Problem 1

$t = 6$
$m = 2$
$R = 1200$
$r = 5/100 = .05$

$n = m \cdot t = 12$

$i = \frac{r}{m} = \frac{.05}{2} = .025$

$$P = R\left[\frac{1-(1+i)^{-n}}{i}\right] = 1200\left[\frac{1-(1.025)^{-12}}{.025}\right]$$

$P \approx \$12309.32$

Problem 2

$t = 25$
$m = 1$
$R = 1500$
$r = 4/100$

$n = m \cdot t = 25$

$i = \frac{r}{m} = \frac{4}{100} = .04$

$$P = R\left[\frac{(1+i)^{n}-1}{i}\right] = 1500\left[\frac{(1.04)^{25}-1}{.04}\right]$$

$P \approx \$62468.86$

Problem 3

$$P = R\left[\frac{(1+i)^{n}-1}{i}\right] = 420\left[\frac{1-(1.005)^{-36}}{.005}\right] = \$13,805.83$$

represent the present value of car after the initial down payment of $8,000. Including the $8,000 down payment, the cash price of the car is $\$21,805.83$

Problem 4

First we find the future value after 10 years

$$S = 3{,}000\left[\frac{(1+.05)^{10}-1}{.05}\right] = 37733.67$$

After the intial 10 years Jacob stops making yearly deposists. The the money accumulated over the remaining 10 years must be compound interest, with S as the principal

$$A = P(1+i)^n = (37{,}733.67)(1+.05)^{10} = \boxed{\$61464.18}$$