# Solutions to EA-2(B) Examination
# Spring, 2001

## Question 1

IRS regulation 1.415-3(a)(2) provides that the dollar limitation under IRC section 415(b) can be adjusted for cost of living increases based upon the calendar year in which the plan year ends (not begins).

Answer is B.

## Question 2

The qualified pre-retirement survivor annuity need not be provided if the participant has been married for less than 1 year. See IRC section 417(d).

Answer is B.

## Question 3

An early retirement window that overlaps two plan years is only used for nondiscrimination testing in the first year. See IRS regulation 1.401(a)(4)-3(f)(4)(ii)(A).

Answer is B.

## Question 4

Any reasonable and consistent method may be used to value current liability for purposes of the pre-termination restrictions on distributions. See IRS regulation 1.401(a)(4)-5(b)(3)(v).

Answer is A.

## Question 5

IRC section 411(a)(5) indicates that if the elapsed time method is not elected, then a full year of service must be granted if at least 1,000 hours is worked.

Answer is B.

## Question 6

This comes straight from IRC section 414(q)(6).

Answer is A.

## Question 7

Only the IRC 415(b) dollar limitation is adjusted for the commencement of payments prior to Social Security Retirement Age.

Answer is A.

## Question 8

This question involves the repeal of the IRC section 415(e) rules, which is covered in Revenue Notice 99-44. In Q&A number 3, it states that benefit increases may be provided to current and former employees who have commenced receiving benefits, but only to the extent that they are participants on or after the effective date of the repeal of IRC section 415(e). Since the participant in this question received a lump sum distribution in 1998, and 415(e) was repealed for limitation years beginning in 2000, the participant was no longer a plan participant at the time of the repeal and would not be entitled to any additional benefit.

Answer is B.

## Question 9

For plan years beginning after December 31, 1999, the lump sum must be determined as the greater of the value using the IRC section 417(e) definition, or the value using the plan's actuarial equivalence definition.

Answer is B.

## Question 10

The allocation of the excess assets into a qualified replacement plan should be no less (not more) rapidly than ratably over the 7-year period. See IRC section 4980(d)(2)(C)(i)(II).

Answer is B.

## Question 11

Missed quarterly contributions are not specifically listed as a reportable event under ERISA 4043. However, IRC section 412(n)(4)(A) requires that the PBGC must be notified if a quarterly contribution required under IRC section 412(m) is missed, and that the unpaid balance exceeds $1,000,000. This statement is false since it is not clear that the plan sponsor's quarterly contribution requirement exceeded this amount. In addition, PBGC Technical Update 97-6 grants an exemption of the reporting requirement for plans with no more than 100 participants.

Answer is B.

## Question 12

ERISA section 4213(a) indicates that the actuary may use either assumptions that in the aggregate are reasonable, or the PBGC actuarial assumptions.

Answer is B.

## Question 13

This comes from ERISA 4209(c)(1).

Answer is A.

## Question 14

ERISA 407(a)(2) indicates that this is true ONLY at the time of acquisition. It is possible that due to fluctuating market conditions, the qualifying employer securities could exceed 10% of the plan assets, and that would be acceptable.

Answer is B.

## Question 15

The rules for the determination of the designated benefit of a missing participant in the event of a plan termination are covered in ERISA section 4050.5. Since the lump sum is an optional benefit, the value of the designated benefit is equal to the greater of the value determined using plan assumptions (had the participant been located) or the value using the missing participant assumptions, applied to the designated benefit with the greatest present value, plus $300.

In this case, there are 3 possible benefit forms – the normal form of life annuity, the qualified joint and 50% survivor annuity, and the lump sum distribution. The annuities must be valued using PBGC assumptions, but ERISA section 4050(b)(2)(A) indicates that plan actuarial equivalence is used for lump sums that can be paid without participant or spousal consent (as is the case here).

The present value of each of the 3 possible benefits is as follows.

Life annuity: $\$75 \times 116.8 = \$8,760$
QJ&50%S: $\$75 \times (1 - .07) \times 126.3 = \$8,809$
Lump sum: $\$75 \times 120.7 = \$9,052$

The first two of these must have \$300 added to them, per the missing participant assumptions:

Life annuity: $\$8,760 + \$300 = \$9,060$
QJ&50%S: $\$8,809 + \$300 = \$9,109$

The lump sum value under plan assumptions is not increased by \$300.

The largest value of these is the value of the QJ&50%S benefit. Therefore, the value of the designated benefit is \$9,109.

