EXERCISE 14.2

Compute the amount and the compound interest in each of the following by using the formulae when :
(i) Principal = Rs 3000, Rate = 5%, Time = 2 years
(ii) Principal = Rs 3000, Rate = 18%, Time = 2 years
(iii) Principal = Rs 5000, Rate = 10 paise per rupee per annum, Time = 2 years
(iv) Principal = Rs 2000, Rate = 4 paise per rupee per annum, Time = 3 years
(v) Principal = Rs 12800, Rate = 7 ½ %, Time = 3 years
(vi) Principal = Rs 10000, Rate = 20% per annum compounded half-yearly, Time = 2 years
(vii) Principal = Rs 160000, Rate = 10 paise per rupee per annum compounded half yearly, Time = 2 years.
Solution:
By using the formula,
$A = P (1 + R/100)^n$
Let us solve
(i) Given, P = Rs 3000, rate = 5%, time = 2years
$A = P (1 + R/100)^n$
$= 3000 (1 + 5/100)^2$
$= 3000 (105/100)^2$
= Rs 3307.5
Compound interest (CI) = A-P = Rs 3307.5 – 3000 = Rs 307.5

(ii) Given, P = Rs 3000, rate = 18%, time = 2years
$A = P (1 + R/100)^n$
$= 3000 (1 + 18/100)^2$
$= 3000 (118/100)^2$
= Rs 4177.2
Compound interest (CI) = A-P = Rs 4177.2 – 3000 = Rs 1177.2

(iii) Given, P = Rs 5000, rate = 10%, time = 2years
$A = P (1 + R/100)^n$
$= 5000 (1 + 10/100)^2$
$= 5000 (110/100)^2$
= Rs 6050
Compound interest (CI) = A-P = Rs 6050 – 5000 = Rs 1050

(iv) Given, P = Rs 2000, rate = 4%, time = 3years

$A = P (1 + R/100)^n$
$= 2000 (1 + 4/100)^3$
$= 2000 (104/100)^3$
$= Rs\ 2249.72$
Compound interest (CI) = A-P = Rs 2249.72 – 2000 = Rs 249.72

(v) Given, P = Rs 12800, rate = 7 ½ % = 15/2% = 7.5%, time = 3years
$A = P (1 + R/100)^n$
$= 12800 (1 + 7.5/100)^3$
$= 12800 (107.5/100)^3$
$= Rs\ 15901.4$
Compound interest (CI) = A-P = Rs 15901.4 – 12800 = Rs 3101.4

(vi) Given, P = Rs 10000, rate = 20 % = 20/2 = 10% (quarterly), time = 2years = 2 × 2 = 4years
$A = P (1 + R/100)^n$
$= 10000 (1 + 10/100)^4$
$= 10000 (110/100)^4$
$= Rs\ 14641$
Compound interest (CI) = A-P = Rs 14641 – 10000 = Rs 4641

(vii) Given, P = Rs 160000, rate = 10% = 10/2% = 5% (half yearly), time = 2years = 2×2 = 4 quarters
$A = P (1 + R/100)^n$
$= 160000 (1 + 5/100)^4$
$= 160000 (105/100)^4$
$= Rs\ 194481$
Compound interest (CI) = A-P = Rs 194481 – 160000 = Rs 34481

2. Find the amount of Rs. 2400 after 3 years, when the interest is compounded annually at the rate of 20% per annum.
Solution:
Given details are,
Principal (p) = Rs 2400
Rate (r) = 20% per annum
Time (t) = 3 years
By using the formula,
$A = P (1 + R/100)^n$
$= 2400 (1 + 20/100)^3$

$= 2400 (120/100)^3$
$= Rs\ 4147.2$
∴ Amount is Rs 4147.2

3. Rahman lent Rs. 16000 to Rasheed at the rate of 12 ½ % per annum compound interest. Find the amount payable by Rasheed to Rahman after 3 years.
Solution:
Given details are,
Principal (p) = Rs 16000
Rate (r) = 12 ½ % per annum = 12.5%
Time (t) = 3 years
By using the formula,
$A = P (1 + R/100)^n$
$= 16000 (1 + 12.5/100)^3$
$= 16000 (112.5/100)^3$
$= Rs\ 22781.25$
∴ Amount is Rs 22781.25

