TUTORIAL : INSTALMENT PURCHASES

1) Mr. Tan bought a scanner through an installment scheme with an interest rate of 5% on the original balance. He paid RM 98.50 monthly for one and a half years. If he paid 200 as down payment, calculate the cash price of the scanner. (4 marks)

$r = 0.05$; $R = RM\,98.50$; $t = 1\frac{1}{2}$ years

$DP = RM\,200$

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

$$98.50 = \frac{(CP - 200) + (CP - 200)(0.05)(1\frac{1}{2})}{12(1\frac{1}{2})}$$

$$1773 = CP - 200 + (CP - 200)(0.075)$$

$$1773 = CP - 200 + 0.075\,CP - 15$$

$$1988 = 1.075\,CP$$

$RM\,1849.30 = CP$ //

2) Liza borrowed RM 70,000 from Agro Bank to buy a shop. The interest charged was 3.5% monthly on the reducing balance. She settled the debt for 9 years through equal deduction from her salary. Use the Constant Ratio Formula, find

i) the total interest charged. (2 marks)

ii) the monthly payment. (2 marks)

iii) the outstanding balance after the 60th payment using Rule of 78. (2 marks)

r = 0.035, n = $9 \times 12 = 108$, M = 12, CP = 70, 000

i) $r = \dfrac{2mI}{OB(n+1)}$

$0.035 = \dfrac{2(12)I}{70,000(109)}$

$2670500 = 24I$

$RM11,127.08 = I$ ✱

ii) $R = \dfrac{B+I}{n}\sqrt{}$

$= \dfrac{70,000+11,127.08}{108}\sqrt{}\sqrt{} = RM\ 751.18\ \sqrt{}$

iii) $k = 108 - 60 = 48\ \sqrt{}$

$OB = RN - I\left(\dfrac{N(N+1)}{n(n+1)}\right)$

$= (751.18 \times 48) - 11,127.08\left(\dfrac{48(48+1)}{108(108+1)}\right)\sqrt{}\sqrt{}$

$= RM\ 33,833.49\ \sqrt{}$

3) The cash price of a car is RM62,000. Under an installment plan, a buyer has to pay a 10% down payment and the balance has to be repaid in 10 years. If the interest is 5% on reducing balance, calculate

i) the amount of interest charged using the constant ratio formula (3 marks)

ii) the monthly payment (2 marks)

iii) the installment price of the car (1 mark)

i) $OB = CP - DP$

$= 6200 - [10\% \times 62000]$

$= 55800$

$r = \frac{2MI}{B(n+1)}$

$5\% = \frac{2(12)I}{55800\,(120+1)}$

$I = 14{,}066.25$

ii)

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

$= \frac{62000+14{,}066.25}{120}$

$= RM\ 633.89$

iii)

$IP = CP + I$

$= 62000 + 14{,}066.25$

$= RM\ 76{,}066.25$

4) Allan borrowed a certain amount of money from a finance company to purchase a car. He has to pay RM880 monthly for 5 years.

i) How much did he borrow if the finance company charged interest at 6.5 % per annum on the original balance? (3 marks)

OB = amount borrowed (P)

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

$$880 = \frac{OB + OB(0.065)(5)}{12(5)}$$

$$52,800 = OB + 0.3250OB$$

$$52,800 = 1.3250OB$$

$$RM\ 39,849.06 = OB$$

ii) If Allan made a 15% down payment, find the cash price of the car. (2 marks)

DP = 15% x CP

$$CP = DP + OB$$
$$CP = 15\%CP + 39849.06 \quad ✓✓$$

$$= \frac{39849.06}{85\%} \quad ✓$$

$$= RM46,881.25 \quad ✓$$

iii) Calculate the outstanding balance using the Rule of 78 if Allan wanted to settle the loan immediately after paying for two years. (5 marks)

$$I = nR - B \quad ✓$$

$$= 52800 - 39849.06 \quad ✓✓$$

$$= RM12950.94 \quad ✓$$

$$OB = RN - I\left(\frac{N(N+1)}{n(n+1)}\right)$$

$$= 880(36) - 12950.94\left(\frac{36(37)}{60(61)}\right)$$ ✓✓✓✓✓

$$= RM26{,}966.71$$ ✓

5) Alice wanted to buy Samson Smartphone that is listed at RM3,999. Through an installment plan, she has to pay down payment of 10%, and the balance has to be repaid in 18 monthly payments. She is given 2 options of the installment plan.

Option	Interest Charged
1	6% on original balance
2	**8%** on reducing balance using constant ratio formula

Calculate

i) the monthly payment for each option (6 marks)

CP = RM3999

DP = 10%(3,999) = RM399.90

OB = RM3599.10

Option	Interest (RM) =	Monthly payment $R = \frac{OB + I}{n}$
1	I=3599.10(6%)(18/12) = 323.92 ✓ ✓ ✓ ✓	RM217.95 ✓✓
2	$n = mt$ $= 12\left(\frac{18}{12}\right) = 18$ $r = \frac{2mI}{OB(n+1)}$	RM212.61 ✓✓

	$0.08 = \frac{2(12)I}{3599.10(19)}$ $I = RM\ 227.94$ ✓	

ii) based on monthly payment, what is the best option? Why? (1 mark)

based on monthly payment, option 2 ✓ is the best because it's the cheapest.

6) A smartwatch can be purchased through an installment scheme in which RM250 down payment was needed. The interest charged is 6% per annum on the original balance. The balance needed to be paid RM89 per month for two years.

i) Find the amount of the balance. (3 marks)

DP = RM 250 ; r = 0.06 (original balance)

R = RM 89 ; t = 2 years.

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

$$89 = \frac{OB + OB(0.06)(2)}{12(2)}$$

$$2136 = OB + 0.120B$$

$$2136 = 1.120B$$

$$RM\ 1,907.14 = OB$$ ✓

ii) Find the cash price of the smartwatch. (2 marks)

CP = OB + DP ✓

= 1907.14 + 250 ✓

Cash price = RM2157.14 ✓✓

iii) By using the Rule of 78, determine the outstanding balance immediately after the 14th payment. (4 marks)

I = nR – B
= 2136 – 1907.14
= RM288.86

or

I = Brt ✓
= 1907.14(0.06)(2) ✓✓
= RM228.86 ✓

k = 24 – 14 = 10

$$OB = RN - I\left(\frac{N(N+1)}{n(n+1)}\right)$$

$$= (89 \times 10) - \left[\left(\frac{10(10+1)}{24(24+1)} \times 228.86\right)\right]$$ ✓✓ = **RM848.04** ✓✓

7) Minho bought a car for RM102,000. He paid a 10% down payment and the balance was settled by making 108 monthly payments with 3.7% reducing balance rate. By using Constant Ratio Formula;

i) Calculate the amount of interest. (4 marks)

OB = CP – DP

= 102000 – (0.1 x 10200) ✓✓

= RM91800 ✓

$n = mt$

$= 12\left(\frac{108}{12}\right)$

$= 108$ ✓

$r = \frac{2mI}{OB(n+1)}$

$0.037 = \frac{2(12)I}{91800(109)}$

RM 15,426.23 = I ✓

ii) Find Minho's monthly payment. (2 marks)

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

$$= \frac{91800 + 15426.23}{108}$$ ✓✓

= **RM992.84** ✓✓

iii) Find the installment price for the car. (2 marks)

Installment price, IP = CP + I

= 102000 + 15426.23 ✓✓

= **RM117426.23** ✓✓