Answer is C.

## Question 16

Formula I: Clearly, the benefit formula before 2001 satisfies the 133 1/3% rule. The fact that the formula increased in 2001 is disregarded for years prior to 2001 (see IRS regulation 1.411(b)-1(b)(2)(ii)(B)). For 2001, IRS regulation 1.411(b)-1(b)(2)(ii)(A) indicates that any amendment is treated as always being in effect. So, this formula satisfies the 133 1/3% rule.

Formula II: This formula satisfies the 133 1/3% rule since \$400 does not exceed 133 1/3% of \$300.

Formula III: This formula satisfies the 133 1/3% rule since \$100 does not exceed 133 1/3% of \$300. Note that this formula is actually frontloaded, and that is allowable.

Answer is D.

## Question 17

The latest date at which the pre-retirement survivor annuity may be paid is the earliest date that Smith would have been eligible to retire (see IRC section 417(c)(1)(A)(ii)). This is the date that Smith would have reached age 55, which is 1/1/2009.

Smith's accrued benefit as of his date of death (12/31/2000) is:

$40,500 × .01 × 25 years of service = $10,125

The early retirement benefit at age 55 (reducing the benefit by 5% for 10 years) is:

$10,125 × 50% = $5,062.50

The minimum qualified pre-retirement spouse annuity is 50%. The reduced annuity is:

$5,062.50 × .85 = $4,303.13

The spouse is entitled to 50% of this. The monthly spousal benefit payable beginning 1/1/2009 is:

$4,303.13 × 50% ÷ 12 = $179.30

Answer is B.

## Question 18

The monthly vested accrued benefit for Smith as of the plan termination date under the terms of the plan is:

[($36,000 + $38,000 + $40,000)/3] × .04 × 25 years of service ÷ 12 = $3,166.67

This must be limited by the PBGC maximum guaranteed benefit. The PBGC maximum guaranteed benefit is equal to the smaller of the PBGC dollar maximum or the high consecutive five-year average compensation. Note that the high consecutive five-year average monthly compensation is:

[($32,000 + $34,000 + $36,000 + $38,000 + $40,000)/60] = $3,000

Since the normal form of the plan benefit is a joint and 100% survivor annuity, the PBGC maximum must be converted to that form. The conversion factor for that purpose is .80.

The adjusted PBGC dollar maximum is:

$3,221.59 × .80 = $2,577.27

The adjusted PBGC compensation maximum is:

$3,000.00 × .80 = $2,400.00

Therefore, Smith's guaranteed monthly benefit is $2,400.00.

Answer is B.

## Question 19

The average annual accrual must be determined since the measurement period is the current and past years.

Average annual accrual = $18,640 ÷ 8 years = $2,330

The normal form of benefit is a 5 C&C. The average annual accrual must be converted to a life annuity for purposes of the normal accrual rate. The average annual accrual is a benefit payable at age 65. So, the conversion factor from a 5 C&C to a life annuity can be determined using the given annuity factors for normalization at age 65. The normalized average annual accrual is:

$2,330 × (8.8125/8.6468) = $2,374.65

The normal accrual rate is the ratio of the normalized annual accrual to the annual testing compensation.

Normal accrual rate = 2,374.65 ÷ 130,000 = .018267, or 1.8267%

For the most valuable accrual rate, consider the most valuable benefit that Smith could elect. Clearly, that would be the early retirement benefit that would first be available at age 63 (when Smith first has 10 years of service), payable as a joint and 50% survivor. There would be no early retirement reduction since the reduction only applies for early retirement before age 62. The early retirement benefit payable as a joint and 50% survivor annuity is:

$2,330 × .95 = $2,213.50

This must be normalized to age 65 (converting it to a life annuity benefit) using the given annuity factors for normalization and the 8% interest assumption used for testing purposes to accumulate from age 63 to age 65. The normalized most valuable accrual is:

$2,213.50 × 10.0239 × $1.08^2$ ÷ 8.6468 = $2,993.01

Most valuable accrual rate = 2,993.01 ÷ 130,000 = .023023, or 2.3023%

The difference between the most valuable accrual rate and the normal accrual rate is:

2.3023% - 1.8267% = .4756%

Answer is B.

## Question 20

ERISA section 4043 covers reportable events. Statement I is a reportable event due to ERISA 4043(c)(10). Statement II is a reportable event due to ERISA 4043(c)(3). Statement III is not a reportable event.

Answer is A.

