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2001 EA-2B
EXAM SOLUTIONS

Solutions last revised April 29, 2019

See revision history on next page

2001 EA-2B Exam Solutions

These solutions were prepared based on the law as in effect at December 31, 2000.

These solutions have been compared with those produced by other technical actuaries, and they represent my best understanding of the correct way to solve these problems. As usual, it seems easy to get an answer in the correct range as long as you are not actually taking the exam!

Revision History:

April 29, 2019	Revised solution for problem 36
May 19, 2011	Revised solutions for problems 18 and 32
April 25, 2004	Revised solutions for problems 11, 28 and 32, added clarification for 21
November 25, 2003	Revised solution for problem 25
April 30, 2003	Revised solutions for problems 11, 25, 31, 34, 35 and 37
January 4, 2003	Revised solutions for problems 15, 19, 29 and 35
June 10, 2002	Revised solutions for problems 19 and 22
April 30, 2002	Revised solution for problem 30
April 24, 2002	Revised solutions for problems 15, 25, and 32
March 27, 2002	Revised solutions for problems 14, 18, and 33
March 05, 2002	Original solutions

Problem 1

Similar to 1998 #12

FALSE

This is almost a direct quote from the regulation at 1.415-5(2), with one word changed:

"The adjusted dollar limitation … applies with respect to limitation years ending with or within that calendar year."

Answer is B

Problem 2

FALSE

The qualified pre-retirement survivor annuity does not have to be provided unless the participant and spouse have been married for at least one year.

See IRC section 417(d)(1)

Answer is B

Problem 3

Similar to 2000 #15

This is a tiny detail in the regulations. Early retirement windows are considered for testing purposes only in the first plan year the window benefits are in effect. They are ignored in subsequent years.

See the regulation at 1.401(a)(4)-3(f)(4)(ii) and 1.401(a)(4)-4(d)(3)

Answer is B

Problem 4

TRUE

This is essentially a direct quote from the regulations.

See the regulation at 1.401(a)(4)-5(b)(3)(v)

Answer is A

Problem 5

FALSE

Under 411(a)(5)(A), the definition of a year of service includes a plan year, calendar year, or other 12 consecutive month period with at least 1,000 hours of service. You could give less than a full year of vesting credit if they had less than 1,000 hours.

Answer is B

Problem 6

TRUE

This definition is essentially a direct quote from IRC section 414(q)(6)

Answer is A

Problem 7

TRUE

The adjustment in 415(b)(2)(C) for payment before Social Security Retirement Age only applies to the dollar limit in 415(b)(1)(A). It does not apply to the compensation limit in 415(b)(1)(B), or to the 10,000 floor in 415(b)(4).

Answer is A

Problem 8

FALSE

This is a question on Notice 99-44, which describes how plans should be amended to reflect the repeal of 415(e). In Q&A 3, it states that a plan can provide benefit increases due to the repeal of 415(e), but only to participants who still have an accrued benefit under the plan. A participant who received a lump sum in 1998 no longer has an accrued benefit under the plan, and would not receive an increase in benefits due to the repeal of 415(e).

Answer is B

Problem 9

FALSE

A plan can use any factors for the determination of lump sums. IRC 417(e)(3)(A)(i) states the minimum amount paid can not be less than the value determined on the applicable interest rate and mortality table.

Answer is B

Problem 10

FALSE

§4980(a) of the Internal Revenue Code states that the excise tax upon reversion is 20%. §4980(d) states that the excise tax increases to 50% unless there is a "qualified replacement plan", or unless certain benefit increases are granted prior to plan termination.

The general definition of a qualified replacement plan includes 95% participation by continuing employees from the terminating plan, plus an asset transfer of at least 25% of the excess assets.

The reason the statement is false is that, for a DC plan, the transferred amount should be placed in a suspense account and allocated no less rapidly than ratably over the 7 year period beginning with the year of transfer.

Answer is B

Problem 11 Similar to 1998 #06 **Revised 04/25/04**

FALSE

PBGC regulation 4043.81 specifies that notice is required for failure to pay the required installments. At 4043.4(d), it states that the PBGC may grant waivers or extensions to the notice requirement.

In the PBGC Form 10 instructions, there are two waivers:
1) Payment of the quarterly installment by the 30th day after the payment is due, or
2) Small plan waiver
   A) If plan has 500 or less participants, or
   B) If underfunding notice to participants is required for prior plan year and year the contribution is owed, and plan has 100 or less participants

There are two reasons why the statement in this question is false. You don't have to notify the PBGC if the quarterly installment is paid within 30 days of the due date, and you don't know how many participants are in the plan.

Answer is B

Problem 12 Similar to 1998 #11

FALSE

In ERISA section 4213(a), it allows two choices for assumptions used in calculation of the UVB:
- Regulations prescribed by the PBGC (if any)
- Reasonable assumptions, the description of which sounds like the IRC section 412 "best estimate in the aggregate"

In ERISA section 4213(b), it states that the actuary may rely on the most recent valuation, and reasonable estimates for the interim years.

Answer is B

Problem 13

TRUE

This is essentially a direct quote from the law, which should make sense to you.

See ERISA section 4209(c)(1)

Answer is A

Problem 14 **Revised 03/27/02**

FALSE

The 10% limitation in ERISA section 407(a) applies to both qualified employer securities and qualified employer real property. The 10% limitation applies only at the time of acquisition of the security.

Subsequent changes in market value could cause the qualifying employer securities to exceed 10% of the plan assets, which would be acceptable.

Answer is B

Problem 15 Similar to 1999 #38 **Revised 01/04/03**

Section 4050 of ERISA contains rules regarding missing participants. In the regulation at 4050.5(a), it describes the amount of the "designated benefit" for four different cases:

- 4050.5(a)(1) Mandatory lump sum - Present value under plan assumptions
- 4050.5(a)(2) De minimis lump sum - Present value < 5,000 under missing participant lump sum assumptions
- 4050.5(a)(3) No elective lump sum - Present value at deemed distribution date under missing participant annuity assumptions
- 4050.5(a)(4) Elective lump sum - greater of values under (a)(1) and (a)(3)

In 4050.2, the missing participant annuity assumptions are defined as the assumptions and methods under section 4044.52, applied as if the deemed distribution date were the termination date. You do not use the expected retirement age assumptions under 4044. In lieu of the expense adjustment under 4044.52(e), add $300 as an expense load for each missing participant whose benefit liability would exceed 5,000 without the expense loading applied.

Under 4050.5(b), the present value must be determined as the most valuable benefit. For benefits not in pay status, the most valuable benefit is the benefit at the benefit commencement age that produces the highest present value as of the deemed distribution date (using the missing participant annuity assumptions.) Since the participant is age 65 at the deemed distribution date, there is only one calculation age in this problem.

Any missing participant not in pay status at the deemed distribution date is assumed to be married to a spouse the same age, and their benefit must be valued under the QJ&SA form payable under the plan. If they were already in pay status, you would use the form of benefit and beneficiary of the pay status benefit.

PLAN Assumptions	Factor	Life only Benefit	Reduction Factor	Lump Sum	Expense Loading	Adjusted Lump Sum
(a)(1) Lump sum	120.7	75.00	1.00	9,052.50	0	9,052.50

PBGC Assumptions	Factor	Life only Benefit	Reduction Factor	Lump Sum	Expense Loading	Adjusted Lump Sum
(a)(2) Lump sum	125.0	75.00	1.00	9,375.00	0	9,375.00
(a)(3) QJ & SA 50%	126.3	75.00	0.93	8,809.43	300.00	9,109.43

Since the plan lump sum exceeds 5,000 under 411(a)(11)(A), case 4050.5(a)(1) does not apply. Since the PBGC lump sum exceeds 5,000, case 4050.5 (a)(2) does not apply. Since the plan elective lump sum is available, case 4050.5 (a)(4) applies. The value of the designated benefit is the greater of the (a)(1) and (a)(3) values, which is 9109.43.

Answer is C

Problem 16

In 411(b)(1)(B), the 133 1/3% rule for benefit accruals requires that the rate of benefit accrual for any later plan year is not more than 133 1/3% of the rate for an earlier plan year.

Item III is allowable, since the ratio is 33 1/3%, which is far less than 133 1/3%. This type of benefit is front loaded, which will always pass the 133 1/3% rule.

