 = \$58,654$

Answer is B.

Question 36

A funding deficiency occurs if the contributions for a plan year, discounted with interest using the plan effective rate for the plan year to the valuation date, are insufficient to pay for the minimum required contribution.

2014 funding deficiency = $750,000 – ($750,000/1.07) = $49,065

A $750,000 contribution is made on 7/1/2016 and applied to the 2015 plan year to the extent allowable. Treasury regulation 54.4971(c)-1(d)(2)(iii) states that when there is a funding deficiency for a prior year, contributions must be used first to correct the prior year deficiency. Therefore, part of the 7/1/2016 contribution is used to pay the $49,065 funding deficiency from 2014.

In order to determine the amount of the 2014 deficiency needed to be repaid on 7/1/2016, the 2014 deficiency is increased with interest using the 2014 plan effective rate (see Treasury regulation 54.4971(c)-1(d)(2)(i)). The balance of the 7/1/2016 contribution is available to pay for the 2015 minimum required contribution.

Available 7/1/2016 contribution = $750,000 – ($49,065 × $1.07^{2.5}$) = $691,893

The remaining 7/1/2016 contribution must be discounted (using the 2015 plan effective rate) to 1/1/2015, and then used to pay for the 2015 minimum required contribution in order to determine the funding deficiency for 2015.

2015 funding deficiency = $850,000 – ($691,893/$1.04^{1.5}$) = $197,638

IRC section 4971(a)(1) requires payment of an excise tax equal to 10% of the funding deficiency, for single employer plans.

$X = $197,638 × 10% = $19,764

Answer is D.

Question 37

The present value of future benefits is equal to the sum of the present value of the future retirement benefits (all benefits expected to be paid at the assumed retirement age) plus the present value of the future pre-retirement death benefits.

Smith is age 62 as of the valuation date of 1/1/2016, with 30 years of past service. That exceeds the maximum 20 years of service for a full retirement benefit. The monthly normal retirement benefit (NRB) for Smith is:

NRB = $200 × 20 years of service = $4,000

For purposes of determining the present value, the commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>male</u> participant using 6% interest. Note that the question states that there are pre-retirement decrements.

$$\text{PV of retirement benefit} = \$4,000 \times 12 \times {}_{3|}\ddot{a}^{(12)}_{62} = \$48,000 \times \frac{N^{(12)}_{65}}{D_{62}}$$

$$= \$48,000 \times \frac{228,812}{25,547} = \$429,913$$

The present value of the death benefit can be calculated using first principles, noting that the death benefit is payable at the end of the year of death, and is only payable if death occurs prior to age 65.

$$
\begin{aligned}
\text{PV of death benefit} &= \$300,000 \times [vq_{62} + v^2\, p_{62}\, q_{63} + v^3\, p_{62}\, p_{63}\, q_{64}] \\
&= \$300,000 \times [0.0063v + (0.9937)(0.0075)v^2 + (0.9937)(0.9925)(0.0084)v^3] \\
&= \$5,860
\end{aligned}
$$

Total present value of future benefits = $429,913 + $5,860 = $435,773

Answer is A.

Question 38

The minimum required contribution under the entry age normal cost method is equal to the normal cost plus the amortization charges of the various bases less the amortization credits of the various bases. The 2015 experience gain is amortized over a 15-year period as a credit base.

Minimum required contribution$_{1/1/2016}$

$$= \$300{,}000 + \$30{,}000 - \$5{,}000 - \frac{\$110{,}000}{\ddot{a}_{\overline{15|}}} = \$314{,}315$$

The credit balance as of the close of 2016 is equal to the credit balance as of 12/31/2015 rolled forward with interest for one year, minus the minimum required contribution increased with interest to the end of 2016.

$$CB_{12/31/2016} = (\$500{,}000 \times 1.06) - (\$314{,}315 \times 1.06) = \$196{,}826$$

Answer is E.