## Question 21

Lump sum payments to one of the 25 highly compensated employees with the greatest compensation in the current or prior year may be paid without restriction provided that the market value of the assets immediately after the distribution equal or exceed 110% of current liability. (See IRS regulation 1.401(a)(4)-5(b)(3)(iv)(A).)

Consider each HCE individually. Test to see whether the assets after a lump sum is paid to the HCE would be at least 110% of the remaining current liability.

HCE1: Assets = 6,000,000 – 1,100,000 = 4,900,000
110% of current liability = 1.1 × (5,440,000 – 900,000) = 4,994,000
Result: Assets < 110% of current liability

HCE2: Assets = 6,000,000 – 275,000 = 5,725,000
110% of current liability = 1.1 × (5,440,000 – 240,000) = 5,720,000
Result: Assets > 110% of current liability

HCE3: Assets = 6,000,000 – 80,000 = 5,920,000
110% of current liability = 1.1 × (5,440,000 – 60,000) = 5,918,000
Result: Assets > 110% of current liability

HCE4: Assets = 6,000,000 – 60,000 = 5,940,000
110% of current liability = 1.1 × (5,440,000 – 15,000) = 5,967,500
Result: Assets < 110% of current liability

Therefore, the requirements are satisfied if either HCE2 or HCE3 receives a lump sum.

Answer is B.

## Question 22

Smith is a substantial owner (owns more than 10%) and is subject to a phase-in of vested benefit over 30 years. The phase-in begins with the year in which Smith first participated under a given benefit formula. Consider each benefit formula chronologically.

1990 formula: Vested accrued benefit = \$15 × 9 years = \$135
Phase-in = \$135 × 9/30 = \$40.50

1999 formula: Vested accrued benefit = \$20 × 9 years = \$180
Increase = \$180 - \$135 = \$45
Phase-in = \$45 × 3/30 = \$4.50

2001 formula: Not considered, since it has been in effect for less than 1 year.

Total guaranteed for Smith = \$40.50 + \$4.50 = \$45.00

Brown is a non-substantial owner and is subject to the 5-year phase in rules.

1990 formula: Vested accrued benefit = \$15 × 4 years = \$60
This is fully guaranteed since the formula has been in effect for at least 5 years.

1999 formula: Vested accrued benefit = \$20 × 4 years = \$80
Increase = \$80 - \$60 = \$20
Phase-in = \$20 × 3 years = \$60; however, only the increase in vested benefit of \$20 is guaranteed.

2001 formula: Not considered, since it has been in effect for less than 1 year.

Total guaranteed for Brown = \$60.00 + \$20.00 = \$80.00

The sum of the guaranteed benefits is:

\$45 + \$80 = \$125

Answer is D.

## Question 23

The mandatory employee contributions must be accumulated using 120% of the Federal Mid-Term Rate each year through the valuation date of 1/1/2001, as follows.

Accumulation of 1996 contribution = 32,000 × .035 × 1.0734 × 1.0713 × 1.0559 × 1.0747
= 1,461.51
Accumulation of 1997 contribution = 34,000 × .035 × 1.0713 × 1.0559 × 1.0747
= 1,446.67
Accumulation of 1998 contribution = 36,000 × .035 × 1.0559 × 1.0747
= 1,429.82
Accumulation of 1999 contribution = 38,000 × .035 × 1.0747
= 1,429.35
Accumulation of 2000 contribution = 40,000 × .035
= 1,400.00

Total accumulated employee contributions as of 1/1/2001
= 1,461.51 + 1,446.67 + 1,429.82 + 1,429.35 + 1,400.00 = 7,167.35

This is accumulated to retirement age 65, and converted to a life annuity using the 30-year Treasury rate (from November 2000) and the applicable mortality table (also equal to the lump sum actuarial equivalence factors). The equivalent benefit at age 65 is:

$7{,}167.35 \times 1.065^{14} \div 10.25 = 1{,}688.61$

The plan accrued benefit is:

[(36,000 + 38,000 + 40,000)/3] × .02 × 5 years of service = 3,800.00

The vested percentage after 5 years of service is 60%. Only the portion of the accrued benefit that is attributable to the employer contributions is subject to the vesting schedule. The portion attributable to the mandatory employee contributions is fully vested.

Vested accrued benefit = 1,688.61 + [(3,800.00 – 1,688.61) × 60%] = 2,955.44

Answer is D.

