16. Solution: B

The point of this question is to test whether a student can determine the outstanding balance of a loan when the payments are not level.

Monthly payment at time $t = 1000(0.98)^{t-1}$

Since the actual amount of the loan is not given, the outstanding balance must be calculated prospectively,

OB_{40} = present value of payments at time 41 to time 60

$= 1000(0.98)^{40}(1.0075)^{-1} + 1000(0.98)^{41}(1.0075)^{-2} + \ldots + 1000(0.98)^{59}(1.0075)^{-20}$

This is the sum of a finite geometric series, with

first term, $a = 1000(0.98)^{40}(1.0075)^{-1}$

common ratio, $r = (0.98)(1.0075)^{-1}$

number of terms, $n = 20$

Thus, the sum

$= a\,(1 - r^n)/(1 - r)$

$= 1000(0.98)^{40}(1.0075)^{-1}\,[1 - (0.98/1.0075)^{20}]/[1 - (0.98/1.0075)]$

$= 6889.11$