Question 39

The normal cost under the entry age normal funding method is based upon the <u>projected</u> benefit at assumed retirement age (65 in this question, per the general conditions of the exam), and is assumed to begin at hire age (regardless of the actual date of entry into the plan). The 4% salary scale is incorporated into the determination of the projected benefit. Smith is age 57 as of the valuation date, so the 2015 salary must be projected 8 years to obtain the projected final salary (which would be the highest salary since Smith's 2014 salary is less than the 2015 salary). Smith will have 10 years of service at age 65.

Final salary $= \$70,000 \times 1.04^8 = \$95,800$
Projected benefit $= 2.5\% \times \$95,800 \times 10$ years of service $= \$23,950$

The present value of benefits must be determined at entry age (age at hire). Smith was hired at age 55. 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 general conditions for the exam state that there are no preretirement decrements).

$\text{PVFB}_{55} = \$23,950 \times \ddot{a}_{65}^{(12)} \times v^{10} = \$23,950 \times 12.41 \times 0.508349 = \$151,091$

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 7% interest rate and the 4% salary scale.

Implicit interest rate for amortizing $= (1.07/1.04) - 1 = ..028846$, or 2.8846%

$\text{NC}_{55} = \text{PVFB}_{55}/\ddot{a}_{\overline{10}|.028846} = \$151,091/8.828173 = \$17,115$

The normal cost as of 1/1/2016 (when Smith is age 57) is equal to the normal cost at age 55, increased by 4% per year (since the normal cost increases by the same percentage as does the salary under the exam general conditions).

$\text{NC}_{57} = \text{NC}_{55} \times 1.04^2 = \$17,115 \times 1.0816 = \$18,512$

Answer is B.

Question 40

The week that this exam was given, there was a law change made that effects how this question would be solved. First, we will consider the solution that was accepted for purposes of this exam, ignoring those law changes.

Revenue Notice 2014-53 provides rules to ensure that the 3 segment rates fall within a specified range, determined based upon an average of corresponding segment rates for the 25-year period ending on September 30 of the calendar year preceding the first day of the plan year (the HATFA stabilization rate). The specified range depends upon the plan year and the upper and lower limits in a table found in IRC section 430(h)(2)(C)(iv)(II).

Under the terms of that table, for the 2016 plan year, each of the segment rates cannot be less than 90% or more than 110% of the 25-year average rate determined as of September 30, 2015. If the segment rate falls within that 90% to 110% range, then it is left unchanged. Otherwise it is increased or decreased to the nearest 90% or 110% endpoint.

The unadjusted segment 3 rate for 2016 is 5%. The HATFA stabilization rate for segment 3 for the 2016 year is 7.75%. 90% of 7.75% is 6.975%. Therefore, the unadjusted segment 3 rate must be increased to 6.975%.

For the 2021 plan year, each of the segment rates cannot be less than 70% or more than 130% of the 25-year average rate determined as of September 30, 2020. If the segment rate falls within that 70% to 130% range, then it is left unchanged. Otherwise it is increased or decreased to the nearest 70% or 130% endpoint.

The unadjusted segment 3 rate for 2021 is 5%. The HATFA stabilization rate for segment 3 for the 2021 year is 7%. 70% of 7% is 4.9%. Therefore, the unadjusted segment 3 rate is not changed as it falls within the 70% to 130% range, and remains 5%.

X% = 6.975% - 5% = 1.975%

Answer is C.

The Bipartisan Budget Act of 2015, enacted in November of 2015, made changes to the table found in IRC section 430(h)(2)(C)(iv)(II). The phase-in of the specified ranges was extended. As a result, for 2021 the range is now 85% to 115% of the 25-year average. 85% of 7% is 5.95%, so under current 2016 law, the 2021 segment 3 rate would be increased to 5.95%. That would change the answer as follows:

$X = 6.975% - 5.95% = 1.025%

Note that the exam is based upon the law in effect on May 31, 2015, so answer C was deemed the correct answer.

Question 41

Treasury regulation 1.430(d)-1 states that the funding target for a hybrid plan is equal to the hypothetical balance (account balance) as of the beginning of the year, accumulated to retirement age using the interest crediting rate, converted to the assumed form of payment (a life annuity in this question) using the plan's actuarial equivalence assumptions, and then discounted back to attained age as of the valuation date using the funding assumptions.

