3. Principal for first six months (first half year) ₹ 3000

Rate for the first half year $\frac{6}{2}$ 3%

Time 1 half year

Interest $\frac{3000 \quad 3 \quad 1}{100}$ ₹ 90 (for 1st half year)

Amount at the end of 1st half year ₹ 3000 90 ₹ 3090

Principal for the second six months (second half year)

Rate $\frac{6}{3}$ % 3%; Time 1 half year

Interest for second year $\frac{3090 \quad 3 \quad 1}{100}$ ₹ 92.7

Amount at end of second half year ₹ (3092 92.7) ₹ 3182.7

Principal for the third six months (third half year) ₹ 3182.7

rate 3% Time 1 half year

Interest ₹ $\frac{3182.7 \quad 3 \quad 1}{100}$ ₹ 95.48

Amount at the end of third half four ₹ 3278.18

Final amount to be paid ₹ 3278.18

CI ₹ (3278.18 3000) ₹ 278.18

4. Principal for first six month (first half year) ₹ 20000

Rate for the first half year $\frac{4}{2}$ % 2%

Time 1 half year

Interest ₹ $\frac{20000 \quad 2 \quad 1}{100}$

₹ 400 (for 1st half year)

Amount at the end of of 1st half year ₹ (20000 400) ₹ 20400

Principal for the second six month (second half year)

Rate $\frac{4}{2}$ % 2%; Time 1 half year

Interest for second half year ₹ 20400 $\frac{2}{100}$ 1 ₹ 408

Amount at the end of second half year ₹ (20400 408) ₹ 20808

Principal for the third six month (third half year) ₹ 20808

Rate for the first half year $\frac{4}{2}$ % 2%

Time 1 half year

Interest for third half year ₹ $\frac{20808 \quad 2 \quad 1}{100}$

₹ 416.16

Amount at the end of second half year ₹ (20808 416.16) ₹ 21224.16

5. 1 year 12 months four quarters.

R 8% $\frac{8}{4}$ % per quarter 2% per quarter

Principal for 1st quarter ₹ 12000

Interest for 1st quarter $₹\frac{12000 \quad 2 \quad 1}{100}$ ₹ 240

Amount at the end of 1st quarter ₹ (12000 240) ₹ 12240

Principal for 2nd quarter ₹ 12240 ; R 2%

Interest for 2nd quarter $₹\frac{12240 \quad 2 \quad 1}{100}$ ₹ 244.8

Amount at the end of 2nd quarter ₹ (12240 244.8)

₹ 12484.8

Principal for 3rd quarter ₹ 12484.8 ; R 2%

Interest for 3rd quarter $₹\frac{12484.8 \quad 2 \quad 1}{100}$ ₹ 249.69

Amount at the end of 3rd quarter ₹ (12484.8 249.69) ₹ 12734.49

Principal for 4th quarter $\frac{12734.49 \quad 2 \quad 1}{100}$ ₹ 254.69

Interest for 4th quarter ₹ (12734.49 244.69) ₹ 12989.18

Compound Interest Final Amount Original price

₹ (12989.18 12000) ₹ 989.18

6. Ruchika borrowed her friend ₹ 18000

Principal ₹ 18000 ; R 12% ; T 2 year

Simple Interest $\frac{PRT}{100}$ $₹\frac{18000 \quad 12 \quad 2}{100}$

₹ 4320

Compound Interest

Principal for the first year ₹ 18000

R 12%

Interest for the first year $\frac{PRT}{100}$

$₹\frac{18000 \quad 12 \quad 1}{100}$ ₹ 2160

Amount after the end of first year

₹ (18000 2160) ₹ 20160

Principal for the second year ₹ 20160

R 12%

Interest for the second year $\frac{PRT}{100}$ $₹\frac{20160 \quad 12 \quad 1}{100}$

