Assignment 1

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QUESTION 1A

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 compounding, T = 1 year

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

Where value of I is in percent.

Therefore, amount due at the end of one year is

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

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

$$A = 22400 - 8400$$
$$A = ₹14000$$

This new amount will now be the principal amount for the next year.
Thus, amount due at the end of the second year is

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

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.