Smith is age 60 as of 1/1/2016, so the $100,000 hypothetical account balance is increased at the interest crediting rate of 4% for 5 years to assumed retirement age 65 (per the general conditions of the exam).

Accumulated hypothetical account balance $= \$100,000 \times 1.04^5 = \$121,665$

Equivalent life annuity $= \$121,665 \div 12.21 = \$9,964.37$

Smith is 5 years from retirement age 65, so the segment 2 interest rate of 6% is used to discount retirement benefits paid from age 65 through age 80, and the segment 3 interest rate of 7% is used to discount benefits paid at age 80 and later. 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 general conditions for the exam state that there are no preretirement decrements). The commutation functions used are found in the tables of supplementary factors provided with the examination, for a <u>male</u> participant using 6% and 7% interest.

$$
\begin{aligned}
\text{Funding target} &= \$9,964.37 \times \left[\frac{N^{(12)}_{65@6\%} - N^{(12)}_{80@6\%}}{D_{65@6\%}} v^5_{6\%} + \frac{N^{(12)}_{80@7\%}}{D_{65@7\%}} v^5_{7\%} \right] \\
&= \$9,964.37 \times \left[\frac{228,812 - 38,423}{20,977}(0.747258) + \frac{17,349}{11,394}(0.712986) \right] \\
&= \$78,398
\end{aligned}
$$

Answer is B.

Question 42

IRC section 430(h)(1) requires that the Enrolled Actuary select assumptions such that each assumption is reasonable, and that all assumptions in combination with each other represent the actuary's best estimate of anticipated plan experience. There is no requirement that an actuary perform an experience study in order to review the prior actuary's actuarial assumptions. The statement is false.

Answer is B.

Question 43

IRC section 431(b)(7)(A) states that amounts received by a multiemployer plan to pay for all or part of an employer's withdrawal liability is considered an employer contribution that is used to satisfy minimum funding. The statement is false.

Answer is B.

Question 44

IRC section 430(j)(4)(B) provides that the liquidity requirement applies if the plan is subject to the quarterly contribution requirement of IRC section 430(j)(3) and had more than 100 participants on any day of the prior year. IRC section 430(j)(3)(A) states that the quarterly contribution requirement applies only if the plan had a funding shortfall for the prior plan year.

Therefore, if there was no funding shortfall in 2015, then there is no quarterly contribution requirement in 2016, and as a result no liquidity requirement for 2016.

The statement is true.

Answer is A.

Question 45

I. Treasury regulation 1.430(h)(3)-1(b)(2) allows the use of a combined static mortality table for both annuitants and non-annuitants only if the plan has 500 or fewer participants on the valuation date. The plan has more than 500 participants, so this is not a permitted mortality assumption.

II. Treasury regulation 1.430(h)(3)-1(a)(4) allows the use of a generational mortality table with projection scale AA and separate rates for annuitants and non-annuitants. This is a permitted mortality assumption.

III. Treasury regulation 1.430(h)(3)-2 allows for the use of a <u>generational</u> (not static) plan-specific substitute mortality table based upon the plan's actual experience. The table described in this statement is not a permitted mortality assumption.

Answer is C.

Question 46

The minimum required contribution is equal to the target normal cost plus the amortization of the shortfall amortization bases. In 2014, the minimum required contribution was $350 and the target normal cost was $150, so the amortization of the shortfall bases was $200 ($350 - $150). The plan was exempt from creating shortfall bases prior to 2014, so the $200 represents the amortization of the 2014 shortfall base.

In 2015, the minimum required contribution was $500 and the target normal cost was $200, so the amortization of the shortfall bases was $300 ($500 - $200). The only prior shortfall base was the 2014 base with an amortization installment of $200, so the new 2015 shortfall base has an amortization installment of $100 ($300 - $200).

The funding shortfall for 2016 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).