₹ 2419.20

Amount after the end of second year ₹ (20160 2419.20) ₹ 22579.20

Compound Interest Final amount Original amount

₹ (22579.20 20000) ₹ 2579.20

Difference between simple interest and compound

Interest ₹ (23579.20 2160) ₹ 419.20

7. Principal Amount ₹ 8500

R $\frac{12\%}{4}$ 3% 9 months 3 quarter

Principal for 1st quarter ₹ 8500

Interest for 1st quarter $₹\frac{8500 \quad 3 \quad 1}{100}$ ₹ 255

Amount at the end of 1st quarter ₹ (8500 255) ₹ 8755

principal for 2nd quarter ₹ 8755

Interest for 2nd quarter ₹ $\frac{8755 \quad 3 \quad 1}{100}$ ₹ 262.65

Amount at the end of 2nd quarter ₹ (8755 262.65) ₹ 29017.65

Principal for 3rd quarter ₹ 9017.65

Interest for 3rd quarter ₹ $\frac{9017.65 \quad 3 \quad 1}{100}$ ₹ 270.53

Amount at the end of 3rd quarter ₹ (9017.65 270.53) 9288.18

8. Principal for the first year ₹ 15000

R 5%

Interest for the first year $\frac{PRT}{100}$

$\frac{15000 \quad 5 \quad 1}{100}$ ₹ 750

Amount after the end of first year

₹ (15000 750) ₹ 15750

Principal for the second year ₹ 15750

R 5%

Interest for the second year $\frac{PRT}{100}$

$\frac{15750 \quad 5 \quad 1}{100}$ ₹ 787.50

Amount after the end of second year

₹ (15750 787.50) ₹ 16537.50

Compound interest final amount Original amount

₹ 16537.50 15000 ₹ 1537.50

9. Six months = Two quarters

R 8% p.a. $\frac{8}{4}$ % per quarter = 2% per quarter

Principal for 1st quarter ₹ 25000

Interest for 1st quarter $\frac{PRT}{100}$ $\frac{25000 \quad 2 \quad 1}{100}$ ₹ 500

Amount at the end of 1st quarter ₹ 25000 ₹ 500 ₹ 25500

Principal for the 2nd quarter ₹ 25500

Interest for the 2nd quarter $\frac{PRT}{100}$

$\frac{25500 \quad 2 \quad 1}{100}$ 255 2 ₹ 510

Amount at the end of 2nd quarter ₹ 22500 ₹ 510 ₹ 26010

C.I. = Final amount – Original Principal

₹ 26010 ₹ 25000 ₹ 1010

Also, note that, C.I. = Interest for (Ist + 2nd) quarter

₹ (500 510) ₹ 1010

10. P ₹ 8000, T 9 months, R 20% p.a.

9 months = three quarters.

R 20% p.a. $\frac{20}{4}$ % per quarter = 5% per quarter.

Principal for 1st quarter ₹ 8000

Interest for 1st quarter $\frac{PRT}{100}$ $\frac{8000 \quad 5 \quad 1}{100}$ 80 5 ₹ 400

Amount at the end of 1st quarter ₹ 8000 ₹ 400 ₹ 8400

Principal for 2nd quarter ₹ 8400

Interest for 2nd quarter $\frac{PRT}{100}$ $\frac{8400 \quad 5 \quad 1}{100}$ 84 5 ₹ 420

Amount at the end of 2nd quarter ₹ 8400 ₹ 420 ₹ 8820

Principal for 3rd quarter ₹ 8820

Interest for 3rd quarter $\frac{PRT}{100}$ $\frac{8820 \quad 5 \quad 1}{100}$ ₹ 441

Amount at the end of 3rd quarter ₹ 8820 ₹ 441 ₹ 9261.

11. P ₹ 25600, T 9 months, R 10% p.a.

9 months = Three quarters.

R 10% p.a. $\frac{10}{4}$ % per quarter

$\frac{5}{2}$ % per quarter.

