Assignment 1

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Question 1(b) Ranbir borrows ₹20,000 at 12 % compound interest. If he repays ₹8400 at the end of the first year and ₹9680 at the end of the second year, find the amount of loan outstanding at the beginning of the third year.

Solution:
Initial loan taken by Ranbir, P = ₹20000
Interest rate, I = 12 %
Time between compunding, T = $1year$

Amount in compound interest,

$$A = P * (1 + I/100)^T$$

(Value of I is in percent)

Therefore, amount due at the end of one year is

$A = 20000 * (1 + 12/100)^1$
A = ₹22400

Amount paid at the end of one year is ₹8400.
Thus remaining amount,

$A = 22400 - 8400$
A = ₹14000

Now, amount due at the end of the second year is

$A = 14000 * (1 + 12/100)^1$
A = ₹15680

Amount paid at the end of second year is ₹9680.
Thus remaining amount,

$A = 15680 - 9680$
A = ₹6000

Therefore, we know that he still has ₹6000 to pay to the bank.

$\implies$ Ranbir still owes to the bank ₹6000 out of the ₹20,000 he had borrowed, after the two annual payments.