## Question 24

IRS regulation 1.414(*l*)-1(e)(2) provides that in cases of a merger, a special schedule of benefits must be set up for participants who would otherwise receive smaller benefits if the merged plan immediately terminated than they would have received from the prior plan.

The total present value of accrued benefits in plan A is $362,000. There is enough money in Plan A to cover all benefits in categories 3 and 4 ($314,000). However, that leaves only $6,000 to pay for Brown's category 5 benefit with a value of $48,000. Only 12.5% (6,000/48,000) of Brown's category 5 benefit is covered.

The total present value of accrued benefits in plan B is $424,000. There is enough money in Plan B to cover all benefits in categories 3 and 4 ($340,000). However, that leaves only $60,000 to pay for Jones' category 5 benefit with a value of $84,000. Only 71.43% (60,000/84,000) of Jones' category 5 benefit is covered.

Plan B is the better funded plan, as it has assets that cover 71.43% of category 5, as compared with 12.5% for Plan A.

The annual benefit to be included in the benefit schedule for Jones is:

$12{,}000 \times (71.43\% - 12.5\%) = 7{,}072$

Answer is A.

Note: The benefit schedule only comes into play should the merged plan terminate during the first 5 years following the date of the merger. Once assets have been allocated through categories 1 through 4, and the first 12.5% of category 5, assets are then allocated to the benefits in the benefit schedule before the remaining benefits in category 5 receive an asset allocation.

## Question 25

Without an optional methodology, the rate group will not pass coverage since no NHCE has both a normal accrual rate at least as large as 2.00% and a most valuable accrual rate at least as large as 4.00%. Therefore, the ratio percentage of the rate group currently is 0% (no NHCEs in the rate group). Let's look at the proposed methodologies.

Clearly, the use of the average benefit percentage test by itself will not help, since the rate group's ratio percentage is 0%, and this would be less than the midpoint percentage test required as part of the average benefits test. (Note that the midpoint percentage is never less than 20%.)

Let's consider grouping the accrual rates around a central rate. Looking at the normal accrual rates, a good guess would be to try 1.90% as the rate to group around since that is halfway between 2.00% (the normal rate for HCE) and 1.80% (the normal rate for NHCE3 – with the smallest normal accrual rate of the NHCEs). The actual accrual rate must be within 5% of the central rate. Unfortunately, if 1.90% is used, then HCE will be just above the grouping (1.90% × 1.05 = 1.995%) and NHCE3 will be just above the grouping (1.90% × .95 = 1.805%). So, grouping will not allow NHCE3 to be part of the group. But clearly, grouping will work for NHCE1 and NHCE2 as far as the normal accrual rates go. For example, using 2.00% as the central rate, the range for the rate grouping is from 1.90% (2.00% × .95) to 2.10% (2.00% × 1.05). So, HCE, NHCE1, and NHCE2 are all deemed to have a normal accrual rate of 2.00%.

Looking at the most valuable accrual rates, a good guess would be to try 3.75% as the rate to group around since that is halfway between 4.00% (the normal rate for HCE) and 3.50% (the normal rate for NHCE2 – with the smallest normal accrual rate of the NHCEs). The actual accrual rate must be within 15% of the central rate when applying this technique to the most valuable rate. This technique allows NHCE1 and NHCE2 to become part of the rate group since both 4.00% and 3.50% are easily within 15% of 3.75%.

Note: the regulations indicate that the accrual rates may not be grouped if the rates of the HCEs are generally significantly higher than those of the NHCEs. This is subjective, and since there is one NHCE with an identical accrual rate to the HCE's accrual rate (both looking at the normal and most valuable accruals), it must be assumed in this question that this condition is satisfied.

There are now 2 NHCEs in the rate group (out of a possible 1,800 non-excludable NHCEs) and 1 HCE in the rate group (out of a possible 200 non-excludable HCEs). The ratio percentage is:

(2/1,800) ÷ (1/200) = .2222, or 22.22%

The NHCE concentration percentage (the percentage of non-excludable employees that are NHCEs) is:

1,800/2,000 = .9, or 90%

This yields a safe harbor percentage of 27.50% and an unsafe harbor percentage of 20.00% (see table in IRS regulation 1.410(b)-4(c)(4)(iv)). The midpoint of these is 23.75%. Unfortunately, the ratio percentage of 22.22% is less than 23.75%. So, the combination of grouping of accrual rates and the use of the average benefits test does not help us.