Principal for 1st quarter ₹ 25600

Interest for 1st quarter $\frac{PRT}{100}$ $\frac{25600 \quad 5 \quad 1}{100 \quad 2}$ 128 5 ₹ 640

Amount at the end of 1st quarter ₹ 25600 ₹ 640 ₹ 26240

Principal for 2nd quarter ₹ 26240

Interest for 2nd quarter $\frac{PRT}{100}$ $\frac{26240 \quad 5 \quad 1}{100 \quad 2}$ ₹ 656

Amount at the end of 2nd quarter ₹ 26240 ₹ 656 ₹ 26896

Principal for 3rd quarter ₹ 26896

Interest for 3rd quarter $\frac{PRT}{100}$ $\frac{26896 \quad 5 \quad 1}{100 \quad 2}$ ₹ 672.40

Amount at the end of 3rd quarter ₹ 26896 ₹ 672.40 = ₹ 27568.40

C.I. = Final amount – Original Principal

27568.40 25600 ₹ 968.40

12. P ₹ 4000, T 9 months, R 6% p.a.

9 months = Three quarters

R 6% p.a. $\frac{6}{4}$ % per quarter $\frac{3}{2}$ % per quarter

Principal for 1st quarter ₹ 4000

Interest for 1st quarter $\frac{PRT}{100}$ $\frac{4000 \quad 3 \quad 1}{100 \quad 2}$ 20 3 ₹ 60

Amount at the end of 1st quarter ₹ 4000 ₹ 60 ₹ 4060

Principal for 2nd quarter ₹ 4060

Interest for 2nd quarter $\frac{PRT}{100}$ $\frac{4060 \quad 3 \quad 1}{100 \quad 2}$ $\frac{203 \quad 3}{10}$ $\frac{609}{10}$ ₹ 60.9

Amount at the end of 2nd quarter ₹ 4060 ₹ 60.9 = ₹ 4120.9

Principal for 3rd quarter ₹ 4120.9

Interest for 3rd quarter $\frac{PRT}{100}$ $\frac{4120.9 \quad 3 \quad 1}{100 \quad 2}$ ₹ 61.81

Interest = Interest for (1st + 2nd + 3rd) quarter

₹ 60 ₹ 60.9 + ₹ 61.81 = ₹ 182.71.

13. P ₹ 64000, T $1\frac{1}{2}$ years $\frac{3}{2}$ years, R 5% p.a.

$1\frac{1}{2}$ years = 3 half years

R 5% p.a. $\frac{5}{2}$ % per half year

Principal for 1st half year ₹ 64000

Interest for 1st half year $\frac{PRT}{100}$ ₹ $\frac{64000 \quad 5 \quad 1}{100 \quad 2}$ ₹ 1600

Amount at the end of 1st half year ₹ (64000 1600) ₹ 65,600

Principal for the 2nd half year ₹ 65,600

Interest for the 2nd half year $\frac{65600 \quad 5 \quad 1}{100 \quad 2}$ ₹ 1640

Amount at the end of 2nd half year ₹ 65600 ₹ 1640 ₹ 67240

Principal for the 2rd half year ₹ 67240

Interest for the 3rd half year $\frac{67240 \quad 5 \quad 1}{100 \quad 2}$ ₹ 1681

Amount at the end of 3rd half year ₹ (67240 1681) ₹ 68921

14. P ₹ 32768, R $12\frac{1}{2}$ % p.a, T 9 months

Time = 9 months = 3 quarters,

R $\frac{25}{2}$ % p.a. $\frac{25}{2 \quad 4}$ % per quarter

$\frac{25}{8}$ % per quarter

Principal for 1st quarter ₹ 32768

Interest for 1st quarter $\frac{32768 \quad 25 \quad 1}{100 \quad 8}$ ₹ 1024

Amount at the end of 1st quarter ₹ (32768 1024) ₹ 33792

Principal for 2nd quarter ₹ 33792

Interest for 2nd quarter $\frac{33792 \quad 25 \quad 1}{100 \quad 8}$ ₹ 1056

Amount at the end of 2nd quarter ₹ 33792 ₹ 1056 ₹ 34848

Principal for 3rd quarter ₹ 34848

Interest for 3rd quarter $\frac{34848 \quad 25 \quad 1}{100 \quad 8}$ ₹ 1089

Amount at the 3rd quarter ₹ 34848 ₹ 1089 ₹ 35937

15. P ₹ 24000,

R 20 paise a rupee p.a. $\frac{20}{100}$ p.a. = 20%

p.a. $\frac{20}{4}$ % per quarter = 5% per quarter

T 9 months = 3 quarters

Principal for 1st quarter ₹ 24000

Interest for 1st quarter $\frac{PRT}{100}$ $\frac{24000 \quad 5 \quad 1}{100}$ ₹ 1200