Item II is allowable, since the ratio is exactly 133 1/3 %. The only potential trick to the problem is the handling of the plan amendment in item I. Benefits were increased for all years of benefit accrual after 2000. It would appear that the increase from $300 to $600 for 2001 violates the 133 1/3% rule.

This situation is allowed for in 411(b)(1)(B)(i), which says that any amendment in effect for the current year can be treated as in effect for all other plan years. This means that you could treat the $600 rate of benefit accrual as having been in effect for earlier years.

All three of the benefit formulas are allowable.

Answer is D

Problem 17

The key to this problem is knowing what "the minimum qualified pre-retirement spouse annuity" (QPSA) means. This is an annuity type similar to a qualified joint and survivor annuity, which is defined in 417(b)(1) as a joint and survivor annuity of at least 50%.

Another key is that the same sentence in the problem says the benefit is paid starting at the latest date allowed under the law. In 417(c)(1)(A)(ii), if the participant dies prior to their earliest retirement age, the annuity should commence at that earliest retirement age. Based on the plan provisions, the participant's earliest retirement age is 55, at 01/01/2009.

Since the participant has been married for more than one year, then it is necessary to provide the QPSA (see 417(d)). The remainder of the problem is a benefit calculation.

Birth date	1/1/1954		
Hire date	1/1/1976		
Date of death	1/1/2001		
As of 1/1/2001			
Age	47		
Service	25		
Final average earnings	40,500		
Accrued Benefit	25(1%)(40,500)	=	10,125.00
Early retirement benefit at 55	(1-5%(10))(10,125)	=	5,062.50
50% J&S benefit form	.85(5,062.50)	=	4,303.13
Death benefit to spouse	.50(4,303.13)	=	2,151.56, or 179.30 / mo

Answer is B

Problem 18 **Revised 05/19/11**

This is a relatively straightforward PBGC guaranteed benefits question. It is rare to have a problem without the five year phase-in calculations.

Guaranteed benefits are based on the vested accrued benefits of the plan participants. In calculating the guaranteed benefit, remember that changes in vesting schedule, normal retirement age, early retirement reductions, and normal form of annuity payment are all considered as changes in benefit amount subject to the phase in rules.

The PBGC maximum monthly guaranteed benefit (MGB) is defined as the lesser of the adjusted ERISA §4022(b) value, or the highest five consecutive years' compensation. You are given information on Smith's compensation, so you should expect it to have an impact:

Five year avg. compensation = (32,000 + 34,000 + 36,000 + 38,000 + 40,000) / 5
= 36,000

The MGB is defined assuming payment on a life annuity basis at age 65, even if it is based on the five year compensation. Since the 2000 PBGC dollar maximum of 3,221.59 is greater, Smith's MGB limit is 3,000 per month.

Based on page 72 of the PBGC study note, it is correct to age adjust the MGB, even when it is based on the highest five year compensation. In general, you should use the later of age at DOPT and age at benefit commencement for purposes of adjusting the MGB. Since Smith is an active employee, the assumed benefit commencement age is the normal retirement age of 65. The age adjustment factor for the benefit commencement age is 1.00.

In addition, the MGB must be adjusted to allow for the payment form of 100% Joint and Survivor. In general, you should use the payment form in effect at the later of age at DOPT and age at benefit commencement. Based on the standard PBGC reduction factors for 100% J&S, the age 65 adjusted MGB is 2,400 = .80 * 3,000. There is no reduction for the spouse's age difference of zero years.

As of 1/1/2001

Age	45	
Service	25	
Final average earnings	38,000 =	(36,000 + 38,000 + 40,000) / 3
Accrued Benefit	25(4%)(38,000) =	38,000 or 3,166.67 per month

The accrued benefit (payable at NRA) appears to be unreduced for the J&S form. Since this exceeds the MGB limit, the monthly guaranteed benefit is 2,400.

Answer is B

Problem 19 Similar to 2000 #25 **Revised 01/04/03**

Based on the measurement period, the method to calculate accrual rates is the "Accrued to Date" method. You should use the given accrued benefit at 12/31/2001. Then you must determine the most valuable form of payment at each benefit commencement age up to testing age (65). The Qualified J&S form is always the most valuable form of benefit payment (as defined in the 1.401(a)(4) regulation).

You calculate the most valuable accrual rate (MVAR) by dividing the greatest normalized accrued benefit by both testing service and average annual compensation. In this problem, you are not given any detailed compensation data, so you should use the "testing compensation" instead.

Smith is age 61 at 1/1/2002, with 8 years of service. Smith will not be eligible for early retirement until age 63, when they have 10 years of service. To calculate the most valuable accrual rate, you need to allow for payment at ages 63 to 65, converted to a QJ&S form. The normalized benefit reflects a life annuity payment form at testing age:

Age	Accrued Benefit	ERF	J&S	Early ret J&S benefit	50% J&S Annuity	Interest	Normalized Benefit
	(1)	(2)	(3)	(4)=(1)(2)(3)	(5)	(6)	(4)(5)(6) / 8.6468
63	18,640	1.00	0.95	17,708	10.0239	$(1.08)^2$	23,944
64	18,640	1.00	0.95	17,708	9.8514	$(1.08)^1$	21,789
65	18,640	1.00	0.95	17,708	9.6723	1.00	19,808

It should be clear that you don't need to do calculations after age 63, since the factors for annuity form and interest accumulation are lower than at age 63. Now use the greatest normalized benefit, and divide by the given testing compensation and past service to determine the accrual rate:

MVAR = 2.30% = 23,944 / (8.0 * 130,000)

The next step is determination of the normal accrual rate. You use the normal form of payment at testing age (65). The normalized benefit reflects a life annuity payment form.

Age	Accrued Benefit	ERF	Early ret C&C benefit	5 C&C Annuity	Normalized Benefit
	(1)	(2)	(3)=(1)(2)	(4)	(3)(4)/ 8.6468
65	18,640	1.00	18,640	8.8125	18,997

NAR = 1.83% = 18,997 / (8.0 * 130,000)

Difference between MVAR and NAR is .47% = 2.30% - 1.83%.

Answer is B

Problem 20

These items come directly from the PBGC reportable event regulations under section 4043 of ERISA. The only one that is potentially tricky is the third one.

I. TRUE

This is covered under liquidation of any member of the controlled group. See the regulation at 4043.30(a)(3).

II. TRUE

This is covered under "Active participant reduction" at 4043.23(a)(3). A reportable event also occurs if the participant count decreases below 75% of the count at the beginning of the prior plan year.

III. FALSE

In order for this to be a reportable event, the amendment has to decrease a benefit that is currently payable to a participant. Since the amendment described in the question decreases future accruals, it is not a reportable event. See the regulation at 4043.22(a).

Only items I and II are true.

Answer is A

Problem 21 Similar to 2000 #45 **Revised 04/25/04**

The regulation at 1.401(a)(4)-5(b)(3) contains the rules regarding restricted distributions. In general, it says the employee can't receive more than one year's life annuity payments in a year. The only employees subject to this restriction are HCEs or former HCEs.

There are several exceptions to this rule. At 1.401(a)(4)-5(b)(3)(iv)(A), it says that if after all payments are made, if the plan assets are at least 110% of the current liability, then the restriction does not apply.

You need to perform calculations for each HCE to see if this requirement is met after each one receives a distribution:

	Actuarial Asset Value	Current Liability	AAV / CL Ratio	Pass / Fail
Before distribution	6,000,000	5,440,000	110.29%	
HCE 1	1,100,000	900,000		
After distribution	4,900,000	4,540,000	107.93%	FAIL
Before distribution	6,000,000	5,440,000	110.29%	
HCE 2	275,000	240,000		
After distribution	5,725,000	5,200,000	110.10%	**PASS**
Before distribution	6,000,000	5,440,000	110.29%	
HCE 3	80,000	60,000		
After distribution	5,920,000	5,380,000	110.04%	**PASS**
Before distribution	6,000,000	5,440,000	110.29%	
HCE 4	60,000	15,000		
After distribution	5,940,000	5,425,000	109.49%	FAIL
Before distribution	6,000,000	5,440,000	110.29%	
HCE 2 and HCE3	355,000	300,000		
After distribution	5,645,000	5,140,000	109.82%	FAIL

The requirements are met only if either HCE2 or HCE3 receive a distribution. You must be careful not to assume that the requirement would be met when they both receive a distribution.