Note that there is another technical issue here. IRS regulation 1.401(a)(4)-2(c)(3)(ii), which is cross-referenced by IRS regulation 1.401(a)(4)-3(c)(2), indicates that if the ratio percentage of the plan as a whole is less than the midpoint percentage, then the ratio percentage for the plan as a whole is used instead of the midpoint percentage. The ratio percentage for the plan as a whole is:

(40/1,800)/(20/200) = 22.22%.

So, 22.22% would be substituted for 23.75%, and the ratio percentage of the rate group would be at least as large (in fact, equal) to this. For some reason, the solution to this question ignores this issue.

Next, consider the effect of demonstration that Plan A is a qualified separate line of business (QSLOB). Provided that the QSLOB is considered to be a reasonable classification of employees, the employees in the QSLOB can be tested as a separate coverage group (see IRS regulation 1.410(b)-7(c)(5)). Assuming that the reasonable classification exists (a requirement for the QSLOB to be tested separately), and the grouping of accrual rates is used (which is necessary since otherwise the ratio percentage of the rate group is 0%), the ratio percentage of the rate group becomes:

(2/40)/(1/20) = 100%

The rate group now satisfies the ratio percentage test, and Plan A now satisfies the general nondiscrimination test. Grouping of accrual rates and demonstration that Plan A employees are in a QSLOB were used.

Answer is B.

## Question 26

A partial withdrawal can be shown to have occurred on 12/31/1997 due to a 70% decline. Looking at the years 1990 – 1994 (the five year period before the three year period ending on 12/31/1997), the years with the two largest contribution base units are 1990 and 1992. The average of the base units from 1990 and 1992 is:

(280,000 + 275,000)/2 = 277,500

30% of this amount is:

277,500 × .3 = 83,250

Clearly, a 70% decline has occurred since the base units in each of 1995, 1996 and 1997 are less than 83,250. The fraction used to prorate the complete liability for Employer A upon the partial withdrawal due to the 70% decline is:

$$1 - \frac{80{,}000}{(280{,}000 + 180{,}000 + 275{,}000 + 170{,}000 + 150{,}000)/5} = .620853, \text{ or } 62.0853\%$$

Note that the numerator in the above fraction is equal to the base units in 1998 (the year following the year of the partial withdrawal).

Answer is D.

Note that the question itself is confusing since it does not specifically state that the fraction being asked about is the one used to prorate the complete liability in the case of a partial withdrawal. However, in the context of the information given, this is the only interpretation that makes sense.

## Question 27

First, compute the total guaranteed benefit for Smith. All benefit provisions that were both effective and adopted at least 5 years before the plan termination date are not subject to phase-in. Therefore, the vested accrued benefit attributable to the 1/1/1996 formula is fully guaranteed. Note that the expected retirement age of 62 should be used.

1/1/1996 formula: \$28 × 14 years of service × .85 = 333.20 (fully guaranteed)

1/1/1999 formula: \$38 × 14 years of service × .91 = 484.12
Increase = 484.12 – 333.20 = 150.92
Phase-in = 150.92 × 40% = 60.37

Total guaranteed benefit = 333.20 + 60.37 = 393.57

Using the plan provisions in effect 5 years before the plan termination date, Smith was eligible to retire 3 years before the plan termination date since he had attained age 55 and had at least 10 years of service. His category 3 benefit (the benefit he would have received on 1/1/1998) is:

$28 × 11 years × .6 = 184.80

The category 4 benefit is the balance of the guaranteed benefit:

393.57 – 184.80 = 208.77

The PBGC category 4 liability is the present value of the category 4 benefit. This is:

$208.77 \times 12 \times {}_{2|}\ddot{a}_{60}^{(12)} = 21{,}345$

Answer is C.

## Question 28

The issue of health benefits payable to retirees is covered in IRC section 420. The maximum that can be transferred (see IRC section 420(e)(2)) is:

Actuarial assets minus the greater of the full funding limit liability or 125% of current liability.

In no event can the transfer exceed the amount that is reasonably expected to pay for the health benefits for the year (see IRC section 420(b)(3)).

The full funding limitation liability is equal to the smaller of the accrued liability plus normal cost or 160% of current liability. Clearly, the smaller of these is the accrued liability plus normal cost of $27,200,000.

125% of current liability is $27,500,000.

Therefore, the maximum transfer (subject to the limitation of IRC section 420(b)(3)) is:

$28,150,000 - $27,500,000 = $650,000

Clearly, this is less than the expected (actual) cost of health benefits for the year.

Answer is C.

