Annuities

Test bank · Multiple-choice questions

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Rules

Total	$\Sigma A = (A \times n) + A \times r \times n/2 \times (F + L)/12$ (use 360 when F and L are in days)
Interest	$\Sigma A - (A \times n)$
Due	payment at the beginning: F = term, L = one period
Ordinary	payment at the end: F = term − one period, L = 0 (no type given = ordinary)
Balance	deposits − withdrawals

Choose one answer for each question. The answer and the working are under each question.

Q1 \$1,000 is deposited every 2 months for one year at 12% annually. If the annuity is due, the accumulated amount is:

A) 6,300 **B)** 6,420 **C)** 6,000 **D)** 6,480

Answer: B) 6,420

n = 6, due: F = 12, L = 2. Total = 6000 + 1000 × 0.12 × 3 × 14/12 = 6000 + 420 = 6,420

Q2 Same data as Q1 but ordinary. The accumulated amount is:

A) 6,420 **B)** 6,000 **C)** 6,300 **D)** 6,360

Answer: C) 6,300

Ordinary: F = 12 − 2 = 10, L = 0. Total = 6000 + 1000 × 0.12 × 3 × 10/12 = 6000 + 300 = 6,300

Q3 500 L.E. is invested at the beginning of each month (Jan–Dec 2021) at 13% annually. The accumulated amount at year-end is:

A) 6,357.5 **B)** 6,422.5 **C)** 6,000 **D)** 6,500

Answer: B) 6,422.5

n = 12, due: F = 12, L = 1. Total = 6000 + 500 × 0.13 × 6 × 13/12 = 6000 + 422.5 = 6,422.5

Q4 200 L.E. is deposited every 10 days for 90 days at 12% simple interest (ordinary). The accumulated amount is:

A) 1,830 **B)** 1,800 **C)** 1,824 **D)** 1,848

> **Answer: C) 1,824**
> n = 9, ordinary (days): F = 90 − 10 = 80, L = 0. Total = 1800 + 200 × 0.12 × 4.5 × 80/360 = 1800 + 24 = 1,824

Q5 Same data as Q4 but due. The accumulated amount is:

A) 1,824 **B)** 1,830 **C)** 1,800 **D)** 1,848

> **Answer: B) 1,830**
> Due: F = 90, L = 10. Total = 1800 + 200 × 0.12 × 4.5 × 100/360 = 1800 + 30 = 1,830

Q6 1,588 L.E. is deposited at the beginning of each month for the first 4 months, then 900 L.E. at the beginning of every 2 months for the rest of the year at 11%. The total at year-end is:

A) 10,728.38 **B)** 6,963.38 **C)** 3,765 **D)** 10,250

> **Answer: A) 10,728.38**
> Group 1: n = 4, F = 12, L = 9: 6352 + 1588 × 0.11 × 2 × 21/12 = 6,963.38. Group 2: n = 4, F = 8, L = 2: 3600 + 900 × 0.11 × 2 × 10/12 = 3,765. Total = 10,728.38

Q7 360 L.E. is deposited every 20 days for 100 days at 16% annually, due. The interest is:

A) 1,800 **B)** 48 **C)** 1,848 **D)** 120

> **Answer: B) 48**
> n = 5, due (days): F = 100, L = 20. Interest = 360 × 0.16 × 2.5 × 120/360 = 48

Q8 Quarterly payments of 1,000 L.E. for 1.5 years at 14% annually (ordinary). The accumulated amount is:

A) 6,000 **B)** 6,525 **C)** 6,625 **D)** 6,425

> **Answer: B) 6,525**
> n = 6, ordinary: F = 18 − 3 = 15, L = 0. Total = 6000 + 1000 × 0.14 × 3 × 15/12 = 6000 + 525 = 6,525

Q9 200 L.E. is deposited at the beginning of every month for the first 4 months of 2020, then 400 L.E. at the end of every 2 months for the rest of the year at 10%. The total at year-end is:

A) 870 **B)** 1,640 **C)** 2,510 **D)** 2,400

> **Answer: C) 2,510**
>
> Group 1: n = 4, F = 12, L = 9: 800 + 200 × 0.10 × 2 × 21/12 = 870. Group 2: n = 4, F = 8 − 2 = 6, L = 0: 1600 + 400 × 0.10 × 2 × 6/12 = 1,640. Total = 2,510

Q10 $300 is deposited at the beginning of every 2 months for 1 year. The accumulated sum is $1,931.25. Find r:

A) 10% **B)** 12% **C)** 12.5% **D)** 13%

> **Answer: C) 12.5%**
>
> n = 6, due: F = 12, L = 2. 1931.25 = 1800 + 300 × r × 3 × 14/12 = 1800 + 1050 r → r = 131.25 / 1050 = 12.5%

