

Data for Question 5 (3 points)

Form of annuity:	Annuity-immediate payable annually.
Annual payment:	\$1,000.
Period of payment:	For lifetime of annuitant age 65, and continuing for 10 years after death.
Interest rate:	5% per annum, effective.

Given:

$$a_{65} = 10.17548$$

$$a_{75} = 8.16109$$

$${}_{10}p_{65} = 0.71429$$

Question 5

In what range is the present value of this annuity at date of purchase?

- (A) Less than \$12,800
- (B) \$12,800 but less than \$13,300
- (C) \$13,300 but less than \$13,800
- (D) \$13,800 but less than \$14,300
- (E) \$14,300 or more

Data for Question 18 (4 points)

Initial number of lives: 1,300, all age 50.

Policy: 3-year term insurance, paying \$10,000 at end of year of death.

Premium: Each insured pays a single premium based on 5% interest and mortality according to $l_x = 100 - x$.

All premiums are deposited into a fund out of which all benefits are paid.

Actual experience: Over the 3-year period, the fund earns interest of $5\frac{1}{4}\%$ per annum and mortality follows $l_x = 102 - x$.

Y = The amount remaining in the fund immediately after third year claims are paid (ignoring expenses)

Question 18

In what range is Y?

- (A) Less than \$0
- (B) \$0 but less than \$10,000
- (C) \$10,000 but less than \$20,000
- (D) \$20,000 but less than \$30,000
- (E) \$30,000 or more

Data for Question 21 (2 points)

You are given:

$$A_{76} = 0.8$$

$${}_1E_{76} = 0.9$$

$i = 3\%$, compounded annually.

Question 21

In what range is A_{77} ?

- (A) Less than 0.806
- (B) 0.806 but less than 0.809
- (C) 0.809 but less than 0.812
- (D) 0.812 but less than 0.815
- (E) 0.815 or more

Data for Question 24 (3 points)

Given:

$$A_x = 0.18$$

$$A_{x+1} = 0.19$$

$$A_{x+2} = 0.20$$

$$1000q_{x+1} = 11.25$$

Question 24In what range is $1000q_x$?

- (A) Less than 9.89
- (B) 9.89 but less than 9.99
- (C) 9.99 but less than 10.09
- (D) 10.09 but less than 10.19
- (E) 10.19 or more

Data for Question 9 (3 points)

Independent lives Smith and Jones, both age 40, purchase an insurance policy with a death benefit of \$100,000 payable if and only if both die in the same year. The death benefit is payable at the end of the policy year.

Interest rate: 5%, compounded annually

$$l_x = 100 - x$$

Question 9

In what range is the single premium for this policy?

- (A) Less than \$500
- (B) \$500 but less than \$520
- (C) \$520 but less than \$540
- (D) \$540 but less than \$560
- (E) \$560 or more

Data for Question 3 (4 points)

The following are based on the same assumptions:

- I. The single premium for a life annuity of \$10,000 payable annually to a life aged 50 with first payment at the end of the year is \$123,325.
- II. The 20-year level annual premium for a whole life insurance with a death benefit of \$100,000 payable at the end of the year of death to a life aged 50 is \$3,314.
- III. The 20-year level annual premium for a 20-year endowment insurance of \$100,000 payable at the end of the year of death to a life aged 50 is X.

Interest rate: 5.0%, compounded annually.

Question 3

In what range is X?

- (A) Less than \$3,600
- (B) \$3,600 but less than \$4,000
- (C) \$4,000 but less than \$4,400
- (D) \$4,400 but less than \$4,800
- (E) \$4,800 or more

Data for Question 14 (5 points)

Smith (age 45) purchases a single premium annuity on 1/1/2006 that has the following characteristics:

Payments	\$1,000 annually at the beginning of each year starting on 1/1/2026 (age 65) and payable for life.
Death benefit	If death occurs before age 65, five annual payments of \$1,000 will be made with the first payment due at the end of the year of Smith's death.

Selected actuarial values:

$$\ddot{a}_{45:\overline{20}|} = 10.9961$$

$$\ddot{a}_{45} = 13.1949$$

$${}_{20}P_{45} = 0.8771$$

Interest rate: 7.0%, compounded annually

Question 14

In what range is the single premium for this annuity?

