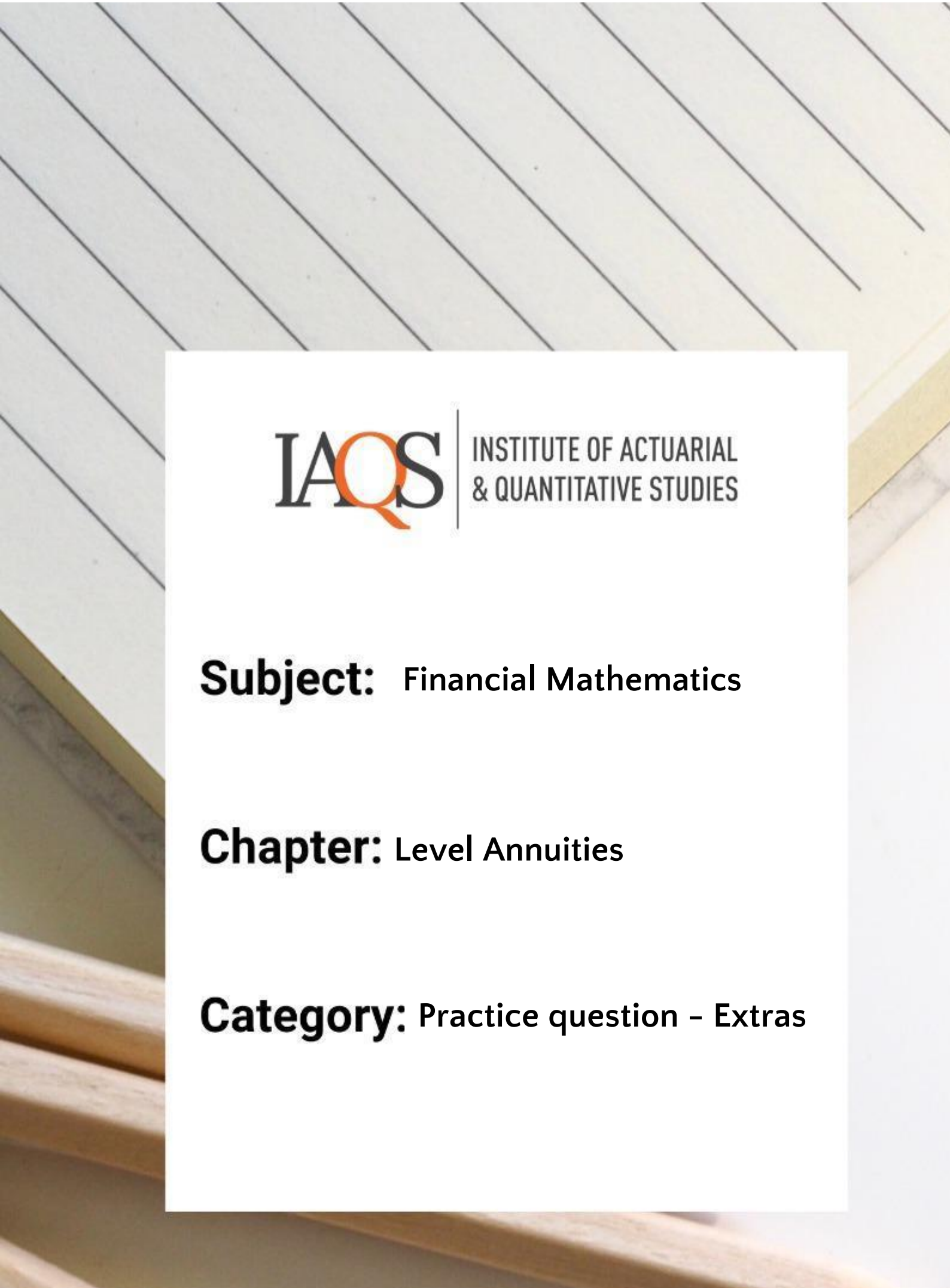

INSTITUTE OF ACTUARIAL & QUANTITATIVE STUDIES

Subject: Financial Mathematics

Chapter: Level Annuities

Category: Practice question – Extras

1. Determine the present value of payments of $500 at the end of each year for the next 20 years. The rate of interest is 5% pa effective.

[$6,231.111]

2. Calculate the present value of payment of $1,000 at the end of each year for the next five years. The nominal rate of interest is 10% pa convertible semiannually.

[$3,766.70]

3. Find present value on 1st April 2010 of payments of 2500 payable on 1st April 2011, 1st April, 2012, 1st April 2013 and so on. The last payment will be made on 1st April 2034. Use 12% pa effective rate of interest.

[19460.79]

4. Find present value on 1st January 1995 of payments of 3000 payable on 1St January 1995, 1st January 1996, 1st January 1997 and so on. The last payment will be made on 1st January 2003 using rate of interest of 8% pa convertible quarterly.

[20,081.93]

5. Find present value on 1st January 2001 of payments of 5000 payable on every 30th June of the year. Payments will start from the year 2004 and last payment will be made in the year 2015, using rate of interest of 9% pa. convertible every 6 months.

[28,439.88]

6. Find the present value at time 0 of payments of 1000 per year payable continuously from time 4 to time 16. Assume force of interest of 9% pa.