Q11 A certain amount is deposited every 10 days for 90 days at 12%; the accumulated sum is $1,824. Find A:

A) 180 **B)** 200 **C)** 220 **D)** 250

> **Answer: B) 200**
>
> No type given = ordinary: n = 9, F = 80, L = 0. 1824 = 9A + A × 0.12 × 4.5 × 80/360 = 9.12A → A = 200

Q12 A certain sum is deposited at the beginning of every 3 months for 3 years at 12%; the amount is 28,680 L.E. Find A:

A) 1,800 **B)** 2,000 **C)** 2,200 **D)** 2,400

> **Answer: B) 2,000**
>
> n = 12, due: F = 36, L = 3. 28680 = 12A + A × 0.12 × 6 × 39/12 = 14.34A → A = 2,000

Q13 600 L.E. is deposited quarterly for 2 years at 11%, then deposits stop. The amount at the end of 2.5 years from the first deposit (ordinary) is:

A) 5,526 **B)** 5,658 **C)** 4,800 **D)** 6,000

> **Answer: A) 5,526**
>
> n = 8, ordinary: first payment at month 3 → F = 30 − 3 = 27; last at month 24 → L = 30 − 24 = 6. Total = 4800 + 600 × 0.11 × 4 × 33/12 = 4800 + 726 = 5,526

Q14 Same data as Q13 but due. The amount is:

A) 5,526 **B)** 5,658 **C)** 4,800 **D)** 5,900

> **Answer: B) 5,658**
> Due: first payment at month 0 → F = 30; last at month 21 → L = 9. Total = 4800 + 600 × 0.11 × 4 × 39/12 = 4800 + 858 = 5,658

Q15 If deposits are made every 2 months for one year, then n equals:

A) 12 **B)** 6 **C)** 2 **D)** 24

> **Answer: B) 6**
> n = 12 ÷ 2 = 6

Q16 For a due annuity with monthly payments over one year, (F, L) are:

A) 12 and 1 **B)** 11 and 0 **C)** 12 and 0 **D)** 10 and 0

> **Answer: A) 12 and 1**
> Due: F = term = 12, L = one period = 1

Q17 For an ordinary annuity with monthly payments over one year, (F, L) are:

A) 12 and 1 **B)** 11 and 0 **C)** 12 and 0 **D)** 10 and 0

> **Answer: B) 11 and 0**
> Ordinary: F = 12 − 1 = 11, L = 0

Q18 A payment of 500 L.E. is made at the end of every 3 months for 2 years. The number of annuities n is:

A) 6 **B)** 8 **C)** 4 **D)** 24

> **Answer: B) 8**
> n = 24 ÷ 3 = 8

Q19 For an ordinary annuity paid every 2 months over 18 months, F is:

A) 18 **B)** 16 **C)** 15 **D)** 14

> **Answer: B) 16**
> Ordinary: F = 18 − 2 = 16

Q20 For a due annuity paid every 2 months over 18 months, L is:

A) 0 **B)** 2 **C)** 4 **D)** 18

> **Answer: B) 2**
> Due: L = one period = 2

Q21 800 L.E. is deposited at the beginning of every month for 6 months at 9% annually. The interest is:

A) 63 **B)** 94.5 **C)** 108 **D)** 126

> **Answer: D) 126**
> n = 6, due: F = 6, L = 1. Interest = 800 × 0.09 × 3 × 7/12 = 126

Q22 Using the data in Q21, the total accumulated amount is:

A) 4,800 **B)** 4,926 **C)** 4,894.5 **D)** 4,908

> **Answer: B) 4,926**
> Total = 4800 + 126 = 4,926

Q23 250 L.E. is deposited every 15 days for 120 days at 12% (ordinary, denominator 360). Find the interest:

A) 30 **B)** 35 **C)** 40 **D)** 45

> **Answer: B) 35**
> n = 8, ordinary (days): F = 120 − 15 = 105, L = 0. Interest = 250 × 0.12 × 4 × 105/360 = 35

Q24 If the total of an annuity is 5,400 L.E. and the sum of annuities is 5,000 L.E., the interest is:

A) 10,400 **B)** 400 **C)** 5,400 **D)** 200

> **Answer: B) 400**
> Interest = 5400 − 5000 = 400

Q25 1,200 L.E. is paid at the beginning of every 4 months for 2 years at 15% annually (due). Find F + L:

A) 24 **B)** 28 **C)** 16 **D)** 12

> **Answer: B) 28**
> Due: F = 24, L = 4 → F + L = 28

Q26 For the annuity in Q25 (due), the number of annuities n is:

