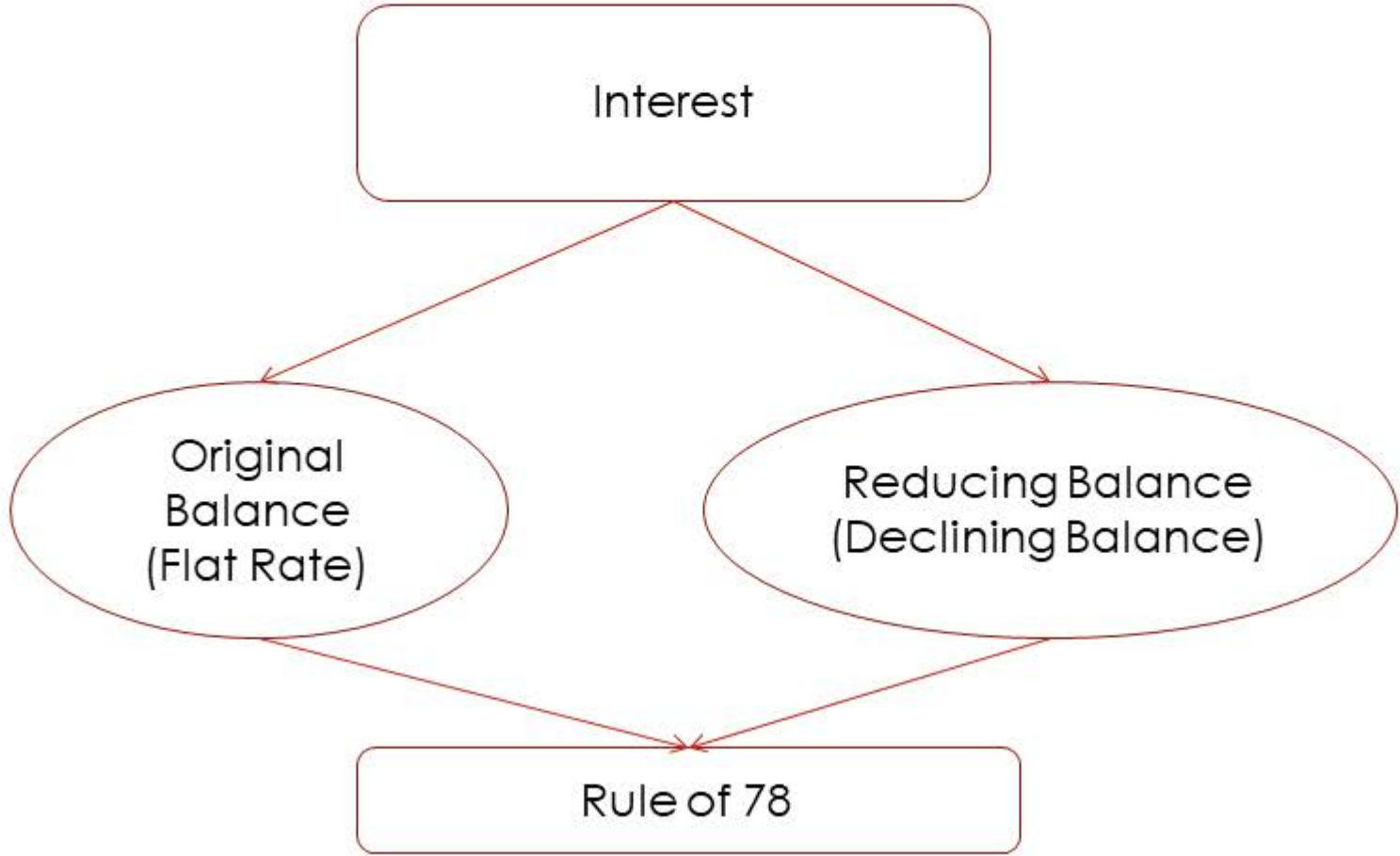# INSTALMENT PURCHASES

Prepared by:

Mathematical Science Department

LEARNING OUTCOMES

By the end of this chapter, student should be able to :

- explain the meaning of instalment purchases,

- understand how the interest rate is charged on the original balance and the reducing balance of the credit,

- compute the interest rate charged on the original balance of credit,

- compute the interest rate charged on the reducing balance of credit, and

- compute the outstanding balance and unearned interest of the lender under Rule of 78

INTRODUCTION

- In an installment purchase plan, a *consume*r is given the *opportunity to pay back over a period.*

- The retailer will usually asked for a considerable sum of *down payment* and will *charged the balance with certain amount of interest* or sometimes called service charged.

- The period of payment may be in week or month.