## Question 29

Smith's accrued benefit as of 12/31/2001 is equal to 1.5% of final 3-year average compensation per year of service. Since the measurement period being used is the current and prior years, the accrued benefit must be divided by years of service to determine the accrual for testing purposes. This makes the accrual for testing purposes to be 1.5% of 3-year average compensation. Dividing by 3-year average compensation, we obtain 1.5%, which is the accrual rate (based upon the normal form of 10 C&C).

Note that it was necessary to assume that testing compensation is also the final 3-year average compensation.

In order to determine the normal accrual rate, the normal form accrual rate must be converted to a life annuity at the testing age of 65, using the testing assumptions.

Normal accrual rate = $1.5\% \times (9.95/9.50) = 1.57\%$

The most valuable accrual rate is equal to the most valuable optional form of benefit that Smith could elect, normalized to a life annuity at the testing age of 65, as a percentage of testing compensation. It would appear that the most valuable form of benefit would be the Qualified Joint and 50% Survivor annuity payable at the earliest possible retirement age of 55. The 1.5% accrual in the normal form at age 65 would have to be adjusted (for form of benefit and for the early retirement reduction) as follows:

$1.5\% \times .97 \times .7 = 1.0185\%$

This must then be normalized to age 65:

Most valuable accrual rate = $1.0185\% \times 11.95 \times 1.075^{10} \div 9.50 = 2.64\%$

Note that other optional forms of benefit and retirement ages must at least be considered to be the most valuable benefit. But it should be clear by examination that we have indeed determined the most valuable benefit. For example, the earliest possible retirement age will clearly yield a more valuable benefit since the early retirement reduction factor calls for a reduction of only 3% per year, yet the benefit is increased by 7.5% back to age 65 in the normalization process. Clearly, the accumulation outweighs the implicit discount. Similarly, the Qualified Joint and 50% Survivor benefit is more valuable than the 10 C&C normal form, as evidenced by the comparison of the 0.97 conversion factor as compared to the true actuarial equivalence factor, which yields a greater reduction.

Rounding the normal and most valuable accrual rates to the nearest 0.05%, the normal accrual rate is 1.55%, and the most valuable accrual rate is 2.65%.

Answer is D.

## Question 30

This is a peculiar question, for various reasons. First, the benefit formula is set up as an offset formula. However, Final Average Compensation, an integral part of offset formulas, is not given, nor is enough information to determine Final Average Compensation. It will be assumed here that Final Average Compensation exceeds Covered Compensation, making the determination of Final Average Compensation unnecessary. A second peculiarity is that the problem does not state an allowed early retirement age, nor does it give any early retirement adjustment factors. But the question itself implies that early retirement is allowed for Smith, at his current age 62. It will be assumed here that there are no early retirement adjustment factors.

The gross benefit (before the offset) would appear to be:

1.30% × $74,000 × 20 years of service = $19,240

The compensation used for the offset must be limited to $45,000, which is the covered compensation for Smith. In addition, the 0.65% offset percentage must be reduced to the maximum percentage allowed for a participant retiring at age 62 with a Social Security Retirement Age (SSRA) of 66. Referring to the disparity tables provided in regulation 1.401(*l*)-3(e)(3), the maximum disparity that could be used for Smith is 0.55% (using the table for SSRA 66) or 0.52% (using the simplified table). We can examine the effects of each offset percentage.

Using 0.55% as the offset percentage, the offset benefit is:

0.55% × $45,000 × 20 years of service = $4,950

However, since the offset percentage was reduced from normal retirement age, the gross benefit percentage must be reduced by the same number of percentage points as the offset percentage was reduced (see IRS regulation 1.401(l)-3(f)(2)). The offset percentage would have been 0.65% at normal retirement age. So, the offset percentage was reduced by .10% from age 65 to age 62, and the gross benefit percentage must be reduced accordingly from 1.30% to 1.20%. The gross benefit is:

1.20% × $74,000 × 20 years of service = $17,760

This makes the total benefit equal to:

$17,760 - $4,950 = $12,810

Using 0.52% as the offset percentage, the offset benefit is:

0.52% × $45,000 × 20 years of service = $4,680

In this case, the gross benefit percentage must be reduced by .13% accordingly from 1.30% to 1.17%. The gross benefit is:

1.17% × $74,000 × 20 years of service = $17,316

This makes the total benefit equal to:

$17,316 - $4,680 = $12,636

Since the question is asking for the **largest** benefit that could be paid to Smith, the correct answer must be $12,810.

Answer is C.

