41510

P1

a) 1-year forward exchange rate of 1 CAD is 1/1.665=0.601 British Pounds GBP.
b) $r_{CAD} = r_{GBP} * \frac{F_{\frac{CAD}{GBP}}}{S_{\frac{CAD}{GBP}}} = 0.55\% * \frac{1.665}{1.625} = 0.5635\%$ from Interest rate parity equation.
c) In this case one would borrow CAD, use elevated interest rate and then buy GBP. Arbitrage profit in this case would mean making profit from different (imperfect) financial markets. Borrow 1 GBP, Convert to CAD, invest for 1 year with better interest rate and convert back to GBP.

$$\frac{1 + 0.015635}{1.625} * 1.655 \ - 1 * (1 + 0.0055) = Profit = 0.03$$

d) John would expect spot price of one year from now to be equal to 1 GBP to 1.665 CAD based on expectations theory of exchange rates, theory which states that percentage difference between future and spot rate is equal to expected percentage change in spot rate, leading to expected spot rate to be equal to forward rate.

P2

a) Payback period is period from which cash inflows exceed to cash outflows. Table below.
b) Discounted payback period is period from which discounted cash inflows exceed discounted cash outflows. Table below.
c) Incase of normal payback period: Let C denote the minimal annual cash flow required to make payback period of 4. In this case summing up cashflows (no discounts) we must have 0 = -300 + C*4 => C=300/4=75 (million DKK).

   In case of discounted payback period: Let C denote the minimal annual cash flow required to make payback period of 4. In this case summing up discounted cashflows $0 = -300 + \sum_{i=1}^{4} \frac{C}{1.05^i} => C = 300 * \frac{1.05^4}{1.05^4 - 1} * (1.05 - 1) = 84.6\ (million\ DKK)$.
d) Profitability index measures the net present value of a project per dollar of investment, thus it is a helpful tool to measure which project to choose *if money at hand is tight and one would not like to raise more cash (has limitations from bank for example)*. Otherwise one would go with all positive NPV projects. NPV of the new project of EV charging stations would thus be 85*1.5=127.5 million DKK.
   New electric car manufacturing facility has, however, profitability index of 68.01/300=0.2267.

   Answer. One would prefer to go with Facility of charging stations as it has better NPV and better profitability index. As project are *exclusive!*, one would have to pick one and it would clearly be charging stations. However we do not know e.g. payback period of charging station project so if it was bad, then this might come into play, however clearly superior NPV and profitability index (in case of cash boundaries) point to charging stations.

Year	0	1	2	3	4	5
Cash flows	-300	+85	+85	+85	+85	+85
Payback value	-300	-215	-130	-45	40	125
Cash flows Discounted	-300	+85/1.05=80.95	$+85/1.05^2$=77.10	$+85/1.05^3$=73.43	$+85/1.05^4$=69.93	$+85/1.05^5$=66.60
Discounted Payback value	-300	-219.5	-141.95	-68.52	1.41	68.01 (this is also project NPV as we have cash flows for 5 years)

P3

a)

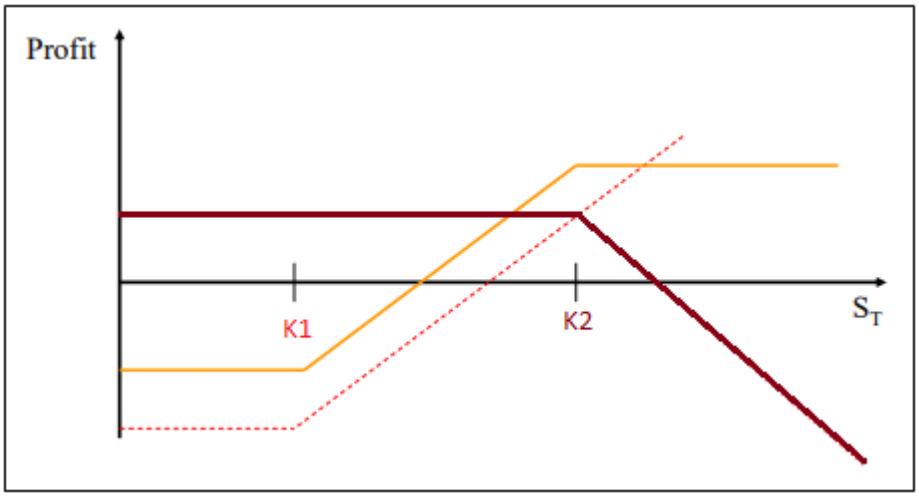

Figure above shows profit diagram for the strategy. Orange/Yellow line shows the profit, dark red show *sell a call option strategy* (individual option strategy) and dotted light red line shows *buy a call option strategy* (individual option strategy). Also note that K1 option has higher price than K2 option, because of lower exercise price and other conditions like time to maturity and environment (same stock price and same interest rates).

b)

Stock price	$S_t \leq K_1$	$K_1 < S_t < K_2$	$S_t \geq K_2$
Value of *buy call*	0	$S_t - K_1$	$S_t - K_1$
Value of *sell call*	0	0	$K_2 - S_t$
Value of stock	S_t	S_t	0 (buyer would exercise the right and you sell stock)
Total payoff	S_t	$2S_t - K_1$	$K_2 - K_1$

c) This strategy is called Bull spread.

P4

a) Dividends payout ratio is ratio which shows how much dividends are paid from the earnings. Thus, dividends payout ratio = 2 / 8 = 0.25 = 25%. This ratio presents that 25% of earnings are distributed out to the shareholders (for individual shareholder indeed, 25% earnings per share is distributed as dividends per share).

b) If debt becomes more expense, i.e. has higher interest rate and thus required rate of return on debt r_D, then for levered firms, WACC does increase and for unlevered firms, WACC does not change. This is due to the fact that WACC is linearly depended on both r_E and r_D, to be more precise WACC formula is

$$WACC = \frac{D}{V} * r_D + \frac{E}{V} * r_E$$

and while r_D does not change, r_E does increase leading to increase in WACC. In case of unlevered firms we have no debt, this means $D = 0$ and $\frac{D}{V} = 0$, so r_D coefficient of 0 makes product zero, leaving unlevered firms only dependent on r_E.

Again, this has an effect on levered firms, but not on unlevered firms, if project presumably is normal project in line with core business. This is due to fact that WACC is used as a discount rate of projects with similar operations (e.g. carbon-copy projects). WACC increases in case of levered firms, in case of unlevered firms it all depends on r_E.

However one thing is important to note this is ceteris paribus all other factors remain constant. E.g. it can be that r_E changes also due to risk-free rate changes, thus yielding also unlevered firms to be effected.

c) It can use a forward contract to hedge itself, this means fixing the prescribed future spot rate with forward contract. This means that regardless of changes in the exchange rate, we are required to trade at prespecified exchange rate. Options contract can be better because it gives you the right to trade at a rate specified in option if exchange rate drops below agreed strike rate. However, if exchange rate gets better from your point of view (our base currency appreciates), then agreed strike rate is lower than spot rate at that point of time, therefore you could abandon option (not exercise the right of option) and sell at spot rate, like nothing happened. So option guarantees the floor, while forward contract fixes the rate and thus both floor and ceiling.