Amount at the end of 1st quarter ₹ 24000 ₹ 1200 ₹ 25200

Principal for 2nd quarter ₹ 25200

Interest for 2nd quarter $\frac{25200 \quad 5 \quad 1}{100}$ ₹ 1260

Amount at the end of 2nd quarter ₹ 25200 ₹ 1260 ₹ 26460

Principal for 3rd quarter ₹ 26460

Interest for 3rd quarter $\frac{26460 \quad 5 \quad 1}{100}$ ₹ 1323

Amount at the end of 3rd quarter ₹ 26460 ₹ 1323 ₹ 27783

C.I. = Final Amount – Principal

₹ 27783 24000 ₹ 3783.

Exercise 6.2

1. (a) Principal ₹ 4000 ; R 6% ; n 3

$$A \quad P \quad 1 \quad \frac{r}{100}^{n}$$

$$4000 \quad 1 \quad \frac{6}{100}^{3}$$

$$4000 \quad \frac{106}{100}^{3}$$

$$4000 \quad \frac{106}{100} \quad \frac{106}{100} \quad \frac{106}{100} \quad ₹ 4764.064$$

CI A P

₹ (4764.064 4000)

₹ 764.064

(b) Principal ₹ 5000 ; R 5 paice per rupee per annum 5%

n 3 year

$$A \quad P \quad 1 \quad \frac{r}{100}^{n}$$

$$5000 \quad 1 \quad \frac{5}{100}^{3}$$

$$5000 \quad \frac{21}{20}^{3}$$

$$5000 \quad \frac{21}{20} \quad \frac{21}{20} \quad \frac{21}{20}$$

₹ 5788.125

CI A P

₹ (5788.125 5000)

₹ 788.125

(c) Principal ₹ 3000 ; Rate 10% per annum comprehended half yearly.

R $\frac{10}{2}$ 5% per half year.

Time 2 year 2 2 half yearly [1 year 2 half year]

$$A \quad P\ 1\ \frac{r}{100}^{n}$$

$$A \quad ₹\ 3000\ 1\ \frac{5}{100}$$

$$₹\ 3000\ \frac{105}{100}\ \frac{105}{100}\ \frac{105}{100}\ \frac{105}{100}$$

$$₹\ 3000\ \frac{21}{20}\ \frac{21}{20}\ \frac{21}{20}\ \frac{21}{20}$$

₹ 3646.52

CI A P ₹ (3646.52 3000) ₹ 646.52

(d) Principal ₹ 20000 Rate 20% per annum compounded half yearly

Time 1 year R $\frac{20}{4}$ 5

1 4 quarterly [1 year 4 quarter]

$$A \quad P\ 1\ \frac{r}{100}^{n}$$

$$20000\ 1\ \frac{5}{100}^{n}$$

$$₹\ 20000\ \frac{105}{100}\ \frac{105}{100}\ \frac{105}{100}\ \frac{105}{100}$$

₹ 24310.125

CI A P ₹ (24310.125 20000) ₹ 4310.125

2. P ₹ 1600, r $7\frac{1}{4}$% p.a. $\frac{29}{4}$% p.a., n 2 years

$$A \quad P\ 1\ \frac{r}{100}^{n} \quad ₹\ 1600\ 1\ \frac{29}{4\ \ 100}^{2} \quad ₹\ 1600\ \frac{429}{400}^{2}$$

$$₹\ \frac{1600\ \ 429\ \ 429}{400\ \ 400} \quad ₹\ 1840.41$$

C.I. A P ₹ 1840.41 ₹ 1600 ₹ 240.41

3. P ₹ 25,000

r_1 10%, r_2 12%, r_3 15%

$$A \quad P\ 1\ \frac{r_1}{100}\ 1\ \frac{r_2}{100}\ 1\ \frac{r_3}{100}$$

$$₹\ 25000\ 1\ \frac{10}{100}\ 1\ \frac{12}{100}\ 1\ \frac{15}{100}$$

$$₹\ 25000\ \frac{110}{100}\ \frac{112}{100}\ \frac{115}{100}$$

$$₹\ \frac{11\ \ 112\ \ 115}{4} \quad ₹\ 1265\ \ 28 \quad ₹\ 35420$$

C.I. A P

₹ 35420 ₹ 25000 ₹ 420.