## Question 31

The annual accrual for Smith is:

$57,600 ÷ 40 years of service = $1,440

Since average annual compensation exceeds covered compensation, the normal accrual rate with disparity imputed is equal to the smaller of the following rates:

(1) $\dfrac{\text{Annual accrual}}{\text{Average annual compensation} - 1/2\ \text{Covered compensation}}$, or

(2) $\dfrac{\text{Annual accrual} + (\text{Permitted disparity factor} \times \text{Covered compensation})}{\text{Average annual compensation}}$

See IRS regulation 1.401(a)(4)-7(c)(3).

Note that since Smith's Social Security Retirement Age (SSRA) is 66, the permitted disparity factor is 0.70% (the maximum permitted disparity for retirement at testing age 65). However, since Smith has 40 years of service as of the testing date, in order to use permitted disparity, the 0.70% factor must be adjusted for years of service in excess of 35 years. The adjusted factor is:

0.70% × 35/40 = 0.6125%

Evaluating the two rates:

(1) $\dfrac{1{,}440}{100{,}000 - (1/2 \times 45{,}000)} = .01858$, or 1.858%

(2) $\dfrac{1{,}440 + (.006125 \times 45{,}000)}{100{,}000} = .01716$, or 1.716%

The smaller of the two rates is 1.716%.

Answer is B.

## Question 32

The non-highly compensated employee concentration percentage is:

(6,000 – 1,500)/(6,600 – 1,600) = 90%

Note that the concentration percentage is determined on an employer-wide basis, so all non-excludable are taken into account.

Using the table in IRS regulation 1.410(b)-4(c)(4)(iv), the safe harbor percentage is 27.5%. Therefore, the ratio percentage for plan B must be at least 27.5%.

If X represents the number of non-excludable NHCEs that must benefit in Plan B, the ratio percent for Plan B is:

(X/4,500)/(250/500) = 27.5% $\Rightarrow$ X = 618.75

Therefore, at least 619 non-highly compensated employees must benefit in Plan B.

The average benefit percentage for the HCEs is:

[(150 × 2.00%) + (250 × 1.75%)]/500 = 1.475%

Note that all non-excludable HCEs are included in the denominator, even if they are not benefiting.

The average benefit percentage for the NHCEs cannot be less than 70% of that of the HCEs. Therefore, the equation representing the average benefit percentage for the NHCEs is:

[(1,500 × 2.00%) + (X × 1.75%)]/500 = 1.475% × 70%

Solving for X,

X = 941

Answer is B.

Note: There appears to be a typographical error in the last statement just prior to the question. I assume that this statement should have read "The two plans have no employees in common."

## Question 33

Under the Alternative Calculation Method, the PBGC variable premium is calculated by first determining the difference between the adjusted value of vested benefits as of the first day of the prior year and the adjusted value of plan assets as of the first day of the prior year. The difference is then increased with interest for one year using the current year PBGC required interest rate. The result is then rounded up to the next thousand dollars, and multiplied by .9%.

The adjusted value of vested benefits as of 1/1/2000 is:

750,000 + 250,000 + 5,000,000 = 6,000,000

The adjusted value of plan assets must be determined as of 1/1/2000 by subtracting contributions receivable and adding back all contributions for each year prior to the current year, each discounted with interest at the PBGC required interest rate from the date they were deposited to 1/1/2000. This is:

$5{,}250{,}000 - 250{,}000 + 250{,}000/1.0467^{6/12} + 250{,}000/1.0467^{18/12} = 5{,}477{,}816$

Adjusted $UVB_{1/1/2001} = (6{,}000{,}000 - 5{,}477{,}816) \times 1.0467 = 546{,}570$

2001 variable premium = $\$547{,}000 \times .009 = \$4{,}923$

2001 flat premium = $750 \times \$19 = \$14{,}250$

Total premium = $\$4{,}923 + \$14{,}250 = \$19{,}173$

Answer is C.

## Question 34

The rules for exclusion from the top-paid group are covered in IRC section 414(q)(5).

Smith can be excluded since he is under age 21.

Green can be excluded since he normally works less than 17½ hours per week.

Jones can be excluded since he has worked less than 6 months.

Black can be excluded since he normally works no more than 6 months during the year.

Brown cannot be excluded.

Answer is D.