Answer is B

The other "useful" exception is for a distribution less than 1% of the total current liability. The non-useful exception is for distributions less than the 411(a)(11)(A) threshold of 5,000.

Problem 22 Similar to 1995 #21 **Revised 06/10/02**

This is a typical PBGC guaranteed benefits question. It tests your knowledge of the 30 year phase-in of guaranteed benefits for substantial owners, and the five year phase-in for non-owners. Guaranteed benefits are based on the vested accrued benefits of the plan participants. In calculating the guaranteed benefit, remember that changes in vesting schedule, normal retirement age, and normal form of annuity payment are all considered as changes in benefit amount that are subject to the phase in rules.

If there were a change in normal form of benefits, you would have to normalize the benefits. Normalization is the process of converting benefits available under earlier sets of plan provisions to equivalent benefit amounts based on the plan provisions in effect at date of plan termination (DOPT). This is a necessary step; otherwise you would be comparing apples and oranges.

The change in plan benefits at 01/01/99 is subject to phase-ins at the DOPT of 12/31/01. The plan change at 04/01/01 has not been in effect for a full year, so it is ignored.

For Brown, the new benefits have been in effect for two full years at DOPT. Since Smith is a substantial owner (>10%), even the 01/01/90 plan benefit is subject to the 30 year phase-ins. These are measured from the later of the effective date, or Smith's date of hire.

	Smith: 30 year phase-ins	**Brown: 5 year phase-ins**
Date of birth	01/01/50	01/01/50
01/01/02 age	52	52
Date of hire	01/01/93	01/01/98
Past service	9	4
Substantial owner?	YES	NO
Vesting percentage	100%	100%
01/01/90 Base plan benefit	135.00 = 9(15)	60.00 = 4(15)
Guaranteeable benefit increase	135.00	60.00
Years plan has been in effect	9	12
Phase-in	40.50 = (9/30)*(135)	60.00
01/01/99 Base plan benefit	180.00 = 9(20)	80.00 = 4(20)
Guaranteeable benefit increase	45.00 = 180 - 135	20.00 = 80 - 60
Years plan has been in effect	3	3
Phase-in	4.50 = (3/30)*(45)	20.00 = 60% or $60
Total guaranteed benefit	45.00 = 40.50 + 4.50	80.00 = 60.00 + 20.00

For Brown's 1999 benefit increase, the phase-in can not exceed the amount of the benefit subject to the phase-in. The sum of the guaranteed benefits is 125.00.

Answer is D

Problem 23 - Page 1

Similar to 2000 #31

§411(c)(2) of the IRC defines the calculation of the employee provided accrued benefit. After the passage of OBRA '89, the §417(e) interest rate is used to accumulate the employee contributions plus interest (EECWI) from the determination date to normal retirement age. The resulting EECWI is converted to an annual annuity by dividing by an annuity at the §417(e) interest rate. For a normal form other than a life annuity, factors in Revenue Ruling 76-47 were used to adjust the resulting benefit.

You are given no information on the old PBGC graded interest rates under §417(e)(3). This plan apparently has been amended to reflect the new GATT rules for lump sum calculations under §417(e)(3).

You need to determine the age, service, vesting percentage and total accrued benefit at 01/01/2001:

As of 01/01/2001

Age	51
Service	5
Vesting %	60%
FAE – 3 years	38,000 = (36,000 + 38,000 + 40,000) / 3
Accrued benefit	3,800 = 38,000 * 5 * 2.0%

The next step is to calculate each year's employee contributions with interest, and then the amount of the employee provided accrued benefit:

Year	Pay	12/31 contrib	120% AFR	12/31 EECWI	EECWI Calculation
1996	32,000	1,120	N / A	1,120.00	= 1,120
1997	34,000	1,190	7.34%	2,392.21	= 1.0734 * 1,120.00 + 1,190
1998	36,000	1,260	7.13%	3,822.77	= 1.0713 * 2,392.21 + 1,260
1999	38,000	1,330	5.59%	5,366.47	= 1.0559 * 3,822.77 + 1,330
2000	40,000	1,400	7.47%	7,167.34	= 1.0747 * 5,366.47 + 1,400

Smith is age 51 at 01/01/01, and you have to convert the contribution balance to a benefit at normal retirement age, which is 14 years later. The 01/01/01 EECWI is accumulated with interest at the §417(e) rate until normal retirement age 65:

$$\text{EECWI at NRA} = 7{,}167.34 * (1.065)^{14}$$
$$= 17{,}308.23$$

Problem 23 - Page 2

The employee provided annual accrued benefit at age 65 is calculated by dividing the age 65 EECWI by the annuity value at the §417(e) interest rate of 6.5%:

17,308.23 ÷ 10.25 = 1,688.61

The final accrued benefit at 01/01/01 is 3,800. The accrued benefit is the greater of the employee provided benefit and the plan formula accrued benefit, which is still 3,800.

The question asks for the vested annual accrued benefit at 01/01/2001. The employee provided portion is always 100% vested, and the remaining accrued benefit is subject to the plan's vesting schedule:

100% (1,688.61) + 60% (3,800.00 - 1,688.61) = 2,955

Answer is D

Problem 24

This is the first time the special schedule in the 1.414(l) regulation has been tested on the EA exams. The operational rules for the special schedule are defined at 1.414(l)-1(f).

The general rule in the regulation is that all plan participants must be at least as well funded after a spinoff or a merger, as they were prior to the event. This requirement can be easily satisfied for a spinoff, but not for a merger, and that is where the special schedule is needed.

In general, two plans will be funded at different levels under ERISA section 4044 prior to the merger. Some participants in the better funded plan would receive a lower benefit if the plan terminated immediately after the merger. You must calculate the benefit they would receive if the plan terminated immediately prior to the merger. The difference in the amount of the benefit is what goes into the special schedule.

First, determine the percentage funding of each plan. Based on the question regarding participant Jones, it appears that Plan B should be the better funded plan.

Plan A	Smith Liability	Brown Liability	Total Liability	Allocated Assets	Allocation Per Cent
PC3	200,000	-	200,000	200,000	100.00%
PC4	50,000	64,000	114,000	114,000	100.00%
PC5	-	48,000	48,000	6,000	12.50%
Total	250,000	112,000	362,000	320,000	

Plan B	Green Liability	Jones Liability	Total Liability	Allocated Assets	Allocation Per Cent
PC3	270,000	-	270,000	270,000	100.00%
PC4	-	70,000	70,000	70,000	100.00%
PC5	-	84,000	84,000	60,000	71.43%
Total	270,000	154,000	424,000	400,000	

Jones is the only participant who is adversely affected by the merger. The merged plan's assets will cover less than 71.43% of the liability in PC5. You should take the difference in the PC5 allocation percentages, apply that to Jones' liability, and then convert it to an annual benefit:

Difference in funding of PC5 is 58.93% = 71.43% - 12.50%. The PC5 liability difference is 49,500 = 84,000 (.5893).

Jones' annuity factor for the PC5 benefit is 7.00 = 84,000 / 12,000. The 49,500 liability equates to a benefit of 7,071.

Answer is A

Problem 25 - Page 1 **Revised 04/30/03**

You are told that the rate groups for 19 of the 20 HCEs pass the 401(a)(4) general nondiscrimination test by having a ratio percentage of at least 70%. You are given three different methodologies that may allow the remaining rate group for Plan A to pass the test.

The general test for a defined benefit plan is defined at 1.401(a)(4)-3(c). The regulation states that the general test is satisfied if each rate group satisfies 410(b). It then points to 1.401(a)(4)-2(c)(3) to define how a rate group satisfies 410(b).

1.401(a)(4)-2(c)(3)(i) states that a rate group must be treated as a separate plan. The numerator of the ratio percentage includes employees in the rate group. The denominator must include all non-excludable employees, even if they are not benefiting under the plan.

1.401(a)(4)-2(c)(3)(i) also refers to other rules in subsections (ii) and (iii) for a rate group to satisfy 410(b). This requires the rate group to pass the average benefits test, which has two parts: the nondiscriminatory classification test, and the average benefit percentage test.

If a plan does not satisfy the ratio percentage test of 1.410(b)-2(b)(2), then it must satisfy one of the other tests in 1.410(b)-2(b). The average benefits test in 1.410(b)-2(b)(3) requires that a plan satisfy both the nondiscriminatory classification test, and the average benefit percentage test.