4. Meera borrowed a sum of Rs. 1000 from Sita for two years. If the rate of interest is 10% compounded annually, find the amount that Meera has to pay back.
Solution:
Given details are,
Principal (p) = Rs 1000
Rate (r) = 10 % per annum
Time (t) = 2 years
By using the formula,
$A = P (1 + R/100)^n$
$= 1000 (1 + 10/100)^2$
$= 1000 (110/100)^2$
$= Rs\ 1210$
∴ Amount is Rs 1210

5. Find the difference between the compound interest and simple interest. On a sum of Rs. 50,000 at 10% per annum for 2 years.
Solution:
Given details are,
Principal (p) = Rs 50000
Rate (r) = 10 % per annum
Time (t) = 2 years

By using the formula,
$A = P (1 + R/100)^n$
$= 50000 (1 + 10/100)^2$
$= 50000 (110/100)^2$
$= Rs\ 60500$
CI = Rs 60500 – 50000 = Rs 10500
We know that SI = (PTR)/100 = (50000 × 10 × 2)/100 = Rs 10000
∴ Difference amount between CI and SI = 10500 – 10000 = Rs 500

6. Amit borrowed Rs. 16000 at 17 ½ % per annum simple interest. On the same day, he lent it to Ashu at the same rate but compounded annually. What does he gain at the end of 2 years?
Solution:
Given details are,
Principal (p) = Rs 16000
Rate (r) = 17 ½ % per annum = 35/2% or 17.5%
Time (t) = 2 years
Interest paid by Amit = (PTR)/100 = (16000×17.5×2)/100 = Rs 5600
Amount gained by Amit:
By using the formula,
$A = P (1 + R/100)^n$
$= 16000 (1 + 17.5/100)^2$
$= 16000 (117.5/100)^2$
$= Rs\ 22090$
CI = Rs 22090 – 16000 = Rs 6090
∴ Amit total gain is = Rs 6090 – 5600 = Rs 490

7. Find the amount of Rs. 4096 for 18 months at 12 ½ % per annum, the interest being compounded semi-annually.
Solution:
Given details are,
Principal (p) = Rs 4096
Rate (r) = 12 ½ % per annum = 25/4% or 12.5/2%
Time (t) = 18 months = (18/12) × 2 = 3 half years
By using the formula,
$A = P (1 + R/100)^n$
$= 4096 (1 + 12.5/2\times100)^3$
$= 4096 (212.5/200)^3$
$= Rs\ 4913$

∴ Amount is Rs 4913

8. Find the amount and the compound interest on Rs. 8000 for 1 ½ years at 10% per annum, compounded half-yearly.
Solution:
Given details are,
Principal (p) = Rs 8000
Rate (r) = 10 % per annum = 10/2% = 5% (half yearly)
Time (t) = 1 ½ years = (3/2) × 2 = 3 half years
By using the formula,
$A = P (1 + R/100)^n$
$= 8000 (1 + 5/100)^3$
$= 8000 (105/100)^3$
= Rs 9261
∴ CI = Rs 9261 – 8000 = Rs 1261

9. Kamal borrowed Rs. 57600 from LIC against her policy at 12 ½ % per annum to build a house. Find the amount that she pays to the LIC after 1 ½ years if the interest is calculated half-yearly.
Solution:
Given details are,
Principal (p) = Rs 57600
Rate (r) = 12 ½ % per annum = 25/2×2% = 25/4% = 12.5/2% (half yearly)
Time (t) = 1 ½ years = (3/2) × 2 = 3 half years
By using the formula,
$A = P (1 + R/100)^n$
$= 57600 (1 + 12.5/2\times100)^3$
$= 57600 (212.5/200)^3$
= Rs 69089.06
∴ Amount is Rs 69089.06

10. Abha purchased a house from Avas Parishad on credit. If the cost of the house is Rs. 64000 and the rate of interest is 5% per annum compounded half-yearly, find the interest paid by Abha after one year and a half.
Solution:
Given details are,
Principal (p) = Rs 64000
Rate (r) = 5 % per annum = 5/2% (half yearly)
Time (t) = 1 ½ years = (3/2) × 2 = 3 half years

