

Question 14**(12 marks)**

Marco is a plumber. Three years ago, he purchased a vehicle costing \$48 000 for his business. He paid a deposit of \$5000 and acquired a personal loan for the remainder from a financial institution, at a reducible interest rate of 22.5% per annum, compounded monthly. He agreed to make repayments of \$1000 at the end of each month.

- (a) (i) Use a recurrence relation to determine the amount Marco currently owes on the loan. (3 marks)

- (ii) Determine how much longer it will take him to completely pay off the loan. (2 marks)

- (b) After three years, Marco finds that his vehicle is only worth \$27 150. Determine the average rate of depreciation of his vehicle, expressed as a percentage. (2 marks)

- (c) When Marco originally took out a personal loan for the purchase of his vehicle, he was given two options by the financial institution. These were:
- increasing his monthly repayment by \$200, or
 - taking an option of reducing the interest rate to 18.5% and maintaining repayments of \$1000 per month.

In terms of time taken to pay off the loan and total paid for his vehicle, which should he have chosen and why? (5 marks)