4. Given : P ₹12500, r 8% p.a. Time $1\frac{1}{4}$ years C.I. = ?

q 1, $\frac{m}{n}$ $\frac{1}{4}$

A P 1 $\frac{r}{100}^{q}$. 1 $\frac{\frac{m}{n}\ 4^{r}}{100}$

A ₹12500 1 $\frac{8}{100}^{1}$. 1 $\frac{\frac{1}{4}\ 8}{100}$

A $\frac{5\ \overset{27}{\cancel{108}}\ 102}{\underset{1}{\cancel{4}}}$ ₹13770

C.I. A P ₹13770 ₹12500 ₹1270.

5. P ₹1625, r 12% p.a., T $1\frac{1}{4}$ years $q\frac{m}{n}$ years

q 1, $\frac{m}{n}$ $\frac{1}{4}$

A P 1 $\frac{r}{100}^{1}$. 1 $\frac{\frac{m}{n}\ r}{100}$

₹1625 1 $\frac{12}{100}^{1}$. 1 $\frac{\frac{1}{4}\ 12}{100}$

₹1625 $\frac{112}{100}$ $\frac{103}{100}$ $\frac{65\ 28\ 103}{100}$

₹$\frac{187460}{100}$ ₹1874.6

C.I. A P ₹1874.60 ₹1625 ₹249.60

6. T 3 years, r 5% p.a., S.I. ₹2400, C.I. = ? P ?

Amount after 3 years Sum $\frac{100\ \ \text{S.I.}}{R\ \ T}$ ₹$\frac{100\ \ 2400}{5\ \ 3}$ ₹16000

P ₹16000, r 5%, T 3 years

P 1 $\frac{r}{100}^{T}$ ₹16000 1 $\frac{5}{100}^{3}$

₹16000 $\frac{105}{100}^{3}$

₹$\frac{16000\ \ 105\ \ 105\ \ 105}{100\ \ 100\ \ 100}$ ₹18522

C.I. A P

₹18522 ₹16000 ₹2522

7. P ₹57600, r $12\frac{1}{2}$% p.a. $\frac{25}{2\ \ 2}$ per half year

r $\frac{25}{4}$ per half year

$T \quad 1\frac{1}{2}$ years $\quad \frac{3}{2}$ years

$T \quad \frac{3}{2} \quad 2$ half year $\qquad\qquad T \quad 3$ half year

$A \quad P\left(1 \quad \frac{r}{100}\right)^{T} \quad ₹\,57600\left(1 \quad \frac{25}{4 \quad 100}\right)^{3} \quad ₹\,57600 \quad \frac{17}{16}$

$₹\,\frac{57600 \quad 17 \quad 17 \quad 17}{16 \quad 16 \quad 16} \quad \frac{225 \quad 4913}{16} \quad ₹\,\frac{1105425}{16} \quad ₹\,9089.06$

8. $P \quad ₹\,15{,}000 \quad r \quad 8\%$ per annum compounded quarterly.

$r \quad \frac{8}{4}\,\% \quad 2\%$

time $\quad 9$ month

3 quarter 9 month $\quad 3$ quarters

$A \quad P\left(1 \quad \frac{r}{100}\right)^{n}$

$₹\,15000\left(1 \quad \frac{2}{100}\right)^{3}$

$₹\,15000 \quad \frac{51}{50} \quad \frac{51}{50} \quad \frac{51}{50}$

$₹\,15918.12$

CI $\quad A \quad P \quad ₹\,(15918.12 \quad 15000) \quad ₹\,918.12$

9. $P \quad ₹\,12800, n \quad 3$ years, $r \quad 6\frac{1}{2}\%$ p.a. $\quad \frac{13}{2}\%$ p.a., C.I. = ?