[5,119.429]

Level annuities

PRACTICE QUESTION – Extras

7. Find the present value of an annuity of £160 per annum payable quarterly in arrears for 4 years, at a rate of interest of 12% per annum effective.

[£507.33]

8. Find the present value on 30th June 2016 of payments of 1000 payable on 1st October 2016, 1st January 2017, 1st April 2017, 1st July 2017 and so on. The Last payment will be made on 1st Jan 2021. Use rate of interest of 6% pa effective.
[15,718.48]

9. Find the present value of the annuity due of $600 per year paid in semi - annual installments for 8 years if the interest rate is 5% pa convertible quarterly.

[$4,010.15]

10. Find the present value of an annuity due for $600 per annum paid in quarterly installments for 8 years, if the interest rate is 5% effective.

[$3,998.37]

11. Determine the present value of payments of $4800 per year paid at the end of each month for 7 years. The nominal rate of interest is 9% pa convertible every 4 months.

[$24,939.80]

12. Find the present value on 1st August 2007 of an annuity of 400 payable at the start of each month starting from 1st January 2010 and last payment will be made on 1st December 2017. Rate of interest is 12% pa effective.

[19290.27]

13. Find the present value on 31st March 2018 of an annuity of 750 paid at the end of each 4-monthly period. Payments starting from 1st September 2020 and last payment will be made on 1st May 23 using nominal rate of interest of 8% pa convertible quarterly.

[5027.01]

14. Find the present value of an annuity of 5000 per year payable at the end of every 3 years for the next 15 years. Assume nominal interest rate of 9% pa convertible quarterly.

[36,114.269]

15. Find the present value of an annuity of 1000 per year payable at the end of each month forever. Assume effective rate of interest of 10% pa.

[10,450.413]

16. Find present value of an annuity that pays 500 at the start of each quarter forever. Assume effective interest rate of 8%pa.

[26,237.976]

17. $100 is deposited in saving bank at the end of each year for 4 years. If it accumulates at 5% pa converted semi- annually, what is the total amount on deposit at the end of 4 years?

[$431.41]

18. Find accumulated value on 1 st April 2020 of payments of 1000 payable on 1st April 2011, 1st April, 2012, 1 st April 2013 and so on. The last payment will be made on 1 st April 2020. Use 6% pa effective rate of interest.

[13,180.79]

19. Find the accumulated value at time 20 of payments of $35 at times 0, 1, 2, and so on, with the last payment made at time 19. The rate of interest is 7% pa effective.

[$1,535.28]

20. Find accumulated value on 1st January 2020 of payments of 3500 payable on every 31st August of the year. Payments will start from the year 2008 and last payment will be made in the year 2017. Use rate of interest of 5% pa effective.

[49,330.74]

21. $50 is deposited in a saving bank at the end of every six months for 4years. If it accumulates at 5% pa effective, what is the total amount in deposit at the end of 4 years?

[$436.34]

22. $250 is deposited at the end of every six months for 10 years in a fund paying 4% pa converted semiannually. Then, $150 is deposited at the end of every three months for 10 years and the interest rate is reduced to 3% pa converted quarterly. Find the total amount on deposit at the end of the 20 years.

[$15,157.30]

23. Calculate the accumulated value, at the end of 8 years, of payments of $4,000 per year which are paid monthly at the start of each month. The annual effective rate of interest is 9% pa.

[$46,236.14]

24. Find the accumulated value at time 16 of payments of 13760 received at the end of every 2-yearly period. The nominal rate of interest is 10% pa convertible every 6 months.

[$240,390.22]

25. Find the accumulated value on 1st October 2030 of payments of 450 payable on 1st April 2017, 1st July 2017, 1st October 2017, 1st January 2018 and so on. The Last payment will be made on 1st July 2030. Use rate of interest of 12% pa effective.

[58280.78]

26. Find the accumulated value on 1st August 2018 of an annuity of 400 payable at the start of each month starting from 1st January 2010 and last payment will be made on 1st December 2017. Rate of interest is 12% pa effective.

[67102.17]

27. If $\bar{a}_{\overline{n}|} = 4$ and $\bar{s}_{\overline{n}|} = 12$, find δ.
[1/6]

28. Find values for the following functions at i = 10%.

a) $\ddot{a}^{(4)}_{\overline{5.5}|}$

b) $a^{(0.2)}_{\overline{30}|}$

c) ${}_{5|}\ddot{a}^{(6)}_{\overline{4}|}$

[a. 4.3317, b. 7.721, c. 2.082]

29. $100 per year is received continuously from time 5 to time 8. Assuming an annual effective interest rate of 4.5%, what is the accumulated value at time 10?

[$350.22]

30. Find the accumulated value at time 15 of payments of 900 per year payable continuously from time 3 to time 12. Assuming force of interest of 7% pa.

[13,920.286]

31. Calculate present value at time 0 of payments of 1000 payable from time 3 to time 17 both inclusive. Assume effective rate of interest is 4% pa until time 12 and 9% pa thereafter.

[9928.44]

32. Calculate present value on 30th April 2020 of payments of 400 payable on the 1st November 2022, 1st March 2023, 1st July 2023 and so on. Last payment will be made on 1st July 2030. Assume effective rate of interest is 5% pa until 1st July 2025 and 7% pa thereafter.

[6,900.34]