1.401(a)(4)-2(c)(3)(ii) states that a rate group satisfies the nondiscriminatory classification test when the rate group's ratio percentage is ≥ the lesser of

- Midpoint between the Safe and Unsafe harbor percentages for the plan, and
- Ratio percentage for the plan

1.401(a)(4)-2(c)(3)(iii) states that a rate group is deemed to satisfy the average benefit percentage test if the result for the entire testing group is at least 70%.

I. Grouping of accrual rates

This is definitely needed to pass the general test. The definition of a rate group is that it consists of all employees with both a normal accrual rate (NAR) and a most valuable accrual rate (MVAR) that are equal to or exceed those rates for a given HCE.

If you do not group the accrual rates, then there are no NHCEs in the rate group for the HCE. The resulting ratio percentage would be zero, which would fail the 401(a)(4) general test.

Problem 25 - Page 2 **Revised 11/25/03**

For the normal accrual rates, you can group all rates within 105% of the midpoint. For most valuable accrual rates, you can group all rates within 115% of the midpoint.

Using the HCE NAR as the midpoint, the rate band includes NAR values between (2.0%)*.95 and (2.0%)*1.05, or from 1.90% to 2.10%. Using the HCE MVAR as the midpoint, the rate band includes MVAR values between (4.0%)*.85 and (4.0%)*1.15, or from 3.40% to 4.60%.

The rate group is based on all employees with rates greater than or equal to both the NAR and the MVAR for the HCE. The rate group includes everyone with an NAR of 1.90% and up, and also with an MVAR of 3.48% and up. There are two NHCEs (1 and 2) who fall in the rate group, and one (NHCE3) who is not in the rate group.

If you assume that Plan A is NOT a QSLOB, here is the calculation of the ratio percentage for the rate group:
[2 / 1,800] / [1 / 200] = .11% / .5% = 22.2%

Since this value is less than 70%, the rate group fails the 401(a)(4) general test on this basis. One of the other two options must be used to pass the 401(a)(4) general test.

II. Demonstration that Plan A is a QSLOB

A QSLOB falls under the mandatory disaggregation rule in 1.410(b)-7(d)(4). This requires the plan to be tested for both 401(a)(4) and 410(b) separately from any other plans.

Since Plan A must be disaggregated and tested separately, the ratio percentage calculation for the rate group should not include any non-excludable employees from other plans. The only data you have for Plan A are the numbers of HCEs and NHCEs that are benefiting. The best guess you can make is that those are also the numbers for the non-excludable employees.

Based on the fact that Plan A is a QSLOB, here is the calculation of the ratio percentage for the rate group:
[2 / 40] / [1 / 20] = 5.0% / 5.0% = 100%

Since this value is at least 70%, Plan A passes the 401(a)(4) general test. This is based on use of both item I and item II.

Problem 25 - Page 3 **Revised 11/25/03**

III. Use of average benefit percentage test

You can show that the rate group can pass the average benefits test under 410(b), and therefore pass the general test under 401(a)(4). This test has two parts: the nondiscriminatory classification test, and the average benefit percentage test. All rate groups are deemed to satisfy the reasonable classification requirement.

At 1.410(b)-7(e), it defines calculation of the average benefit percentage test (ABPT). It states that the ABPT uses "all plans in the testing group". This is defined as the plan being tested, plus all plans that could be permissively aggregated under 1.410(b)-7(d). In addition, certain disaggregation rules are ignored.

In particular, the QSLOB disaggregation rule at 1.410(b)-7(d)(4) is ignored. This means that the ABPT result of 80% given in the problem is the correct value for use with Plan A (regardless of whether Plan A is a QSLOB). As described earlier, all rate groups are deemed to satisfy the average benefit percentage test if the result for the entire testing group is at least 70%.

Even though the rate group satisfies the ABPT, you still don't know whether Plan A satisfies the general test. If the rate group satisfies the nondiscriminatory classification test, then you can state that Plan A satisfies the general test. The nondiscriminatory classification test is not included in items I, II or III. You can't use the ABPT by itself to state that Plan A satisfies the general test.

Answer is B

NOTE:
You can show that Plan A passes the general test. To do this, you must show that the rate group satisfies the nondiscriminatory classification test. The rate group's ratio percentage must be at least equal to the lesser of

- Midpoint between the Safe and Unsafe harbor percentages for the plan, and
- Ratio percentage for the plan

The NHCCP is 1,800 / (1,800 + 200) = 90.0%. The Safe harbor percentage is 27.5% and the Unsafe harbor percentage is 20.0%. The midpoint between the values is 23.75%.

If you assume that Plan A is <u>not</u> a QSLOB, the plan's ratio percentage is 22.2%:
[40 / 1,800] / [20 / 200] = .022% / .10% = 22.2%

Assuming that Plan A is <u>not</u> a QSLOB, the rate group's ratio percentage is also 22.2%:
[2 / 1,800] / [1 / 200] = .11% / .5% = 22.2%

The lesser of the midpoint between the Safe and Unsafe harbor percentages for the plan, and Ratio percentage for the plan is 22.2%. Since the rate group passes both parts of the average benefits test, all rate groups pass the general test under 401(a)(4).

Problem 26 - Page 1

Similar to 1997 #37

This problem does not clarify the type of the partial withdrawal. It is either a regular partial withdrawal, or one due to a 70% decline in contributions.

In this problem, you actually don't have sufficient information to calculate the fraction for a regular partial withdrawal in 2001 - you would need the contribution base units for 2002. The fraction to multiply the "complete withdrawal" liability by is

$$1.0 - \frac{\text{Base units for plan year following year of partial W/D}}{\text{Average base units during 5 yr. period preceding year of partial W/D}}$$

Due to the lack of information, you have no choice but to assume that the partial withdrawal occurred due to a 70% decline in contributions. A 70% contribution decline occurs when 30% of "units in the high base year" exceeds the units in each year of the "three year testing period". The "three year testing period" includes the year that the 70% decline occurs as the last year. The "units in the high base year" is the average of the two highest years in five years preceding the "three year testing period".

You must calculate the various items to see when a 70% decline has occurred. If you have worked these problems before, you know that the units during the three year testing period have to be much lower than the prior five years. I'll guess 1995 - 1997:

Assumed year	**1996**	**1997**
3 year testing period	1994-1996	1995-1997
Highest units in 3 year testing period	150,000	80,000
Highest testing / .30	500,000	266,667
Base years	1989-1993	1990-1994
Two base years exceed the Highest testing/.30?	NO	YES
High base years		1990, 1992
Units in high base year		.5*(280,000 + 275,000) = 277,500
30% of units in high base year		83,250
70% decline occurred?		YES

To calculate the partial withdrawal liability due to a 70% contribution decline,

(1) Initial year of the three year testing period is considered as the year of withdrawal for calculation of employer share of UVB

(2) The fraction to multiply the "complete withdrawal" liability by is

$$1.0 - \frac{\text{Base units for plan year following last year of three year testing period}}{\text{Average base units during 5 yr. period preceding three year testing period}}$$

Problem 26 - Page 2

$$\text{fraction} = 1.0 - \frac{1998 \text{ units}}{20\% * (\text{Sum of 1990 through 1994 units})}$$

$$= 1.0 - \frac{80{,}000}{20\% * (280{,}000 + 180{,}000 + 275{,}000 + 170{,}000 + 150{,}000)}$$

$$= 1.0 - 80 / 211$$
$$= 62.1\%$$

Answer is D

One slightly confusing aspect of this problem is that the 2001 year of withdrawal is far beyond 1997 (the year of the 70% decline.) For prior exam problems, they simply did not specify which year the complete withdrawal occurred.

Problem 27 - Page 1

Similar to 1997 #26

This is the first problem that tested knowledge of how to use the PBGC expected retirement age (XRA) for the valuation of benefits.

Most PBGC problems are strictly concerned with benefits in priority categories for asset allocation purposes, or with the definition of guaranteed benefits. In this problem, the participant has benefits in both Priority Category 3 and in Priority Category 4, which is unusual for exam questions. Priority Category 4 is defined based on the five year phase-in for non-owners. After you subtract the benefit in Priority Category 3, you will have the remaining benefit allocated to Priority Category 4.