$A \quad P\left(1 \quad \frac{r}{100}\right)^{n} \quad 12800\left(1 \quad \frac{13}{2 \quad 100}\right)^{3}$

$₹\,12800 \quad \left(\frac{213}{200}\right)^{3}$

$₹\,\frac{12800 \quad 213 \quad 213 \quad 213}{200 \quad 200 \quad 200} \quad ₹\,15461.75$

C.I. $\quad A \quad P \quad ₹\,15461.75 - ₹\,12800 = ₹\,2661.75$

10. $P \quad ₹\,5000, n \quad 3$ years, $r_1 \quad 10\%, r_2 \quad 12\%, r_3 \quad 14\%$

$A \quad P\left(1 \quad \frac{r_1}{100}\right)\left(1 \quad \frac{r_2}{100}\right)\left(1 \quad \frac{r_3}{100}\right)$

$₹\,5000 \quad 1 \quad \frac{10}{100} \quad 1 \quad \frac{12}{100} \quad 1 \quad \frac{14}{100}$

$₹\,5000 \quad \frac{110}{100} \quad \frac{112}{100} \quad \frac{114}{100}$

$₹\,\frac{5 \quad 110 \quad 12768}{1000} \quad ₹\,7022.40$

C.I. $\quad A \quad P$

$₹\,7022.40 \quad ₹\,5000 \quad ₹\,2022.40$

11. $P \quad ₹\,2000, r \quad 10\%$ p.a., $n \quad 1\frac{1}{2} \quad \frac{3}{2}$ years

Since interest is credited half-yearly

$r = \frac{10}{2}\% = 5\%$ per half year and $n = \frac{3}{2} \times 2 = 3$ half-years

Now, $A = P\left(1 + \frac{r}{100}\right)^n = ₹2000\left(1 + \frac{5}{100}\right)^3 = ₹2000\left(\frac{21}{20}\right)^3$

$= ₹\frac{2000 \times 21 \times 21 \times 21}{20 \times 20 \times 20} = \frac{9261}{4} = ₹2315.25$

12. $P = ₹50000, r = 10\%$ p.a., $n = 1\frac{1}{2} = \frac{3}{2}$ years

Since interest is credited half-yearly

$r = \frac{10}{2}\%$ p.a. $= 5\%$ per half year and $n = \frac{3}{2} \times 2 = 3$ half years

Now, $A = P\left(1 + \frac{r}{100}\right)^n = ₹50000\left(1 + \frac{5}{100}\right)^3 = ₹50000\left(\frac{21}{20}\right)^3$

$= ₹\frac{50000 \times 21 \times 21 \times 21}{20 \times 20 \times 20} = ₹\frac{25 \times 9261}{4} = ₹\frac{231525}{4} = ₹57881.25$

Exercise 6.3

1. $P = ₹16000, n = 3$ years, C.I. $= ₹6781.25, r\% = ?$

by C.I. $A - P$

$A = P +$ C.I.

$= ₹16000 + 6781.25$

$= ₹22781.25$

Now, by $A = P\left(1 + \frac{r}{100}\right)^n$

$$22781.25 = 16000\left(1 + \frac{r}{100}\right)^3$$

$$\frac{22781.25}{16000} = \left(1 + \frac{r}{100}\right)^3$$

$$\frac{2278125}{16000 \times 100} = \left(1 + \frac{r}{100}\right)^3$$

$$\frac{2278125}{2 \times 8000 \times 25 \times 4} = \left(1 + \frac{r}{100}\right)^3$$

$$\frac{91125}{8 \times 8000} = \left(1 + \frac{r}{100}\right)^3$$

$$\frac{(5 \times 9)^3}{(2 \times 20)^3} = \left(1 + \frac{r}{100}\right)^3$$

$$\frac{5 \times 9}{2 \times 20} = 1 + \frac{r}{100}$$

$$\frac{45}{40} = \frac{100 + r}{100}$$

$$900 = 800 + 8r$$

$$900 - 800 = 8r$$

$$100 \quad 8r$$

$$r \quad \frac{100}{8} \qquad\qquad r \quad 12.5\%$$

2. P ₹ 20,000, n 3 years, r_1 5%, r_2 6%, r_3 8%

$$A \quad P.\ 1 \quad \frac{r_1}{100} \quad 1 \quad \frac{r_2}{100} \quad 1 \quad \frac{r_3}{100}$$