- *Some examples of business outlet* that uses the installment plan in their business transaction are Court Mammoth, The Catalog Shop, Singer and Sen Heng Electrical Appliances.

TERMS USED IN INSTALLMENT PURCHASE.

- **Cash price (CP)**: The cost of item listed at the time of purchase.

- **Interest (I)**: Amount charged on balance

- **Original balance (B)** : The balance after down payment was made or the deposit.(Cash balance)

- **Periodic payment (R)**: Amount of installment paid every week or month.

- **Number of payment (n):** Total number of payment to settle the balance plus interest.

- **Installment price (IP):** The total amount paid for the item bought including the down payment.
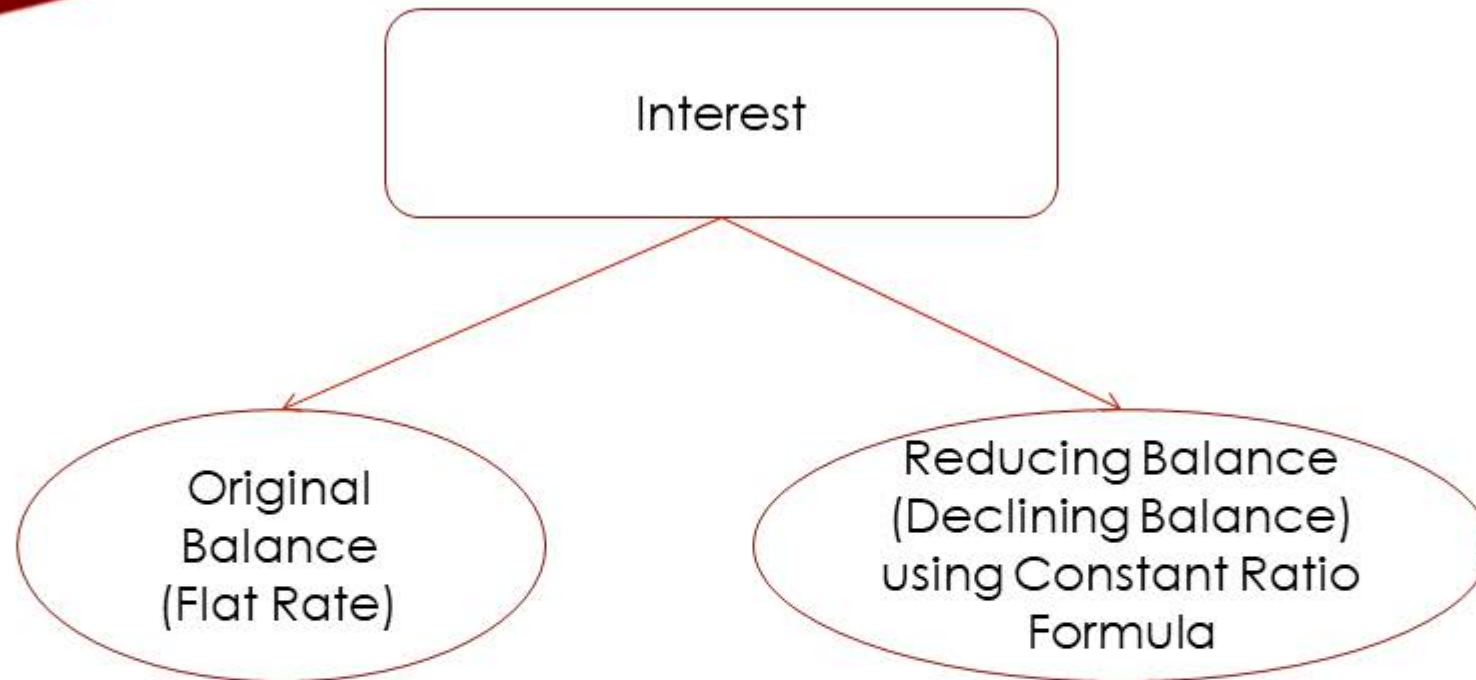
GENERAL FORMULA

$$CP = B + DP$$

$$R = \frac{B + I}{n}$$

$$IP = CP + I$$
$$= B + DP + I$$
$$= Rn + DP$$

Tip : n
If monthly payment (years x 12)
If weekly payment (years x 52)

Interest

Original Balance (Flat Rate)

Reducing Balance (Declining Balance) using Constant Ratio Formula

$$I = Prt$$

$$I = \frac{Br\,(n + 1)}{2\,m}$$

$$I = Prt$$

I = amount of interest

P = balance

r = interest rate

t = duration in year

$$I = \frac{Br(n+1)}{2m}$$

I = amount of interest

B = balance

r = annual interest rate

n = total number of payments

m = 12 (monthly payment)

    = 52 (weekly payment)

- Hire Purchase Act
- Outstanding Principal Balance

  = unpaid payment – interest rebate

$$OPB = Rk - I\left[\frac{k(k+1)}{n(n+1)}\right]$$

David paid a down payment of RM15,000 to buy

a new car. The balance of RM60,000 was paid by

making a loan which charged an interest of 3.7%

on reducing balance. He settled the loan by

making equal monthly payments for seven years.

