Unit 2 · Compound Interest

ANSWER KEY · FOR TEACHERS

Full marks 33

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 Key words

1. principal → **c.** the money first deposited or borrowed
2. compound interest → **a.** interest worked out on the principal plus the interest already added
3. compound amount → **g.** the principal and the compound interest together
4. compounding period → **b.** the time after which interest is added to the principal
5. $\frac{R}{2}$% for $2T$ periods → **f.** what half-yearly compounding uses in place of R% for T years
6. $\frac{R}{4}$% for $4T$ periods → **d.** what quarterly compounding uses in place of R% for T years

K · 3

Each carries 0.5 mark.

2 Fill the diagram

1. R/4 %
2. Kartik
3. Magh
4. Baisakh

U · 2

Each carries 0.5 mark.

3 Multiple choice

i. **c.** $P\left(1+\frac{R}{100}\right)^T$ K · 1

The bracket is multiplied by itself once for every year. The first is the simple-interest amount, the second multiplies by T instead of raising to the power T, and the last is the compound interest, not the amount.

ii. **b.** Rs 1,100 U · 1

After the first year the principal is Rs 11,000, and 10% of it is Rs 1,100. Rs 2,100 is both years' interest together; Rs 12,100 is the amount.

iii. **c.** 50000×1.03^8 U · 1

Quarterly: $12 \div 4 = 3\%$ a quarter, and 2 years have 8 quarters.

iv. **b.** 5% A · 1

The third year multiplies Rs 8,820 by $\frac{9261}{8820} = 1.05$, which is adding 5%. 105% mistakes the factor for the rate.

v. **a.** simple, yearly, half-yearly, quarterly A · 1

The sooner interest is added to the principal, the sooner it earns interest itself. Simple interest never adds it at all.

4 Very short answers

a. MARKING SCHEME K · 1

✓ The formula with $\frac{R}{200}$ and the power $2T$ written.

b. MARKING SCHEME U · 1

✓ 1.08.

c. MARKING SCHEME A · 1

✓ 12%.

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5 Short answers

a. MARKING SCHEME U · 2

- ✓ Simple interest is worked out on the first principal every year.
- ✓ Compound interest adds each year's interest to the principal, so later years earn interest on interest.

b. MARKING SCHEME U · 2

- ✓ The power must be $2T = 2$, not 1.
- ✓ Rs 21,632.

c. MARKING SCHEME A · 2

- ✓ $P = \dfrac{8820}{1.1025}$.
- ✓ Rs 8,000.

6 Problems

a. ANSWER A · 4

Year 1: interest $\dfrac{64000 \times 6}{100} = 3840$; principal for year 2: 67,840.

Year 2: interest $\dfrac{67840 \times 6}{100} = 4070.40$; principal for year 3: 71,910.40.

Year 3: interest $\dfrac{71910.40 \times 6}{100} \approx 4314.62$.

CI $= 3{,}840 + 4{,}070.40 + 4{,}314.62 =$ **Rs 12,225.02**; CA $=$ **Rs 76,225.02**.

MARKING SCHEME

- ✓ Year 1: interest 3,840; principal for year 2 is 67,840.
- ✓ Year 2: interest 4,070.40; principal for year 3 is 71,910.40.
- ✓ Year 3: interest 4,314.62.
- ✓ CI Rs 12,225.02 and CA Rs 76,225.02.

b. ANSWER A · 4

$T = 2, M = 5$: $\text{CA} = 150000\left(1 + \dfrac{6}{100}\right)^2\left(1 + \dfrac{5 \times 6}{1200}\right)$.

i. $\text{CA} = 150000 \times 1.1236 \times 1.025 = 172753.50$: **Rs 1,72,753.50**.

ii. $\text{CI} = 172753.50 - 150000 =$ **Rs 22,753.50**.

MARKING SCHEME

- ✓ $\text{CA} = 150000\left(1 + \dfrac{6}{100}\right)^2\left(1 + \dfrac{5 \times 6}{1200}\right)$ written.
- ✓ $150000 \times 1.1236 \times 1.025$.
- ✓ i. CA Rs 1,72,753.50.
- ✓ ii. CI Rs 22,753.50.

c. ANSWER A · 4

Year 1: $80000 \times 0.15 = 12000$; after tax $12000 \times 0.95 = 11400$.

Year 2: principal 91,400; half-yearly $91400(1.075^2 - 1) = 91400 \times 0.155625 \approx 14224.13$; after tax ≈ 13512.92.

Difference: $13512.92 - 11400 = 2112.92$; $\dfrac{2112.92}{11400} \times 100\% \approx$ **18.53% more**.

MARKING SCHEME

- ✓ Year 1 interest after tax: $12000 \times 0.95 = 11400$.
- ✓ Year 2 principal 91,400, half-yearly interest $91400(1.075^2 - 1) \approx 14224.13$.
- ✓ After tax ≈ 13512.92; difference 2,112.92.
- ✓ $\dfrac{2112.92}{11400} \times 100\% \approx 18.53\%$.

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7 Think

ANSWER HA · 2

At 5%: $10000(1.05^2 - 1) = 1025$. At 10%: $10000(1.1^2 - 1) = 2100$. Double 1,025 is 2,050, so **she is not right**: the interest more than doubles, because the bigger first year's interest also earns interest at the bigger rate.

MARKING SCHEME

- ✓ CI at 5% is Rs 1,025 and at 10% Rs 2,100.
- ✓ Not right: 2,100 is more than double 1,025 (interest on interest grows faster).

8 Activity: What do the banks pay?

(not marked)

WHAT STUDENTS SHOULD FIND

Commercial banks' rates on individual fixed deposits in Nepal were 4.55% a year at most in mid-2026, most often with interest added quarterly. Rs 1,00,000 at 4% a year, compounded quarterly, becomes $100000 \times 1.01^8 \approx$ Rs 1,08,286 in 2 years (before tax). The better choice is the one that gives more after tax, which is usually the higher rate, even if its interest is added less often.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	5	9	17	2	**33**

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