$$20{,}000\ 1 \quad \frac{5}{100} \quad 1 \quad \frac{6}{100} \quad 1 \quad \frac{8}{100}$$

$$20{,}000 \quad \frac{105}{100} \quad \frac{106}{100} \quad \frac{108}{100} \quad \frac{1202040}{50} \quad ₹\,24040.80$$

3. Let the sum be ₹ P, n_1 2 years, A_1 ₹ 12100, r 10% p.a.

n_2 3 years A_2 ₹ 13310

Then, $$A \quad P\ 1 \quad \frac{r}{100}^{n}$$

$$12100 \quad P\ 1 \quad \frac{10}{100}^{2} \qquad \ldots(1)$$

and, $$13310 \quad P\ 1 \quad \frac{10}{100}^{3} \qquad \ldots(2)$$

Now, the value of P can be find out by any of two equations given above.
From (1), we have

$$12100 \quad P \quad \frac{11}{10}^{2}$$

$$12100 \quad P \quad \frac{121}{100}$$

$$P \quad \frac{12100 \quad 100}{121}$$

$$P \quad 100 \quad 100 \qquad\qquad P \quad ₹\,10000$$

4. Let the principle be ₹ P Then amount (A) $\frac{9P}{4}$, n 2 years, r% ?

by, $$A \quad P\ 1 \quad \frac{r}{100}^{n}$$

$$\frac{9}{4} \quad 1 \quad \frac{r}{100}^{2}$$

$$\frac{3}{2}\ 1 \quad \frac{r}{100}$$

$$\frac{3 \quad 2}{2} \quad \frac{r}{100}$$

$$r \quad \frac{100}{2} \quad 50$$

$$\frac{9}{4}P \quad P.\ 1 \quad \frac{r}{100}^{2}$$

$$\sqrt{\frac{9}{4}} \quad \sqrt{1 \quad \frac{r}{100}^{2}}$$

$$\frac{3}{2}\ 1 \quad \frac{r}{100}$$

$$\frac{1}{2} \quad \frac{r}{100}$$

$$r \quad 50\%$$

5. Time (T) or n 2 years r 15% p.a.

difference (i.e. C.I. S.I.) = ₹ 144

Let the principal be ₹ P

$$\text{S.I.} \quad \frac{PRT}{100} \quad \frac{P \quad 15 \quad 2}{100} \quad \frac{30P}{100} \qquad \ldots(1)$$

C.I. $P\ 1\ \frac{r}{100}^{n}\ 1\quad P.\ 1\ \frac{15}{100}^{2}\ 1\quad P.\ \frac{115}{100}^{2}\ 1$

$P.\ \frac{(115)^2\ (100)^2}{(100)^2}\quad P.\ \frac{3225}{100\ \ 100}$

$P.\ \frac{129}{100\ \ 4}\quad \frac{129}{400}P$ …(2)

C.I. – S.I. = 144

$\frac{129P}{400}\ \ \frac{30P}{100}\ \ 144\qquad \frac{129P\ \ 120P}{400}\ \ 144$

$9P\ \ 144\ \ 400\qquad P\ \ \frac{144\ \ 400}{9}$

$P\ \ 16\ \ 400\qquad P\ \ ₹\,6400$

Hence, the required sum is ₹ 6400.

6. Let the principle be ₹ 'P'

C.I. – S.I. ₹ 1.50

r 5%, n 2 years

S.I. $\frac{PRT}{100}\ \ \frac{P\ \ 5\ \ 2}{100}\ \ \frac{10P}{100}$ …(1)

C.I. $P.\ 1\ \frac{r}{100}^{n}\ 1$

$P.\ 1\ \frac{5}{100}^{n}\ 1\quad P.\ \frac{105}{100}^{2}\ 1$

$P.\ \frac{(105)^2\ (100)^2}{(100)^2}\quad P.\ \frac{205\ \ 5}{100\ \ 100}\quad P.\ \frac{41}{400}$ …(2)

C.I. – S.I. $P.\ \frac{41}{400}\ \ \frac{10P}{100}$

$1.50=\frac{41P\ \ 40P}{400}\qquad 1.50=\frac{P}{400}$

$P\ \ 1.50\ \ 400\qquad P\ \ ₹\,600$

Hence the required sum is ₹ 600.