The funding shortfall as of 1/1/2016 is:

$12,900 – ($10,000 - $500) = $3,400

The new 2016 shortfall base is equal to the funding shortfall, less the outstanding balance of the prior shortfall amortization bases. The outstanding balance of the prior bases is determined by multiplying the amortization installments by a present value factor using the current (2016) segment rates. For the 2014 base, there are 5 years remaining on the 7-year base, and for the 2015 base there are 6 years remaining.

1/1/2016 outstanding balance of prior bases = ($200 × 4.5460) + ($100 × 5.2932)
= $1,439

2016 shortfall amortization base = $3,400 – $1,439 = $1,961

2016 shortfall installment for new base = $1,961/5.9982 = $327

Total 2016 shortfall installment = $200 + $100 + $327 = $627

Note that the 5-year amortization factor of 4.5460, the 6-year amortization factor of 5.2932, and the 7-year amortization factor of 5.9982 were provided in a table with the exam when the segment rates are (5%, 6%, 7%).

1/1/2016 minimum required contribution = $250 + $627 = $877

Answer is D.

Question 47

The minimum required contribution under the Unit Credit method is equal to the normal cost, plus the amortization charges, less the amortization credits, brought forward with interest at the valuation rate to the last day of the plan year. The **smallest amount needed to satisfy the minimum funding standard** is the minimum required contribution, reduced by the credit balance.

The waived funding deficiency must be determined as of the end of 2015. This is the excess of the funding items (normal cost plus amortization charges less amortization credits) over the sum of the credit balance and the contribution made for 2015. All of these items must be increased with interest at the valuation interest rate of 7.5% to 12/31/2015.

1/1/2015 normal cost plus amortization charges less amortization credits

$$= \$500,000 + \$200,000 + \$80,000 = \$780,000$$

The contribution for 2015 was made on 12/31/2015, so there is no interest to credit. The credit balance as of 12/31/2014 gets one year of interest to 12/31/2015.

2015 waived deficiency = ($\$780,000 \times 1.075$) – $\$50,000$ – ($\$50,000 \times 1.075$) = $\$734,750$

The waived deficiency is amortized over 15 years beginning on 1/1/2016. In addition, the $50,000 experience loss from 2015 is amortized over 15 years beginning on 1/1/2016.

$$\$X = \$475,000 + \$200,000 + \$80,000 + \frac{\$734,750}{\ddot{a}_{\overline{15|}}} + \frac{\$50,000}{\ddot{a}_{\overline{15|}}} = \$837,700$$

Answer is C.

Question 48

The asset valuation method described in this question is the smoothed value method that is detailed in Revenue Procedure 2000-40. The actuarial value of assets under this method is equal to the current market value of assets, adjusted by adding a percentage of past year losses and subtracting a percentage of past year gains, with a smoothing period of no more than 5 years. This question uses a 5-year smoothing period.

The adjustment to the current (1/1/2016) market value of assets is equal to $\frac{4}{5}$ of the prior year (2015) gain/loss, $\frac{3}{5}$ of the 2014 gain/loss, $\frac{2}{5}$ of the 2013 gain/loss, and $\frac{1}{5}$ of the 2012 gain/loss.

The asset gains and losses are provided for each year other than 2015. The gain or loss for 2015 is equal to the difference between the actual earnings and the expected earnings. The expected earnings are calculated using the assumed rate of return for 2015 and the actual dates that the contribution and benefit payments were made. The actual earnings are calculated as the increase in the market value of assets during 2015, reduced by the excess of the contributions made over the benefit payments.

The actual earnings for 2015 are:

$$(207{,}000 - 186{,}000) - (20{,}000 - 21{,}500) = 22{,}500$$

The expected earnings for 2015 are:

$$[186{,}000 \times .075] + [20{,}000 \times (1.075^{9/12} - 1] - [21{,}500 \times (1.075^{6/12} - 1] = 14{,}273$$

The actual earnings are greater than the expected earnings, so there is an asset gain in 2015.

2015 asset gain = 22,500 − 14,273 = 8,227

The smoothed value of assets as of 1/1/2016 is:

$$\$207{,}000 - (\tfrac{4}{5} \times \$8{,}227) + (\tfrac{3}{5} \times \$20{,}000) + (\tfrac{2}{5} \times \$5{,}000) + (\tfrac{1}{5} \times \$10{,}000) = \$216{,}418$$

In no event can the actuarial value of assets exceed 120% of the market value of assets, or be less than 80% of the current market value of assets. 120% of $207,000 is $248,400. The 1/1/2016 actuarial value of assets cannot exceed than that amount.

