Discounted Cash Flow Questions and Answers – Advanced (7 questions)

148. Explain why we would use the mid-year convention in a DCF

You use it to represent the fact a company's cash flow does not come 100% at the end of each year – instead, it comes in evenly throughout each year

In a DCF without mid-year convention, we would use discount period numbers of 1 for the first year, 2 for the second year, 3 for the third year and so on

With mid-year convention, we would instead use 0.5 for the first year, 1.5 for the second year, 2.5 for the third, and so on

149. What discount period numbers would I use for the midyear convention if I have a stub period – like Q4 of year 1 – in my DCF?

The rule is that you divide the stub period discount period by 2, and then you simply subtract 0.5 from the normal discount periods for the future years. Example for a Q4 stub:

	Q4	Year 1	Year 2	Year 3	Year 4	Year 5
Normal Discount Periods with Stub:	0.25	1.25	2.25	3.25	4.25	5.25
Mid-Year Discount Periods with Stub:	0.125	0.75	1.75	2.75	3.75	4.75

150. How does the terminal value calculation change when we use the midyear convention?

When you're discounting the terminal value back to the present value, you use different numbers for the discount period depending on whether you're using the multiples method or Gordon growth method:

1. Multiples method: you add 0.5 to the final year discount number to reflect the fact that you're assuming the company gets sold at the end of the year
2. Gordon growth method: you use the final year discount number as is, bc you're assuming the cash flows grow into perpetuity and that they are still received throughout the year rather than just at the end

You get the same terminal values, but just discount them by like 4.5 years instead of 5 years

151. If I'm working with a public company in a DCF, how do I calculate its per-share value?

Once you get to enterprise value, add cash and then subtract debt, preferred stock, and noncontrolling interest (and any other debt like items) to get to equity value

Then, you need to use a circular calculation that takes into account the basic shares outstanding, options, warrants, convertibles, and other dilutive securities. It's circular because the dilution from these depends on the per-share price – but the per-share price depends on number of shares outstanding, which depends on the per-share price

To resolve this, you need to enable iterative calculations in Excel so that it can cycle through to find an approximate per-share price

"circular" because the value of options and convertible securities is dependent on the share price itself

152. **Walk me through a dividend discount model (DDM) that you would use in place of a normal DCF for financial institutions**

The mechanics are the same as a DCF, but we use dividends rather than free cash flows:

1. Project out the company's earnings, down to EPS
2. Assuming a dividend payout ratio – what percentage of the EPS actually gets paid out to shareholders in the form of dividends – based on what the firm has done historically and how much regulatory capital it needs
3. Use this to calculate dividends over the next 5-10 years
4. Do a check to make sure that the firm still meets its target tier 1 capital and other capital ratios – if not, reduce the dividends
5. Discount the dividen in each year to its present value based on the cost of equity – not WACC – and then sum these up
6. Calculate terminal value based on P/BV and book value in the final year, and then discount this to its present value based on cost of equity
7. Sum the present value of the terminal value and the present values of the dividends to get the company's net present per share value

153. **When you're calculating WACC, let's say that the company has convertible debt. Do you count this as debt when calculating levered beta for the company?**

Trick question. If the convertible debt is in the money then you do not count it as debt but instead assume that it contributes to dilution, so the company's equity value is higher. If it's out of the money then you count it as debt and use the interest rate on the convertible for cost of debt

154. **We're creating a DCF for a company that is planning to buy a factory for $100 in cash (no debt or other financing) in year 4. Currently the present value of its enterprise value according to the DCF is $200. How would we change the DCF**

to account for the factory purchase, and what would our new enterprise value be?

In this scenario, you'd add capex spending of $100 in year 4 of the DCF, which would reduce free cash flow for that year by $100. The enterprise value, in turn, would fall by the present value of that $100 decrease in free cash flow

The actual math here is messy but you would calculate the present value by dividing $100 by ((1 + discount rate) ** 4). Then you would subtract this amount from the enterprise value