A) 4 **B)** 6 **C)** 8 **D)** 12

> **Answer: B) 6**
> n = 24 ÷ 4 = 6

Q27 900 L.E. is deposited every 6 months for 3 years at 8% (ordinary). Find the interest:

A) 216 **B)** 252 **C)** 288 **D)** 540

> **Answer: D) 540**
> n = 6, ordinary: F = 36 − 6 = 30, L = 0. Interest = 900 × 0.08 × 3 × 30/12 = 540

Q28 2,000 L.E. is deposited at the beginning of each quarter for 2 years at 10% annually. The accumulated amount is:

A) 16,000 **B)** 17,800 **C)** 17,000 **D)** 16,500

> **Answer: B) 17,800**
> n = 8, due: F = 24, L = 3. Total = 16000 + 2000 × 0.10 × 4 × 27/12 = 16000 + 1800 = 17,800

Q29 If a due annuity has F = 36 and L = 3 with quarterly payments, the term of the annuity is:

A) 2 years **B)** 3 years **C)** 4 years **D)** 5 years

> **Answer: B) 3 years**
> Due: F = term = 36 months = 3 years

Q30 1,000 L.E. is deposited at the beginning of every month for 5 months, then 2,000 L.E. at the end of every 3 months for the next 9 months at 12%. For the first group, (F, L) are:

A) 14 and 10 **B)** 14 and 9 **C)** 12 and 9 **D)** 12 and 10

> **Answer: A) 14 and 10**
> The whole period is 5 + 9 = 14 months. First payment at month 0 → F = 14; last payment at month 4 → L = 14 − 4 = 10

Q31 In Q30, the second group's (F, L) are:

A) 9 and 0 **B)** 6 and 0 **C)** 9 and 3 **D)** 6 and 3

> **Answer: B) 6 and 0**
> Payments at months 8, 11 and 14 → F = 14 − 8 = 6, L = 0

Q32 The balance due in a deposits–withdrawals problem is calculated as:

A) Withdrawals − Deposits **B)** Deposits + Withdrawals
C) Deposits − Withdrawals **D)** Deposits × Withdrawals

> **Answer: C) Deposits − Withdrawals**
> Balance = total of deposits − total of withdrawals

Q33 5,000 L.E. is deposited at the beginning of each month for 12 months at 6% annually. The interest is:

A) 1,950 **B)** 1,800 **C)** 1,650 **D)** 1,500

> **Answer: A) 1,950**
> n = 12, due: F = 12, L = 1. Interest = 5000 × 0.06 × 6 × 13/12 = 1,950

Q34 300 L.E. is deposited at the end of every 10 days for 60 days at 9% annually (denominator 360). Find the interest:

A) 11.25 **B)** 27 **C)** 40.5 **D)** 54

> **Answer: A) 11.25**
> n = 6, ordinary (days): F = 60 − 10 = 50, L = 0. Interest = 300 × 0.09 × 3 × 50/360 = 11.25

Q35 1,500 L.E. is deposited at the beginning of every 2 months for 1 year at 10% annually. The accumulated amount is:

A) 9,000 **B)** 9,375 **C)** 9,450 **D)** 9,525

> **Answer: D) 9,525**
> n = 6, due: F = 12, L = 2. Total = 9000 + 1500 × 0.10 × 3 × 14/12 = 9000 + 525 = 9,525

Q36 Same data as Q35 but ordinary. The accumulated amount is:

A) 9,000 **B)** 9,375 **C)** 9,450 **D)** 9,525

> **Answer: B) 9,375**
> Ordinary: F = 10, L = 0. Total = 9000 + 1500 × 0.10 × 3 × 10/12 = 9000 + 375 = 9,375

Q37 600 L.E. is deposited quarterly for 2 years at 11%, then deposits stop. At the end of 2.5 years (ordinary), the number of annuities is:

A) 6 **B)** 8 **C)** 10 **D)** 12

> **Answer: B) 8**
> Payments are made for 2 years only: n = 24 ÷ 3 = 8

Q38 For the annuity in Q37, the value of F (ordinary) is:

A) 30 **B)** 27 **C)** 24 **D)** 21

> **Answer: B) 27**
> First payment at month 3 → F = 30 − 3 = 27

Q39 For the annuity in Q37 (due version), the value of L is:

A) 6 **B)** 9 **C)** 12 **D)** 15

> **Answer: B) 9**
> Last payment at month 21 → L = 30 − 21 = 9

Q40 For the annuity in Q37 (due version), the total amount is:

A) 5,526 **B)** 5,658 **C)** 4,800 **D)** 5,900

Answer: B) 5,658

F = 30, L = 9. Total = 4800 + 600 × 0.11 × 4 × 39/12 = 4800 + 858 = 5,658