By using constant ratio formula, find

i) the interest charged,

ii) the instalment price

$DP = 15000$

$B = 60000$

$r = 0.037$

$n = 12(7) = 84$

$m = 12 \ (monthly)$

$$I = \frac{Br(n+1)}{2m}$$

$$= \frac{60000(0.037)(84+1)}{2(12)}$$

$$= RM7862.50$$

$IP = B + DP + I$

$= 60000 + 15000 + 7862.50$

$= RM82862.50$

A series of magazines was purchased by making a down payment of RM100 and 10 monthly payments of RM121.50. If the interest charged was 1.5% based on the original balance, find:

i) the instalment price of the magazines.

ii) the cash price of the magazines.

iii) the amount of outstanding balance just after the 8th payment using the Rule of 78.

i)

$IP = Rn + DP$

$\quad = 121.50\,(10\,)+100$

$\quad = RM1315$

ii)

$I = Prt$

$\quad = B(0.015)\left(\dfrac{10}{12}\right)$

$\quad = 0.0125B$

$R = \dfrac{B+I}{n}$

$121.50 = \dfrac{B+0.0125B}{10}$

$1215 = 1.0125B$

$B = RM1200$

$CP = B + DP$

$\quad = 1200 + 100$

$\quad = RM1300$

iii)

$k = 10 - 8 = 2$

$I = 0.0125\ B$

$\quad = 0.0125\ (1200\ )= 15$

$OPB = Rk - I\left[\dfrac{k(k+1)}{n(n+1)}\right]$

$\quad = 121.50\ (2)- 15\left[\dfrac{2(2+1)}{10(10+1)}\right]$

$\quad = RM242.18$

EXAMPLE

A loan of RM20,000 is charged RM8,000

interest and was repaid by making 48 equal

monthly payments. Find

i) the monthly payment,

ii) the outstanding balance just after the 10th payment using the rule of 78.

$i)$

$$R = \frac{B+I}{n}$$

$$= \frac{20000 + 8000}{48}$$

$$= \text{RM583.33}$$

$ii)$

$$k = 48 - 10 = 38$$

$$OPB = Rk - I\left[\frac{k(k+1)}{n(n+1)}\right]$$

$$= 583.33\ (38) - 8000\left[\frac{38(38+1)}{48(48+1)}\right]$$

$$= \text{RM17125.72}$$

Nazmir wishes to purchase a set of furniture that costs him RM25,000 and he has two options to consider.

	Option A	Option B
Down payment	RM2000	RM2000
Interest rate	4% on flat rate	6% on reducing balance
Mode of payment	monthly	monthly
Period of payment	24 months	24 months

For each option, calculate

i)   the interest charged

ii)   the periodic payment

Based on the total interest charged, which option should Nazmir select? Why?

SOLUTION

Option A

$B = CP - DP$

$\quad = 25000 - 2000$

$\quad = 23000$

$I = Prt$

$\quad = 23000\ (0.04)\left(\dfrac{24}{12}\right)$

$\quad = RM1840$

$R = \dfrac{B + I}{n}$

$\quad = \dfrac{23000 + 1840}{24}$

$\quad = RM1035$

Option B

$B = CP - DP$

$\quad = 25000 - 2000$

$\quad = 23000$

$I = \dfrac{Br\ (n + 1)}{2m}$

$\quad = \dfrac{23000\ (0.06)(24 + 1)}{2(12)}$

$\quad = RM1437.50$

$R = \dfrac{B + I}{n}$

$\quad = \dfrac{23000 + 1437.50}{24}$

$\quad = RM1018.23$

Decision:
Based on total interest charged, Nazmir should select Option B because interest charged is lower.

Naza wishes to purchase a set of home-theater equipment that costs RM30,000 and he has two shops to consider.

	Shop WY	Shop KL
Down payment	RM1500	RM1500
Interest rate	6% on original balance	10% on reducing balance
Installment payment	monthly	monthly
Duration of installment	2 years	2 years

For each shop, calculate

i)   the interest charged

ii)   the monthly installment payment

iii)   the installment price

iv)   the difference in the installment price between two shops