By using the formula,
$A = P (1 + R/100)^n$
$= 64000 (1 + 5/2\times100)^3$
$= 64000 (205/200)^3$
$= Rs\ 68921$
$\therefore CI = Rs\ 68921 – 64000 = Rs\ 4921$

11. Rakesh lent out Rs. 10000 for 2 years at 20% per annum, compounded annually. How much more he could earn if the interest be compounded half-yearly?
Solution:
Given details are,
Principal (p) = Rs 10000
Rate (r) = 20% per annum
Time (t) = 2years
By using the formula,
$A = P (1 + R/100)^n$
$= 10000 (1 + 20/100)^2$
$= 10000 (120/100)^2$
$= Rs\ 14400$

When the interest is compounded half yearly,
Rate = 20/2 % = 10%
Time = 2×2 years = 4years
By using the formula,
$A = P (1 + R/100)^n$
$= 10000 (1 + 10/100)^4$
$= 10000 (110/100)^4$
$= Rs\ 14641$
$\therefore$ Rakesh could earn Rs (14641 - 14400) = Rs 241 more

12. Romesh borrowed a sum of Rs. 245760 at 12.5% per annum, compounded annually. On the same day, he lent out his money to Ramu at the same rate of interest, but compounded semi-annually. Find his gain after 2 years.
Solution:
Given details are,
Principal (p) = Rs 245760
Rate (r) = 12.5% per annum
Time (t) = 2years
By using the formula,

$A = P (1 + R/100)^n$
$= 245760 (1 + 12.5/100)^2$
$= 245760 (112.5/100)^2$
$= Rs\ 311040$

When compounded semi-annually,
Rate = 12.5/2% = 6.25%
Time = 2×2 years = 4years
By using the formula,
$A = P (1 + R/100)^n$
$= 245760 (1 + 6.25/100)^4$
$= 245760 (106.25/100)^4$
$= Rs\ 313203.75$
∴ Romesh gain is Rs (313203.75 - 311040) = Rs 2163.75

13. Find the amount that David would receive if he invests Rs. 8192 for 18 months at 12 ½ % per annum, the interest being compounded half-yearly.
Solution:
Given details are,
Principal (p) = Rs 8192
Rate (r) = 12 ½ % per annum = 25/2×2 = 25/4% = 12.5/2% (half yearly)
Time (t) = 18 months = 18/12 = 1 ½ years = (3/2) ×2 = 3years
By using the formula,
$A = P (1 + R/100)^n$
$= 8192 (1 + 12.5/2×100)^3$
$= 8192 (212.5/200)^3$
$= Rs\ 9826$
∴ Amount is Rs 9826

14. Find the compound interest on Rs. 15625 for 9 months, at 16% per annum, compounded quarterly.
Solution:
Given details are,
Principal (p) = Rs 15625
Rate (r) = 16% per annum = 16/4 = 4% (quarterly)
Time (t) = 9 months = 9/12 ×4 = 3quarters of a year
By using the formula,
$A = P (1 + R/100)^n$
$= 15625 (1 + 4/100)^3$

$= 15625 (104/100)^3$
$= Rs\ 17576$
∴ CI = Rs 17576 – 15625 = Rs 1951

15. Rekha deposited Rs. 16000 in a foreign bank which pays interest at the rate of 20% per annum compounded quarterly, find the interest received by Rekha after one year
Solution:
Given details are,
Principal (p) = Rs 16000
Rate (r) = 20% per annum = 20/4 = 5% (quarterly)
Time (t) = 1 year = 4 quarters of a year
By using the formula,
$A = P (1 + R/100)^n$
$= 16000 (1 + 5/100)^4$
$= 16000 (105/100)^4$
$= Rs\ 19448.1$
∴ CI = Rs 19448.1 – 16000 = Rs 3448.1

16. Find the amount of Rs. 12500 for 2 years compounded annually, the rate of interest being 15% for the first year and 16% for the second year.
Solution:
Given details are,
Principal (p) = Rs 12500
$Rate_1$ (r) = 15% and $Rate_2$ = 16%
Time (t) = 2 years
By using the formula,
$A = P (1 + R_1/100 \times 1 + R_2/100)$
$= 12500 (1 + 15/100 \times 1 + 16/100)$
$= 12500 (1.15 \times 1.16)$
$= Rs\ 16675$
∴ Amount after two years is Rs 16675