7. T 2 years, S.I. ₹ 100, C.I. ₹ 104

$\because$ S.I. $\frac{PRT}{100}$

$100\ \ \frac{PR\ \ 2}{100}$

$\frac{100\ \ 100}{2}\ \ PR\qquad PR\ \ 5000$

$P\ \ \frac{5000}{R}$ …(1)

$\because$ C.I. $P\ \ 1\ \ \frac{R}{100}^{T}\ \ 1$

$$104 \quad \frac{5000}{R} \quad 1 \quad \frac{R}{100}^{2} \quad 1 \qquad \text{[From (1)]}$$

$$104 \quad \frac{5000}{R} \quad \frac{(1 \quad R)^2 \quad (100)^2}{100000}$$

$$104 \quad \frac{1}{R}(100 \quad R \quad 100)(100 \quad R \quad 100)$$

$$104 \quad \frac{1}{2R}(200 \quad R).R$$

$$104 \quad \frac{200 \quad R}{2}$$

$$208 \quad 200 \quad R \qquad\qquad R \quad 8\%$$

MCQ's

1. (b) **2.** (c) **3.** (b) **4.** (a)
5. (c) **6.** (d) **7.** (d)

7 Algebraic Expressions and Factorisation

Exercise 7.1

1. (a) $2x \quad 7x \quad \{2 \quad 7\} \quad \{x \quad x\} \quad 14 \quad x^2 \quad 14x^2$

(b) $3x^2 \quad 6x^3 \quad \{3 \quad 6\} \quad \{x^2 \quad x^3\} \quad 18 \quad x^{2 \quad 3} \quad 18x^5$

(c) $(\ 7x^2\ ) \quad 2y \quad \{\ 7 \quad 2\} \quad x^2 \quad y \quad 14x^2 y$

(d) $\frac{3}{2}x^2 y^2 \qquad \frac{6}{7}xy^2 \qquad \frac{3}{2} \quad \frac{6}{7} \quad \{x^2 \quad x\} \quad \{y^2 \quad y^2\}$

$$\frac{18}{14} \quad \{x^{2 \quad 1}\} \quad \{y^{2 \quad 2}\}$$

$$\frac{18}{14}x^3 y^4 \quad \frac{9}{7}x^3 y^4$$

2. (a) Multiply $3x$, $4x^2$ and $7x^3$ $\quad 3x \quad 4x^2 \quad 7x^3$

$$\{3 \quad 4 \quad 7\} \quad \{x \quad x^2 \quad x^3\}$$

$$84 \quad \{x^{1 \quad 2 \quad 3}\} \quad 84x^6$$

(b) Multiply a^3, $6a^2 b$ and $2b^3$ $\quad a^3 \quad 6a^2 b \quad 2b^3$

$$\{\ 6 \quad 2\} \quad \{a^3 \quad a^2 \quad b \quad b^3\}$$

$$12 \quad \{a^{3 \quad 2}\} \quad \{b^{1 \quad 3}\} \quad 12a^5 b^4$$

(c) Multiply $16x^6$, $10xy^2$ and $\frac{3}{5}x^2 y^2$ $\quad 16x^6 \quad 10xy^2 \quad \frac{3}{5}x^2 y^2$

$$16 \quad 10 \quad \frac{3}{5} \quad \{x^6 \quad x \quad y^2 \quad x^2 \quad y^2\}$$

$$\{16 \quad 2 \quad 3\} \quad \{x^6 \quad x \quad x^2\} \quad \{y^2 \quad y^2\}$$

$$96\{x^{6 \quad 1 \quad 2}\}\{y^{2 \quad 2}\}$$

$$96x^2 y^4$$