The first part of the problem is calculation of the Priority Category 3 (PC3) benefit. Plan termination date (DOPT) is 01/01/01. Participants in PC3 are those who were (or could have been) in pay status at DOPT-3, or 01/01/98. The early retirement eligibility that is used is based on the plan provisions in effect at DOPT-3, which is the 1/1/96 plan.

Priority Category 3 benefits are the lowest amount payable in the three years preceding DOPT, determined based on lowest level of plan benefits in effect for the five years preceding DOPT. There are no maximum benefit limits on PC3 benefits. For participants who were not in pay status at DOPT-3, the PC3 benefit is calculated as if they retired at DOPT-3:

	Smith: PC3 benefit
Date of birth	01/01/41
Date of hire	01/01/87
01/01/98 age	57
01/01/98 service	11
01/01/96 plan Early retirement factor	60% = 1 - 8 * 5%
01/01/96 plan benefit, 01/01/98 retirement	184.80 = (28)(11)(60%)

This problem tests your knowledge of the five year phase-in for non-owners. Guaranteed benefits are based on the vested accrued benefits of the plan participants. In calculating the guaranteed benefit, remember that changes in vesting schedule, normal retirement age, early retirement reductions, and normal form of annuity payment are all considered as changes in benefit amount that are subject to the phase in rules.

If there were a change in normal form of benefits, you would have to normalize the benefits. Normalization is the process of converting benefits available under earlier sets of plan provisions to equivalent benefit amounts based on the plan provisions in effect at date of plan termination (DOPT). This is a necessary step, otherwise you would be comparing apples and oranges.

Problem 27 - Page 2

The change in plan benefits at 01/01/99 is subject to phase-ins at the DOPT of 01/01/01. Based on item nine on page 84 of the PBGC study note, use the later of the adoption date and the effective date of the increase for phase-in purposes.

The PBGC maximum monthly guaranteed benefit (MGB) is defined as the lesser of the adjusted ERISA §4022(b) value, or the highest five year consecutive compensation. For this problem, no MGB value was given. Based on the magnitude of Smith's benefits, it would not apply.

The MGB should be adjusted based on a benefit commencement age at DOPT different from age 65. Here it would be adjusted to the XRA (age 62.) The calculation of the guaranteed benefit for the five year phase-in also assumes the benefit commencement age is equal to the XRA of 62.

	Smith: PC3+PC4 benefit - 5 year phase-ins
Date of birth	01/01/41
01/01/01 age	60
Date of hire	01/01/87
01/01/01 service	14
Vesting percentage	100% (any vesting schedule)
01/01/96 plan ERF, age 62	85% = 1 - 3 * 5%
01/01/96 plan vested accrued benefit, retirement at 62	333.20 = 28(14)(85%)
Full years plan has been in effect	5
Phase-in	333.20
01/01/99 plan ERF, age 62	91% = 1 - 3 * 3%
01/01/99 plan vested accrued benefit, retirement at 62	484.12 = 38(14)(91%)
Maximum Guaranteeable benefit	N/A
Guaranteeable benefit increase	150.92 = 484.12 - 333.20
Full years plan has been in effect	2
2 year phase-in	60.36 = Greater of 40% or $40/mo.
Total PC3+PC4 benefit	393.57 = 333.20 + 60.36

The benefit allocated to PC4 equals 393.57 minus the PC3 benefit of 184.80, or 208.77. The present value based on the factor for ${}_{2|}\ddot{a}_{60}^{(12)}$ is 12(8.52)(208.77), or 21,344.

Answer is C

Problem 28 **Revised 04/25/04**

This is the first question asked on the exam regarding Internal Revenue Code section 420, which was added to the syllabus in 2000. Section 420 defines what constitutes a qualified excess asset transfer from a pension plan to a 401(h) account.

IRC 420(b)(3) states the limitation on the amount transferred. The amount of excess pension assets that may be transferred can not exceed the reasonably estimated amount the employer would pay (directly or through reimbursement) out of the account for qualified current retiree health liabilities. This equals the sum of the health benefits paid in 2001. The limitation is 1,050,000 = 575,000 + 475,000.

IRC 420(b)(1) defines a "qualified transfer" as a transfer of excess pension assets to a health benefits account which is part of such plan. IRC 420(b)(5) states that there will be no qualified transfers in any taxable year beginning after 12/31/2005.

IRC 420(e)(2) defines "excess pension assets" as the excess of an asset amount over a liability amount, determined as of the most recent valuation date before the transfer. The asset is the amount under §412(c)(7)(A)(ii), which is the lesser of market and actuarial value of assets. The liability is the greater of (i) the liability component of the Full Funding Limitation (FFL) under §412(c)(7)(A)(i), or (ii) 125% of the OBRA '87 current liability plus normal cost.

Based on the general conditions for the exam, the OBRA and RPA current liabilities have the same value, which is given as 22,000,000. The liability component of the FFL is the lesser of the Accrued liability plus normal cost, or the applicable percentage of the OBRA current liability:

Liability piece		
27,200,000	= lesser of 27,200,000 or	160%(22,000,000)
27,500,000	= greater of 27,200,000 or	125%(22,000,000)

Excess assets = 28,150,000 - 27,500,000
= 650,000

Answer is C

Problem 29 Similar to 2000 #25 **Revised 01/04/03**

Based on the measurement period, the method to calculate accrual rates is the "Accrued to Date" method. You should calculate the accrued benefit at 12/31/2001. Then you must determine the most valuable form of payment at each benefit commencement age up to testing age (65). The Qualified J&S form is always the most valuable form of benefit payment (as defined in the 1.401(a)(4) regulation).

You calculate the most valuable accrual rate (MVAR) by dividing the greatest normalized accrued benefit by both testing service and average annual compensation. In this problem, you are given neither the hire date, nor the compensation. But they are not needed, since they actually cancel out in the final step when you divide by service and compensation. In effect, you can assume a value of 1.00 for each of them in your calculations.

Smith is age 55 at 1/1/2002, and is eligible for early retirement. To calculate the most valuable accrual rate, you need to allow for payment at ages 55 to 65, converted to a QJ&S form. The normalized benefit reflects a life annuity payment form at testing age. Since you have no factors for ages 56-64, you must skip those calculations.

Age	Accrued Benefit	ERF	J&S	Early ret J&S benefit	50% J&S Annuity	Interest	Normalized Benefit
	(1)	(2)	(3)	(4)=(1)(2)(3)	(5)	(6)	(4)(5)(6) / 9.50
55	1.50%	0.70	0.97	1.02%	11.95	$(1.075)^{10}$	2.64%
65	1.50%	1.00	0.97	1.46%	10.40	1.00	1.59%

Next you would typically divide by the service and testing compensation to determine the accrual rate. But those same values would have been used to develop the accrued benefit. The largest value of the normalized benefit shown above is actually the MVAR.

The next step is determination of the normal accrual rate. You use the normal form of payment at testing age (65). The normalized benefit reflects a life annuity payment form.

Age	Accrued Benefit	ERF	Early ret C&C benefit	10 C&C Annuity	Life Annuity	Normalized Benefit
	(1)	(2)	(3)=(1)(2)	(4)	(5)	(3)(4)/(5)
65	1.50%	1.00	1.50%	9.95	9.50	1.57%

The rounded MVAR is 2.65% and the rounded NAR is 1.55%.

Answer is D

Problem 30 - Page 1

Similar to 1997 #40

This is a typical problem on maximum offset allowance (MOA) plans. The safe harbor rules under §401(l) require that the MOA be defined as the lesser of (i) 0.75% (as adjusted under §1.401(l)-3(d) and §1.401(l)-3(e), if necessary), or (ii) .50 times the gross benefit percentage times a ratio. The ratio (limited to 1.0) equals the average annual compensation divided by [final average compensation (FAC), limited to the offset level]. See below for definitions of these terms.

§1.401(l)-3(d) contains the requirements for the offset level. The offset level is normally defined as the lesser of employee's covered compensation or FAC, which satisfies §1.401(l)-3(d)(3). In this problem, that is NOT the case, which is unusual. However, based on this particular employee, their FAC would be greater than their covered compensation, so the offset definition would satisfy the safe harbor in the regulation.