17. Ramu borrowed Rs. 15625 from a finance company to buy scooter. If the rate of interest be 16% per annum compounded annually, what payment will he have to make after 2 ¼ years?
Solution:
Given details are,
Principal (p) = Rs 15625

Rate (r) = 16%
Time (t) = 2 ¼ years
By using the formula,
$A = P (1 + R/100 \times 1 + R/100)$
$= 15625 (1 + 16/100)^2 \times (1 + (16/4)/100)$
$= 15625 (1 + 16/100)^2 \times (1 + 4/100)$
$= 15625 (1.16)^2 \times (1.04)$
= Rs 21866
∴ Amount after 2 ¼ years is Rs 21866

18. What will Rs. 125000 amount to at the rate of 6%, if the interest is calculated after every four months?
Solution:
Given details are,
Principal (p) = Rs 125000
Rate (r) = 6% per annum
Time (t) = 1 year
Since interest is compounded after 4months, interest will be counted as 6/3 = 2% and
Time will be 12/4 = 3quarters
By using the formula,
$A = P (1 + R/100)^n$
$= 125000 (1 + 2/100)^3$
$= 125000 (102/100)^3$
= Rs 132651
∴ Amount is Rs 132651

19. Find the compound interest at the rate of 5% for three years on that principal which in three years at the rate of 5% per annum gives Rs. 12000 as simple interest.
Solution:
Given details are,
Simple interest (SI) = Rs 12000
Rate (r) = 5% per annum
Time (t) = 3 years
SI = (PTR)/100
P = (SI×100) / (T×R)
= (12000×100) / (3×5)
= 1200000/15
= 80000
By using the formula,

$A = P (1 + R/100)^n$
$= 80000 (1 + 5/100)^3$
$= 80000 (105/100)^3$
$= Rs\ 92610$
$\therefore CI = Rs\ 92610 – 80000 = Rs\ 12610$

20. A sum of money was lent for 2 years at 20% compounded annually. If the interest is payable half-yearly instead of yearly, then the interest is Rs. 482 more. Find the sum.
Solution:
Given details are,
Rate (r) = 20% per annum = 20/2 = 10% (half yearly)
Time (t) = 2 years = 2 × 2 = 4 half years
Principal be = Rs P
$P (1 + R/100)^n - P (1 + R/100)^n = 482$
$P (1 + 10/100)^4 – P (1 + 20/100)^2 = 482$
$P (110/100)^4 – P (120/100)^2 = 482$
$P (1.4641) – P (1.44) = 482$
$0.0241P = 482$
$P = 482/0.0241$
$= 20000$
$\therefore$ Amount is Rs 20000

21. Simple interest on a sum of money for 2 years at 6 ½ % per annum is Rs. 5200. What will be the compound interest on the sum at the same rate for the same period?
Solution:
Given details are,
Rate = 6 ½ % per annum = 13/2%
Simple Interest (SI) = Rs 5200
Time (t) = 2 years
By using the formula,
$SI = (PTR)/100$
$P = (SI×100) / (T×R)$
$= (5200×100) / (2×13/2)$
$= (5200×100×2) / (2×13)$
$= 1040000/26$
$= Rs\ 40000$
Now,

P = Rs 40000
R = 13/2% = 6.5%
T = 2years
By using the formula,
$A = P (1 + R/100)^n$
$= 40000 (1 + 6.5/100)^2$
$= 40000 (106.5/100)^2$
= Rs 45369
∴ CI = Rs 45369 – 40000 = Rs 5369

22. What will be the compound interest at the rate of 5% per annum for 3 years on that principal which in 3 years at the rate of 5% per annum gives Rs. 1200 as simple interest.
Solution:
Given details are,
Rate = 5 % per annum
Simple Interest (SI) = Rs 1200
Time (t) = 3 years
By using the formula,
SI = (PTR)/100
P = (SI×100) / (T×R)
= (1200×100) / (3×5)
= 120000/15
= Rs 8000
Now,
P = Rs 8000
R = 5%
T = 3years
By using the formula,
$A = P (1 + R/100)^n$
$= 8000 (1 + 5/100)^3$
$= 8000 (105/100)^3$
= Rs 9261
∴ CI = Rs 9261 – 8000 = Rs 1261