The actuarial value of assets as of 1/1/2016 is $216,418.

Answer is C.

Question 49

IRC section 412(c)(1)(A) provides that the Secretary of the Treasury may not waive the minimum funding standard more often than 3 times in any 15-year period for a single employer plan. In the 15 years including the 2016 plan year (the years 2002 – 2016), only 2 waivers have been granted, in 2006 and in 2011. A waiver may be granted in 2016. The statement is true.

Answer is A.

Question 50

IRC section 432(e)(7) requires a surcharge in addition to the contribution otherwise required under a collective bargaining agreement when a multiemployer plan is in critical status and has adopted a rehabilitation plan. The surcharge is equal to 5% of the required contribution under the collective bargaining agreement during the first year in which the plan is in critical status, and 10% of the required contribution in subsequent years in which the plan is in critical status.

In this question, 9/30/2016 is the end of the second year in which the plan has been in critical status. The 10% surcharge applies to this plan.

The contribution required under the collective bargaining agreement is equal to the $2.20 contribution rate multiplied by the number of hours worked by the employees.

Required contribution = $2.20 × 700,000 hours = $1,540,000

Surcharge = 10% × $1,540,000 = $154,000

The statement is false (note that the $77,000 represents only a 5% surcharge).

Answer is B.

Question 51

The minimum required contribution is equal to the target normal cost plus the amortization of the shortfall amortization bases. For 2015, the minimum required contribution (MRC) is:

$$MRC_{1/1/2015} = \$425,000 + \$75,000 = \$500,000$$

The employer contributes the smallest amount that satisfies the minimum funding standard on 12/31/2015. This is the minimum required contribution reduced by the funding balances. As of 1/1/2015, the funding balances total $600,000, which exceeds the minimum required contribution. The general conditions of the exam state that funding balances are used to reduce the minimum unless it is otherwise stated, so there is no contribution made on 12/31/2015.

The funding standard carryover balance must be used first to reduce the minimum (IRC section 430(f)(3)(B)), so the entire $300,000 funding standard carryover balance is used, as well as $200,000 of the prefunding balance. That leaves $100,000 of the prefunding balance unused as of 1/1/2015.

IRC section 430(f)(8) requires that any unused prefunding balance be adjusted with the actual asset rate of return for the year in determining the remaining balance as of the first day of the following year. The asset rate of return for 2015 is 20%.

1/1/2016 prefunding balance = $100,000 × 1.2 = $120,000

Answer is D.

Question 52

IRC section 431(d) provides rules with regard to obtaining an extension of amortization periods for a multiemployer plan for purposes of the minimum required contribution. In general, an extension cannot exceed 5 years. However, IRC section 431(d)(2) allows for an additional extension period such that, when coupled with the initial extension period does not exceed 10 years.

In this question, the plan received an initial 5 year extension in 2011, and has applied for an additional 5 year extension in 2016. The combined 10 years falls within the requirements of IRC section 431(d)(2), and is allowed.

The assertion is true, but the reason is incorrect, as the additional extension coupled with the initial extension cannot exceed 10 years, not 15 years.

Answer is C.

Question 53

IRC section 430(j)(3)(A) requires that if there was a funding shortfall for the preceding year, quarterly contributions are required to be made for a plan year. There was a funding shortfall in 2015, so quarterly contributions are required to be made for the 2016 plan year. The amount of the quarterly contribution under IRC section 430(j)(3)(D) is equal to 25% of the smaller of 90% of the minimum required contribution for the current year or 100% of the minimum required contribution for the preceding year.

90% of 2016 minimum required contribution = 90% × $645,000 = $580,500

The 2015 minimum required contribution of $630,000 is larger than $580,500, so the quarterly contribution due on 4/15/2016 is equal to 25% of $580,500:

25% × $580,500 = $145,125

$10,000 is contributed on 4/15/2016, so the remaining quarterly contribution that must be satisfied is $135,125 ($145,125 - $10,000).