## Question 35

The annual benefit payable to Smith under the terms of the plan benefit formula is:

$$14\% \times [(90{,}000 + 80{,}000 + 70{,}000 + 50{,}000 + 50{,}000)/5] \times 8 \text{ years of participation} = 76{,}160$$

The lump sum payable to Smith under the plan's actuarial equivalence assumptions on 1/1/2001 (at age 61) is:

$$76{,}160 \times 11.552 = 879{,}800$$

This must be compared to the IRC section 417(e) minimum lump sum, using the applicable interest rate and applicable mortality table. This is:

$$76{,}160 \times 11.185 = 851{,}850$$

Since this is less than the lump sum using the plan assumptions, the 417(e) assumptions have no effect.

Next, the maximum lump sum allowed under IRC section 415(b) must be determined. First, calculate the dollar maximum at age 61. The dollar maximum at age 62 (based upon the social security retirement age of Smith of 66) is:

$$140{,}000 \times .75 = 105{,}000$$

This must be further reduced to age 61 using both plan actuarial equivalence, and equivalence based upon 5% interest and the applicable mortality table. There is an interest only discount since there is a pre-retirement death benefit.

Since the plan actuarial equivalence interest rate is 6%, the smaller equivalent benefit will clearly be based upon that. The IRC section 415(b) dollar maximum at age 61 is:

$$105{,}000 \times 11.319 \div 1.06 \div 11.552 = 97{,}059$$

Finally, this must be reduced for years of participation less than 10:

$$97{,}059 \times .8 = 77{,}647$$

The IRC section 415(b) compensation maximum is:

$$(90{,}000 + 80{,}000 + 70{,}000)/3 = 80{,}000$$

There is no reduction to this maximum due to retirement age, and Smith has more than 10 years of service.

The overall IRC section 415(b) benefit limit at age 61 is 77,647.

The maximum lump sum under IRC section 415(b) is equal to 77,647 multiplied by the smaller lump sum factor using the plan actuarial equivalence or the applicable interest rate and applicable mortality table. Clearly from the factors given, the smaller factor is that using the applicable interest rate (6.5%). The maximum lump sum allowed under IRC section 415(b) is:

$77,647 \times 11.185 = 868,482$

This is the lump sum payable to Smith since it is less than the lump sum of 879,800 that would otherwise be payable from the plan.

Answer is D.

## Question 36

The top-heavy percentage for Plan B is based upon the determination date for each of Plans A and B that fall within the same calendar year as the determination date for Plan B. (See IRS regulation 1.416-1, Q&A T-23.) The determination date for Plan B is November 30, 2000. The plan year that ends for Plan A during the 2000 calendar year is January 31, 2000.

Since the valuation date for Plan B is the last day of the plan year, the present value of accrued benefits is determined as of 11/30/2000 for plan B. However, the valuation date for Plan A is the first day of the year. Therefore, the valuation date for the plan year ending on Plan A's determination date of 1/31/2000 is 2/1/1999.

The top-heavy percentage is:

$$\frac{200,000 + 225,000}{200,000 + 160,000 + 225,000 + 125,000} = .5986, \text{ or } 59.86\%$$

Answer is B.

## Question 37

The retirement benefit due Smith based upon the normal retirement benefit formula is:

$\$160,000 \times 10\% \times 9$ years of service $= \$144,000$

As of 1/1/1999, this was to be limited by IRC section 415(b) and 415(e). The IRC section 415(b) dollar limit is:

$130,000 × .9 reduction for years of participation less than 10 = $117,000

The IRC section 415(b) compensation limit (reflecting the 9 years of service at retirement) is:

$160,000 × .9 = $144,000

The IRC section 415(e) limit can be determined by looking at the defined benefit fraction.

$$0.90 = \frac{X}{130{,}000 \times 1.25} \qquad \Rightarrow \qquad X = \$146{,}250$$

Therefore, the normal retirement benefit payable to Smith in 1999 was $117,000.

Pursuant to the plan amendment in 2000, this benefit can increase at the same percentage as the dollar limit increases each year.

The total benefit paid through 12/31/2001 is:

$$\$117{,}000 \times \left(1 + \frac{135{,}000}{130{,}000} + \frac{140{,}000}{130{,}000}\right) = \$364{,}500$$

Answer is B.

## Question 38

Smith's accrued benefit at the date of death, payable at age 60 = $50,000 × .6 = $30,000

The actuarially equivalent Qualified Joint and 50% Survivor Annuity, determined using plan actuarial equivalence assumptions, is:

$30,000 × (13.04/14.03) = $27,883

The spouse is entitled to 50% of this:

$27,883 × 50% = $13,942

Answer is A.