- (A) Less than \$2,425
- (B) \$2,425 but less than \$2,440
- (C) \$2,440 but less than \$2,455
- (D) \$2,455 but less than \$2,470
- (E) \$2,470 or more

Data for Question 24 (3 points)

Selected values from a 1-year select and ultimate mortality table:

$$p_x = 0.955$$

$$q_{[x]} = 0.5q_x$$

Other data:

Interest rate: 6.0%, compounded annually

$$A_x = 0.5842$$

Question 24

In what range is $\ddot{a}_{[x]}$?

- (A) Less than 7.000
- (B) 7.000 but less than 7.200
- (C) 7.200 but less than 7.400
- (D) 7.400 but less than 7.600
- (E) 7.600 or more

Data for Question 30 (3 points)

Data for a single premium life insurance policy:

Age at issue 40

Benefit \$10,000 payable at end of year of death

If death occurs before age 50, an additional benefit equal to 50% of the single premium accumulated with interest at 5.0%, compounded annually, is payable at the end of the year of death.

Selected actuarial values:

$$A_{40} = 0.31549$$

$${}_5E_{40} = 0.71823$$

$${}_5E_{45} = 0.71230$$

Interest rate: 5.0%, compounded annually

Question 30

In what range is the net single premium?

- (A) Less than \$3,300
- (B) \$3,300 but less than \$3,700
- (C) \$3,700 but less than \$4,100
- (D) \$4,100 but less than \$4,500
- (E) \$4,500 or more

Data for Question 10 (5 points)

Smith and Jones (both age 65) purchase an insurance policy that pays \$100,000 at the end of the year of Smith's death, if Jones is then alive.

Selected actuarial values:

$$a_{64:65} = 10.0$$

$$a_{65:65} = 9.9$$

$$q_{64} = 0.002$$

Question 10

In what range is the single premium?

- (A) Less than \$9,000
- (B) \$9,000 but less than \$10,400
- (C) \$10,400 but less than \$11,800
- (D) \$11,800 but less than \$13,200
- (E) \$13,200 or more

Data for Question 15 (3 points)

Selected actuarial values:

$$A_{76} = 0.800$$

$$D_{76} = 400$$

$$D_{77} = 360$$

Interest rate: 3%, compounded annually.

Question 15

In what range is A_{77} ?

- (A) Less than 0.806
- (B) 0.806 but less than 0.811
- (C) 0.811 but less than 0.816
- (D) 0.816 but less than 0.821
- (E) 0.821 or more

Data for Question 16 (3 points)

Selected actuarial values:

$$a_{30:\overline{9}|} = 5.60$$

$${}_{10}E_{30} = 0.35$$

Interest rate: 10.0%, compounded annually.

Question 16

In what range is $1000P_{1\overline{30:10}|}$?

- (A) Less than 7.70
- (B) 7.70 but less than 10.70
- (C) 10.70 but less than 13.70
- (D) 13.70 but less than 16.70
- (E) 16.70 or more

Data for Question 10 (4 points)

A 25-year endowment policy has annual premiums of \$272.70 payable at the beginning of the year for the first 5 years followed by annual premiums of \$746.00 payable at the beginning of the year for the next 20 years. This annual premium pattern is actuarially equivalent to an annual premium pattern of \$136.10 payable at the beginning of the year for the first 5 years followed by \$846.00 payable at the beginning of the year for the next 20 years.

P = the level annual premium payable at the beginning of the year for each of the 25 years.

Question 10

In what range is P ?

- (A) Less than \$500
- (B) \$500 but less than \$520
- (C) \$520 but less than \$540
- (D) \$540 but less than \$560
- (E) \$560 or more

Data for Question 11 (4 points)

A life age 40 is scheduled to receive an annuity due of \$5,000 payable annually for a maximum of 20 years. If death occurs within the 20 years, a lump sum equal to the sum of the unpaid annuity payments is paid at the end of the year of death.

You are given:

\underline{x}	$\underline{N_x}$	$\underline{R_x}$
40	31,309	17,169
41	29,499	16,417
...
60	7,147	5,105
61	6,475	4,685

Y = the present value of the annuity, including the death benefit.

Question 11

In what range is the present value of Y ?

- (A) Less than \$72,500
- (B) \$72,500 but less than \$73,500
- (C) \$73,500 but less than \$74,500
- (D) \$74,500 but less than \$75,500
- (E) \$75,500 or more

Data for Question 21 (2 points)

Smith purchases a one-year term insurance policy at age 60. The benefit is payable at the end of the year of death.