A plan sponsor may elect to apply a funding balance (adjusted with interest at the plan effective rate to the due date of the installment) to pay for the quarterly contribution requirement under Treasury regulation 1.430(j)-1(c)(4). The funding standard carryover balance must be used before any prefunding balance can be used.

Total available funding standard carryover balance as of 4/15/2016

$$= \$12,000 \times 1.065^{3.5/12} = \$12,222$$

Remaining quarterly contribution due = $135,125 - $12,222 = $122,903

This can be discounted back to 1/1/2016 to find the amount of the 1/1/2016 prefunding balance needed to pay for the 4/15/2016 quarterly contribution requirement.

$X = \$122,903 \div 1.065^{3.5/12} = \$120,666$

Answer is B.

Question 54

The minimum required contribution is equal to the target normal cost plus the amortization of funding shortfall bases. This is offset by any existing funding balance to determine the **<u>smallest amount that satisfies the minimum funding standard</u>**. The prefunding balance is equal to zero, so this is just the minimum required contribution.

The funding shortfall is equal to the funding target reduced by the actuarial value of assets (which is reduced by the funding balances, if any). The funding target is equal to the present value of the benefit accrued as of the first day of the year. The increase in the 2015 IRC section 401(a)(17) limit does not have any effect on the beginning of year accrued benefit because 2015 salary is not used to determine that benefit. The IRC section 415 limit was unchanged in 2015 from 2014. So the funding target as of 1/1/2015 is $240,000.

1/1/2015 funding shortfall = $240,000 - $240,000 = $0

When the funding shortfall is equal to zero, there are no shortfall amortization bases (all existing bases are deemed to be fully amortized). See IRC section 430(c)(6).

The target normal cost is equal to the present value of the increase in the accrued benefit during 2015. The accrued benefit as of the first day of the 2015 plan year is determined using only salary history and benefit limits in effect through 2014.

Compensation each year must be limited to the maximum provided under IRC section 401(a)(17). For the years 2012, 2013, and 2014 those amounts are $250,000, $255,000, and $260,000, respectively. The salaries paid to Smith for those years must be limited.

Smith has 3 years of service as of 1/1/2015.

$$\text{Accrued benefit}_{1/1/2015} = 6.5\% \times \frac{\$250,000 + \$255,000 + 260,000}{3} \times 3 \text{ years of service}$$
$$= \$49,725$$

The accrued benefit determined as of 12/31/2015 includes assumed salary increases for 2015. In this question the assumed salary increase is 0%, so Smith's assumed 2015 salary is $300,000. This must be limited to the 2015 IRC section 401(a)(17) limit of $265,000. As of 12/31/2015, Smith has 4 years of service, and the final 3-year average salary is based on the years 2013 – 2015, as limited under IRC section 401(a)(17).

$$\text{Accrued benefit}_{12/31/2015} = 6.5\% \times \frac{\$255,000 + \$260,000 + 265,000}{3} \times 4 \text{ years of service}$$
$$= \$67,600$$

The limitation of IRC section 415 must be considered with regard to both the beginning and end of year accrued benefits. Smith entered the plan on 1/1/2012 (immediate entry is assumed under the plan general conditions) and has 3 years of plan participation as of 1/1/2015. The IRC section 415 dollar limit for 2015 is $210,000 (it is unchanged from the 2014 limit). This is reduced when years of plan participation are less than 10, as is the case for Smith.

1/1/2015 IRC section 415 dollar limit $= \frac{3}{10} \times \$210,000 = \$63,000$

12/31/2015 IRC section 415 dollar limit $= \frac{4}{10} \times \$210,000 = \$84,000$

The IRC section 415(b) percentage of salary limits will not apply because Smith's salary far exceeds the $210,000 dollar limit. In addition, the actual beginning and end of year accrued benefits are well below the dollar limits, so IRC section 415 does not have any impact on the accrued benefits for Smith.