§1.401(l)-3(e) contains the adjustments for benefit commencement prior to the Social Security Retirement Age (SSRA), which are now provided as part of the EA-2B exam. Since the problem asks for the benefit payable at age 62, the .75% in the safe harbor limit will be reduced to .55% based on Smith's SSRA of 66.

Additional definitions in the §401(l) regulation:

- The offset level is a limit on the amount of each employee's FAC taken into account to calculate the offset under the plan.

- Covered compensation is the average of earnings (limited to the taxable wage base) for the 35 year period that ends with the last day of the calendar year that the employee will attain SSRA.

- §1.401(a)(4)-3(e)(2) defines average annual compensation as an average of 414(s) compensation over <u>at least</u> three consecutive 12 month periods (but not longer than the employment period). In general, this should match the compensation definition used for the gross benefit.

- FAC is the average of 414(s) compensation (limited to the social security taxable wage base) over the three consecutive year period ending with or within the plan year (but not longer than the employment period).

In the given plan, the gross benefit percentage is 1.30%, and the offset percentage is .65%. The safe harbor requires that the offset percentage be the lesser of
(i) .55%, which is the age adjusted .75%, or
(ii) .65%, which is half of the gross benefit accrual (times the ratio, which is 1).

Problem 30 - Page 2 **Revised 04/30/02**

Unlike earlier problems, it is not sufficient to say that the MOA can't exceed 50% of the gross benefit portion. The key point to this problem is that offset plans are treated differently than excess plans under §1.401(l)-3(f)(2). The regulation says that the gross benefit percentage must be reduced by an amount that is at least as large as the reduction in the offset percentage due to benefit commencement prior to normal retirement age.

For retirement at age 62, the offset percentage is reduced from .65% to .55%, or by .10%. The gross benefit percentage must also be reduced by .10%, from 1.30% down to 1.20%. The resulting benefit will satisfy the safe harbor rules under 401(l):

Date of birth	12/31/39
12/31/2001 age	62
Date of hire	12/31/81
Years of service	20

Social Security Retirement Age	66
"Gross" benefit percent under plan (adjusted)	1.20%
Average annual compensation	74,000
"Gross" benefit under plan	74,000*(1.20%)*20.0 = 17,760

FAC (assumed)	74,000
Covered compensation	45,000
FAC < covered compensation	45,000

"Offset" benefit percent under plan (adjusted)	0.55%
"Offset" benefit under plan: [FAC < CC] * offset % * service	45,000*(.55%)*20.0 = 4,950
Final offset, limited to half of gross	4,950

Final benefit, gross minus limited offset	12,810

Answer is C

One thing you should also check is whether the use of the "Simplified table" produces a higher benefit than the table based on SSRA of age 66. Based on the age 62 factor of .52%, the reduction in the offset % is .13%. The gross benefit % would be reduced to 1.30% - .13% = 1.17%. The resulting benefit is 17,316 – 4,680, or 12,636, which is a lower amount than the 12,810 previously calculated.

Problem 31 **Revised 04/30/03**

This is the first question asked on calculations involving imputed permitted disparity. There are several items to consider:

- You can't impute permitted disparity on any 401(k) deferrals (for cross-tested plans)
- There are two different calculations that vary based on compensation level
- The annual permitted disparity factor varies based on SSRA

There are different calculations for the imputed permitted disparity based on whether the average annual compensation exceeds covered compensation (see below.) For employees with average annual compensation above covered compensation, you must calculate the "C rate" and the "D rate", and use the lesser of the rates. These are defined at 1.401(a)(4)-7(c)(3) as:

C Rate	**D Rate**
$\frac{\text{ER provided accrual}}{\text{avg. annual comp} - ½ \text{ (covered comp.)}}$	$\frac{\text{ER provided accrual} + \text{(permitted disparity factor) * (covered comp.)}}{\text{Average annual compensation}}$

For DB plans, the annual permitted disparity factor (APDF) is .75%, based on retirement at SSRA. In this problem the testing age is 65, so you must allow for the difference between age 65 and the SSRA of 66. The APDF must be reduced to .70%.

The employee has more than 35 years of service. The key point to this problem is that the APDF is zero after 35 years. This prevents longer service employees from exceeding the cumulative permitted disparity limit under 1.401(l)-5(c)(1). The permitted disparity factor (PDF) is defined at 1.401(a)(4)-7(c)(4)(iii)(A), as follows:

PDF = (sum of annual PDF) / (testing service during measurement period)

The resulting PDF is .6125% = (.70%*35 + .00%*5) / 40. Now you can calculate the C rate and the D rate, as described earlier. The annual accrual is 1,440 = 57,600 / 40. The plan allocation rate adjusted for imputed permitted disparity is 1.716%, the lesser of the C rate and the D rate:

C rate = 1.858% = 1,440 / [100,000 - .5(45,000)]
D rate = 1.716% = [1,440 + .6125%(45,000)] / 100,000

Answer is B

For employees with average annual compensation ≤ covered compensation, you must calculate the "A rate" and the "B rate", and use the lesser of the rates. The unadjusted accrual rate is either the NAR or MVAR without imputing permitted disparity.

A Rate	**B Rate**
2 * unadjusted accrual rate	unadjusted accrual rate + permitted disparity rate

Problem 32 - Page 1 **Revised 04/24/02**

This problem gives you information about both Plan A and Plan B. The question asks how many NHCEs you need under Plan B to meet the minimum coverage requirements of 410(b). The obvious place to start is with the ratio percentage test.

The ratio percentage is defined under the regulations at §1.410(b)-9 as the percentage of non-highly compensated employees (NHCEs) who benefit under the plan divided by the percentage of highly compensated employees (HCEs) who benefit under the plan:

$$\text{Ratio \% test: } \frac{\left(\frac{\text{Non HCEs who benefit}}{\text{Total Non-excludable non HCEs}}\right)}{\left(\frac{\text{HCEs who benefit}}{\text{Total Non-excludable HCEs}}\right)}$$

The percentage of NHCEs who benefit under the plan equals the number of NHCEs in the plan divided by the total number of non-excludable NHCEs. The percentage of HCEs who benefit under the plan equals the number of HCEs in the plan divided by the total number of non-excludable HCEs.

Depending on whether the employer elects to aggregate plans (they did NOT do so here), you may use only the employees benefiting under a single plan for the numerator in the ratio percentage test. There are some complicated rules in the 1.410(b)-7 regulation that govern when you can voluntarily aggregate plans, as well as when you must mandatorily disaggregate plans.

The ratio denominators should be based on counts for the entire controlled group, not just for the single plan being tested. The excludable employees include those who do not meet the minimum participation requirements, collectively bargained employees, and nonresident aliens.

Let X be the number of NHCEs for Plan B. Then set up the ratio percentage test, and solve for the value of X:

$$\frac{X / (6{,}000 - 1{,}500)}{250 / (600 - 100)} = .70 = \frac{X / 4{,}500}{250 / 500} = X / 2{,}250 \rightarrow X = 1{,}575$$

The key to this question is that you can use the information for Plan A to help Plan B meet the requirements of 410(b). In general, a plan must meet one of three requirements:

(A) Plan benefits at least 70% of ees who are not Highly compensated ees (HCEs), or
(B) Plan benefits a percentage of ees who are not HCEs which is at least 70% of the percentage of HCEs that benefit under the plan, or
(C) Plan meets the requirements of the average benefits test

Problem 32 - Page 2 **Revised 04/24/02**

The average benefits test in 1.410(b)-2(b)(3) requires that a plan satisfy both the nondiscriminatory classification test, and the average benefit percentage test. We will deal with the nondiscriminatory classification test later.

The average benefit percentage test is defined under the regulations at §1.410(b)-5 as the ratio of the actual benefit percentage (ABP) for non-highly compensated employees (NHCEs) who benefit under the plan divided by the ABP for highly compensated employees (HCEs) who benefit under the plan.

1.410(b)-7(e) states that "all plans in the testing group" must be taken into account for the average benefit percentage test. It goes on to define "all plans in the testing group" as the plan being tested, plus all plans that could be permissively aggregated under 1.410(b)-7(d). This permissive aggregation for ABPT ignores

- 1.410(b)-7(d)(4) QSLOB rule
- 1.410(b)-7(d)(5) requirement re: same plan years
- Mandatory disaggregation rules for 401(k) / 401(m), and ESOP / non ESOP

The ABP for NHCEs equals the sum of benefit accrual rates for NHCEs in the plan divided by the total number of non-excludable NHCEs. The ABP for HCEs equals the sum of benefit accrual rates for HCEs in the plan divided by the total number of non-excludable HCEs.