Face Amount: \$1,000,000 (policy pays double if death is accidental)

$$q_{60}^{(All\ Causes\ of\ Death)} = 0.0070$$

$$q_{60}^{(Accidental\ Death)} = 0.0005$$

Interest: 6% per year, compounded annually.

Question 21

In what range is the single premium for this policy?

- (A) Less than \$6,750
- (B) \$6,750 but less than \$6,900
- (C) \$6,900 but less than \$7,050
- (D) \$7,050 but less than \$7,200
- (E) \$7,200 or more

2008

Data for Question 29 (3 points)

Smith (age 20) purchases an insurance policy on 1/1/2008 that pays the following amounts at the end of the year of Smith's death:

<u>Year of death</u>	<u>Amount</u>
2008 – 2027	\$100,000
2028 – 2047	\$200,000
2048 and later	\$50,000

Selected actuarial values:

$$A_{20} = 0.0454$$

$$A_{20:\overline{20}|}^1 = 0.0081$$

$$A_{20:\overline{40}|} = 0.1068$$

$${}_{40}E_{20} = 0.0901$$

Question 29

In what range is the net single premium for this insurance?

- (A) Less than \$3,750
- (B) \$3,750 but less than \$3,850
- (C) \$3,850 but less than \$3,950
- (D) \$3,950 but less than \$4,050
- (E) \$4,050 or more

2009

Data for Question 11 (4 points)

Selected net annual premiums for whole life insurance policy:

$$P_{50} = 0.03550$$

$$P_{51} = 0.03712$$

$$I = 4.0\%$$

N = Out of the 100,000 alive at age 50, the number expected to die after age 51.

Question 11

In what range is N ?

- (A) Less than 93,800
- (B) 93,800 but less than 95,300
- (C) 95,300 but less than 96,800
- (D) 96,800 but less than 98,300
- (E) 98,300 or more

Data for Question 4

Type of insurance policy: Whole life.

Issue age: 45.

Death benefit: \$50,000, payable at end of year of death.

Commissions included in gross annual premium:

75% of first year premium
10% of second through fifth year premiums
5% of all premiums thereafter

Additional expenses included in gross annual premium:

\$10 per \$1,000 of insurance for first year.
\$2 per \$1,000 of insurance for each subsequent year
\$5 per \$1,000 of insurance for cost of settlement

Selected commutation functions:

$D_{45} = 502$ $N_{45} = 9,500$ $N_{50} = 7,070$ $M_{45} = 50$

Question 4

In what range is the gross annual premium?

- [A] Less than \$250
- [B] \$250 but less than \$300
- [C] \$300 but less than \$350
- [D] \$350 but less than \$400
- [E] \$400 or more

Data for Question 7

Type of annuity contract: Deferred life.

Age at issue: 45.

Type of premiums: Level.

Frequency of premiums: Annually, at the beginning of each year.

Number of premiums: 20.

Age at first annuity payment: 65.

Frequency of annuity payments: Monthly.

If the insured dies before age 65, all premiums paid are returned at the end of the year of death with interest at 7%.

Interest rate: 7% per year, compounded annually.

Contract reserve at end of fifth year: \$10,000.

Selected annuity value:

$$\ddot{a}_{65}^{(12)} = 8.74$$

Question 7

In what range is the monthly annuity payment?

- [A] Less than \$500
- [B] \$500 but less than \$550
- [C] \$550 but less than \$600
- [D] \$600 but less than \$650
- [E] \$650 or more

Data For Question 26 (4 Points)

Interest Rate: 5% per year, compounded annually.

A term certain and life annuity issued to a person, age 65, provides \$500 payable at the end of each month. The load is 8% of the gross premium. Annuity payments are payable at least until a sum equal to the gross single premium has been paid.

Selected Values:

$${}_{13|}a_{65}^{(12)} = 3.31$$

$${}_{14|}a_{65}^{(12)} = 2.92$$

$${}_{15|}a_{65}^{(12)} = 2.56$$

Question 26

In what range is the gross single premium?

- [A] Less than \$83,000
- [B] \$83,000 but less than \$85,000
- [C] \$85,000 but less than \$87,000
- [D] \$87,000 but less than \$89,000
- [E] \$89,000 or more