The 2015 target normal cost is provided, prior to the application of the 2015 IRC section 401(a)(17) cost of living increase. Therefore, the target normal cost assumed a 2015 limit of $260,000, rather than $265,000. The 12/31/2015 accrued benefit without regard to the 2015 limit is:

$$6.5\% \times \frac{\$255,000 + \$260,000 + 260,000}{3} \times 4 \text{ years of service} = \$67,167$$

Upon reflecting the 2015 IRC section 401(a)(17) increase, the accrued benefit increase for 2015 is:

$67,600 - $49,725 = $17,875

Without regard to the 2015 IRC section 401(a)(17) increase, the accrued benefit increase for 2015 is:

$67,167 - $49,725 = $17,442

The target normal cost without regard to the 2015 IRC section 401(a)(17) increase is $80,000. The target normal cost reflecting that increase is:

$$\$80,000 \times \frac{\$17,875}{\$17,442} = \$81,986$$

This is the **smallest amount that satisfies the minimum funding standard** because there is no funding shortfall and no funding balance.

Answer is C.

Question 55

The funding target is based upon the benefit accrued as of the first day of the plan year. For a hybrid plan, the accrued benefit is the hypothetical account balance, which is $100,000 as of 1/1/2016.

The portion of the funding target associated with the death benefit is equal to the present value of the death benefit payable each year with regard to the beginning of year accrued benefit.

Smith is age 62 on 1/1/2016. Deaths are assumed to occur on the first day of the year, so Smith could possibly die on 1/1/2016, 1/1/2017, or 1/1/2018 (at ages 62, 63, or 64) prior to retirement. The present value of those possible death benefit payments must be determined by multiplying the death benefit (the $100,000 increased by the interest crediting rate of 4% to the date of death) by the probability of death. The segment 1 interest rate of 5% is used to discount the possible death benefit payments at ages 62 through 64 since they would be paid within the next 5 years.

$$\$X = (\$100{,}000 \times q_{62}) + (\$100{,}000 \times 1.04 \times p_{62} \times q_{63} \times v_{5\%})$$
$$+ (\$100{,}000 \times 1.04^2 \times p_{62} \times p_{63} \times q_{64} \times v_{5\%}^2)$$
$$= (\$100{,}000 \times 0.0060) + (\$100{,}000 \times 1.04 \times 0.9940 \times 0.0069 \times 0.9524)$$
$$+ (\$100{,}000 \times 1.04^2 \times 0.9940 \times 0.9931 \times 0.0077 \times 0.9070)$$
$$= \$2{,}025$$

Answer is A.

Question 56

IRC section 430(f)(3) allows a plan sponsor to elect to apply part or all of a funding balance in order to reduce the contribution required to satisfy the minimum required contribution. In this question, the plan sponsor does not elect to apply any funding balance for 2015.

IRC section 430(f)(8) states that any unused funding balance is increased/decreased using the actual asset rate of return for the year. The remaining prefunding balance must be increased from 1/1/2015 to 1/1/2016 using the 2015 asset rate of return of 12%.

Contributions made after the valuation date must be discounted from the date paid to the valuation date using the plan effective rate for the year (IRC section 430(j)(2)). The $750,000 contribution for 2015, made on 12/31/2015, must be discounted for one year using the 2015 plan effective rate of 6%.

PV of 12/31/2015 contribution = $750,000/1.06 = $707,547

With a minimum required contribution of only $500,000, there is an excess contribution of $207,547 ($707,547 - $500,000). IRC section 430(f)(6)(B) allows the employer to elect to increase the prefunding balance by any excess contribution. The general conditions of the exam state that the employer makes this election. This excess contribution is added to the prefunding balance as of the first day of the next year (1/1/2016), and is increased with interest using the plan effective rate for the plan year for which the excess contribution is made.

1/1/2016 prefunding balance = ($100,000 × 1.12) + ($207,547 × 1.06) = $332,000

Answer is D.

Question 57

IRC section 430(h)(1) requires that all assumptions, other than those prescribed by law, should reflect the actuary's (not the plan sponsor's) best estimate of experience under the plan. The statement is false.

Answer is B.