	HCEs	**NHCEs**
Total employees	600	6,000
Total Excludable employees	100	1,500
Total Non-Excludable ees	500	4,500
Employees benefiting under Plan B	250	X
Sum of benefit accrual rates - Plan B	250 * 1.75%	X * 1.75%
Employees benefiting under Plan A	150	1,500
Sum of benefit accrual rates - Plan A	150 * 2.00%	1,500 * 2.00%
Sum of benefit accrual rates - total	738%	1.75X% + 3,000%

Now set up the average benefit percentage test and solve for the value of X. Use the lesser of the two values of X as the final answer:

$$\frac{(1.75X + 3{,}000) / 4{,}500}{738 / 500} = .70 = (1.75X + 3{,}000) / 6{,}637.51 \rightarrow X = 940.7$$

By using the average benefit percentage test, you only need 941 of the non-HCEs to benefit under plan B, which is far less than the 1,575 under the ratio percentage test.

Problem 32 - Page 3 **Revised 05/19/11**

RATIO TEST – AGGREGATE PLANS

There is one more calculation that you must make to be sure that you have the minimum value for X. If you aggregate Plan A and Plan B for nondiscrimination testing, then the ratio test will be based on the employees benefiting in both plans.

Let X be the number of NHCEs for Plan B. Set up the ratio percentage test based on aggregating both plans for nondiscrimination testing, and solve for the value of X:

$$\left[\frac{(X + 1{,}500)}{(6{,}000 - 1{,}500)} \right] = .70$$
$$\left[\frac{(250 + 150)}{(600 - 100)} \right]$$

$$\left[\frac{(X + 1{,}500)}{4{,}500} \right] = .70$$
$$\left[\frac{400}{500} \right]$$

$X + 1{,}500 = .70*(400/500)*4{,}500 \rightarrow X = 1{,}020$

This value of X exceeds the previously calculated value of 941. So the minimum value of X is unchanged at 941.

NON-DISCRIMINATORY CLASSIFICATION TEST

The average benefits test in 1.410(b)-2(b)(3) requires that a plan satisfy both the nondiscriminatory classification test, and the average benefit percentage test. You should check that the plan passes the nondiscriminatory classification test.

1.410(b)-4(c) states that a plan satisfies the nondiscriminatory classification test when the plan's ratio percentage is greater than or equal to the Safe harbor percentage, and the plan has a reasonable classification of employees. You are told that each plan passes the reasonable classification test.

1.410(b)-4(c)(4) defines the Safe and Unsafe harbor percentages based on the non-highly compensated concentration percentage (NHCCP). The NHCCP is defined under the regulations at §1.410(b)-4(c)(4)(iii) as the ratio of non-excludable NHCEs to total non-excludable employees. Similar to the ABPT, this calculation uses "all plans in the testing group."

Based on the non-excludable counts from the prior page, the NHCCP is calculated as 4,500 / (4,500 + 500) = 90.0%. Using the tables of values provided with the exam, the Safe harbor percentage is 27.5% and the Unsafe harbor percentage is 20%.

Problem 32 - Page 4 **Revised 05/19/11**

The ratio percentage calculation was discussed on the first page of this solution. The ratio denominators should be based on counts for the entire controlled group, not just for the single plan being tested. Assuming that we are not aggregating plans, the numerators should only be based on Plan B, reflecting the 941 NHCEs from the prior page:

Plan B ratio % = [941 / 4,500] / [250 / 500]
= 20.9% / 50%
= 41.8%

You are told that the plan has a reasonable classification of employees. Since Plan B's ratio percentage is greater than the Safe harbor value of 27.5%, then the plan passes the nondiscriminatory classification test. Plan B passes the average benefit test, and also passes the 410(b) coverage requirements.

Answer is B

NOTES:

(1) You could calculate the ratio percentage above by assuming that the two plans are aggregated for testing, and it will still pass the nondiscriminatory classification test. The resulting ratio percentage is higher:

[(941+1500) / 4,500] / [(250+150) / 500] = 67.8%

The lesser of the two values is still the Safe harbor percentage of 27.5%.

(2) If you read the problem carefully, the last statement before the question makes no sense, since the two plans have the same plan sponsor. It should read as follows: "The two plans have no employees in common" (instead of no employers

Problem 33 Similar to 2000 #37 **Revised 03/27/02**

This problem tests your knowledge of the method for adjusting assets and discounting contributions under the Alternative calculation method (ACM) for calculating the Variable Rate Premium (VRP) on the PBGC-1 Form, Schedule A. The problem does not specify a method, but gives adjusted liability values for the ACM. You do not have the liability values at 1/1/2000 under the required interest rate, so you can not do calculations under the General method.

Since this is the 2001 PBGC premium calculation under the ACM, the determination date is 01/01/2000. You are given the adjusted liability values:

01/01/00 Vested current liability 6,000,000 = 750,000 + 250,000 + 5,000,000

Use the asset value at 01/01/00, and reduce it by any included receivable contributions. Then you must add the discounted value of "contributions paid for plan years prior to the premium payment year …" The interest rate used for discounting assets is always the Required Interest Rate:

01/01/00 Adjusted assets = (5,250,000 - 250,000) + 250,000*(1.0467)$^{(-6/12)}$
+ 250,000*(1.0467)$^{(-18/12)}$
= 5,477,816

01/00 Unfunded vested liability = 6,000,000 – 5,477,816
= 522,184

The adjusted value of the unfunded benefits liability is the excess of the liabilities over the adjusted assets, "adjusted for the passage of time from the first day of the plan year preceding the premium payment year to the premium snapshot date." The interest rate used for the adjustment is the Required Interest Rate:

01/01 Unfunded vested liability = 522,184 * 1.0467
= 546,570

The adjusted unfunded benefits liability must be rounded up to the next multiple of 1,000. The last step is to multiply the adjusted value of the unfunded benefits liability by .009:

2001 Variable rate premium = 547,000 * .009
= 4,923

The total PBGC premium is the sum of the variable rate premium and the per employee premium:

2001 Total PBGC premium = 19,173 = 4,923 + 19(750)

Answer is C

Problem 34 Similar to 1999 #14 **Revised 04/30/03**

This question covers an aspect of the definition of highly compensated employee (HCE) that has not been tested before. IRC section 414(q)(1) defines an HCE as any employee who

A. Was a 5% owner at any time during the current year or the prior year, or
B. For the preceding year
   i. Had compensation from the employer in excess of 80,000, and
   ii. If the employer elects application of this clause for the prior year, was in the top paid 20% of employees for the prior year

IRC section 414(q)(5) defines exclusions that apply to the determination of the top paid group, and to the 414(r) rules on separate lines of business:

A. Employees who have not completed 6 months of service
B. Employees who normally work less than 17 ½ hours per week
C. Employees who normally work during not more than 6 months during any year
D. Employees who have not attained age 21
E. Employees who are included in a unit of employees covered by a collective bargaining agreement

Based on these exclusions, Brown is the only employee who is NOT excluded

Answer is D

NOTES:

(1) The employer may elect to apply 414(q)(5)(A), (B), (C), or (D) by substituting a shorter period of service, smaller number of hours or months, or lower age than that specified in such subparagraph.

(2) If you take these exclusions at face value, you will get the wrong impression. There are some small details in the 1.414(q)-1T regulation that are "unusual":

The exclusion for less than 6 months of service is based on the sum of service for two years. See 1.414(q)-1T Q&A-9 (b)(1)(i)(A), which states " … service in the immediately preceding year is added to service in the current year in determining whether the exclusion is applicable …"

In addition, the regulation significantly modifies the exclusion for employees covered by a collective bargaining agreement (CBA). It does not apply unless 90 per cent or more of the employees are covered under a CBA, and the plan being tested only covers employees who are not covered under a CBA. See 1.414(q)-1T Q&A-9 (b)(1)(iii)(A) and (B).

Problem 35 - Page 1 Similar to 1999 #27 **Revised 04/30/03**

This is a fairly typical problem on 415, except for the use of lump sum benefits. The first step is calculation of the plan benefit without the 415 limits.

As of 01/01/2001

Age	61	Birth date	1/1/40
Service	11 years	Hire date	1/1/90
Participation	8 years	Effective date	1/1/93
		Normal retirement age	61

Final average earnings at age 61	=	(50,000 + 50,000 + 70,000 + 80,000 + 90,000)/5
	=	68,000
Accrued benefit at age 61	=	76,160 = 68,000 * 14% * 8
Normal retirement benefit at age 61	=	76,160

Plan lump sum at 6% IAM	=	879,800 = 76,160(11.552)
417 lump sum at 6.5% "app. mort."	=	851,850 = 76,160(11.185)
Greater of two lump sum values	=	879,800

Earnings under §415 are defined as total compensation. Earnings used for the §415 limits are not subject to the §401(a)(17) limit of 170,000. The §415(b)(1)(B) compensation limit is reduced when service is less than ten years.

100% 3 year comp. §415 limit	=	80,000 = (70,000 + 80,000 + 90,000) / 3

Under §415(b)(1)(A), the dollar limit is reduced when participation is less than ten years.

Social Security Retirement Age	=	66 since born in 1940
§415 dollar limit during 2001	=	140,000 at age 66 * (8/10)
§415 dollar limit at age 65	=	112,000 * .9333
§415 dollar limit at age 64	=	112,000 * .8667
§415 dollar limit at age 63	=	112,000 * .8000
§415 dollar limit at age 62	=	112,000 * .7500
	=	84,000

§415(b)(2)(E)(i) says to use the greater of 5% and the interest rate specified in the plan to reduce the §415 dollar limit prior to age 62. The examples in Revenue Ruling 98-1 clarify that the §415 dollar limit is reduced using the lower of the factors calculated based on the mandated mortality and interest rate, and the plan basis for actuarial equivalence. Based on the general conditions for this exam, if you have no optional form factors, you would assume that the basis for actuarial equivalence is the same as the funding assumptions.

Problem 35 - Page 2 **Revised 01/04/03**

In this problem, you are given the factors for $\ddot{a}^{(12)}_{61}$ and $\ddot{a}^{(12)}_{62}$ on several bases. This is consistent with the definition of the death benefit under the plan. If your death benefit were anything except 100% of the present value of the accrued benefit, then you would use the "N/N" factors to reduce the dollar limit prior to age 62.

Actuarial reduction from 62 to 61	=	$(1+i)^{-1}$ ($\ddot{a}^{(12)}_{62}$ / $\ddot{a}^{(12)}_{61}$)
Mandated 5% GAM83 basis	=	$(1.05)^{-1}$ (12.456 / 12.750)
	=	.9304
Plan basis 6% IAM83	=	$(1.06)^{-1}$ (11.319 / 11.552)
	=	.9244
§415 dollar limit at age 61	=	84,000 * lesser of [.9304 or .9244]
	=	77,647

Smith's plan benefit of 77,160 does not appear to be limited by 415. But there is one more step, which is conversion of the 415 limit to a lump sum.

§415(b)(2)(E)(ii) says to use the greater of the applicable interest rate under 417(e)(3) and the interest rate specified in the plan to convert the 415 limit to a form of payment that is subject to 417(e)(3). The examples in Revenue Ruling 98-1 clarify that the §415 dollar limit is converted using the lower of the factors calculated based on the applicable mortality and applicable interest rate, and the plan basis for optional forms.

"Applicable basis" 6.5% GAM83	=	11.185
Plan basis 6% IAM83	=	11.552
§415 Lump sum at age 61	=	77,647 * lesser of [11.185 or 11.552]
	=	868,481

Since the lump sum under 415 is lower than the plan lump sum of 879,800, the participant's lump sum benefit must be limited to 868,481.

Answer is D

NOTE: The solution did not make use of the information regarding the late retirement benefits under the plan. If the problem had involved increases in the dollar limit under 415 beyond SSRA, then that information would be important.

Assume you have a plan that does not increase benefits for late retirement. In that case, there is no increase in the 415 dollar limit after NRA. This is based on the lower of
(i) the factors using the mandated mortality and interest rate, and
(ii) the plan actuarial increase factors, which equal 1.00 for all ages above NRA.

Problem 36 Similar to 1999 #42 **Revised 04/29/19**

In general, the Top Heavy (T-H) determination date is the last day of the preceding plan year. An exception to this is the first plan year, when the determination date is the last day of the first plan year. To determine if Plan B is T-H for the plan year ending November 30, 2001, the determination date would be November 30, 2000.

Plan A and Plan B are a required aggregation group, so you must combine the two plans to determine the T-H status. If the entire aggregation group is T-H, then each of the plans would also be T-H for the year. Question T-23 of the 1.416-1 regulation requires you to use determination dates that fall within the same calendar year. The 2000 determination date for Plan A would be January 31, 2000.

Based on questions T-24 and T-25, the present value of accrued benefits for the DB plan (or account balance for the DC plan) is calculated as of the valuation date in the 12 month period ending on the determination date. Once you have identified the valuation dates for Plan A and Plan B, you can do the T-H determination.

	Plan A	**Plan B**	**Sum**
2000 Determination date	01/31/00	11/30/00	
Valuation date within prior 12 months	02/01/99	11/30/00	
Key employees	200,000	225,000	425,000
Non-key employees	160,000	125,000	285,000

The Top heavy ratio is

59.86% = 425 / (425 + 285)

Answer is B

Problem 37 **Revised 04/30/03**

This is the first calculation question on Notice 99-44, which describes how plans should be amended to reflect the repeal of 415(e). The example in Q-4 of Notice 99-44 allows a plan amendment to increase participants' benefits to the 415(b) limit ignoring 415(e). The amendment may allow for the COLA increases in the 415 limit after the participant's original retirement date.

The first step is calculation of the plan benefit without the 415 limits.

As of 01/01/1999

Age	65	Birth date	1/1/34
Service	9 years	Hire date	1/1/90
Participation	9 years	Effective date	1/1/89

Final average earnings at age 65	=	160,000
Accrued benefit at age 65	=	144,000 = 160,000 * 10% * 9
Normal retirement benefit	=	144,000

Earnings under §415 are defined as total compensation. Earnings used for the §415 limits are not subject to the §401(a)(17) limit of 170,000. The §415(b)(1)(B) compensation limit is reduced when service is less than ten years:

3 year comp. §415 limit	=	144,000 = 160,000 * (9/10)

Under §415(b)(1)(A), the dollar limit is reduced when participation is less than ten years.

Social Security Retirement Age	=	65 since born in 1934
§415 dollar limit during 1999	=	130,000 at age 65 * (9/10)
	=	117,000
§415 dollar limit during 2000	=	121,500 = 135,000 * (9/10)
§415 dollar limit during 2001	=	126,000 = 140,000 * (9/10)

One confusing item is that the participant's benefit is not limited by 415(e). The problem did not give you the Defined contribution plan fraction. Based on the general conditions for the exam, you can assume they have never been covered under a DC plan.

The participant's benefit during 1999 was limited to 117,000. After the plan amendment in 2000, the benefits increase along with the 415 dollar limit, as calculated above. The total benefits paid are 364,500 = 117,000 + 121,500 + 126,000.

Answer is B

In the Q-4 example of Notice 99-44, it states that the amendment could also increase a participant's benefit to reflect the value of any prior 415 dollar limit COLAs which had not been paid in the past. There were none of those in this problem, since the participant retired at 01/01/99, and the first increase in the 415 limit occurred for 2000.

Problem 38

The key to working the problem is knowing how to calculate the survivor annuity. As described in 417(c)(1)(A)(i), the benefit is calculated as if the participant retired the day before they died, and elected a Joint and Survivor form, and subsequently dies.

Birth date	1/1/1941	
Hire date	1/1/1991	
Date of death	1/1/2001	
As of 1/1/2001		
Age	60	
Service	10	
Spouse age	60	
Accrued Benefit	50,000	(given)
Early retirement reduction	1-8%(5)	= 60%
Early retirement benefit	(60%)(50,000)	= 30,000
50% J&S reduction (plan factors)	(13.04 / 14.03)	= .9294
50% J&S benefit	(.9294)(30,000)	= 27,883
Death benefit to spouse	(50%)(27,883)	= 13,942

Answer is A

This problem is essentially a simple benefit calculation. You do not need most of the various annuity factors.

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