Practice MCQ questions – Solutions

1 A - Exercise value = S0 – X = 593 – 600 = 0, because the option can never have a negative value.

2 D - Payout ratio = dividend/earnings, eg, 5p dividend, 20p of earnings, payout ratio is 0.25, or 25%. If the company has unstable earnings, but a dividend that is showing steady growth, then the payout ratio will be variable from period to period, so A is correct. This means that B must be wrong.

If you have a stable payout ratio, eg 25% of earnings will be paid out as dividends, then if earnings are volatile, it means the dividend will be unpredictable as well, so C is correct as well.

3 A - For puts the value is ascertained by X – S0, here this will be 350 – 358 = 0 (option can't have a negative value), so you lose what you pay for the option, ie 5p.

4 D - Call prices rise with higher interest rates, because the right hand part of the equation is the present value of the exercise price, which is subtracted. If the interest rate goes up, then this value will fall, meaning you are subtracting a smaller value, the call is more valuable, so I is incorrect. II is false, futures have a symmetrical payoff. III interest rate swaps only involve the swapping of interest payments, it is the currency swap that involves interest and principal.

5 B - This is a present value of annuity problem. You need the money today and there are multiple payments. The expression is;

PVA = CF*$PVAIF_{i,n}$ and you tick off the elements you have got in the question. You have the PVA (£125k), the CF (£39.5k), the number of periods (4). The only missing item is *i,* so we rearrange the formula;
$PVAIF_{i,4}$ = PVA/CF = £125,000/£39,500 = 3.1646

This is the PVAIF factor, which you would look up table 2 in the text appendix (you get these tables in the exam). If you read along row 4 (for the periods) until you get close to 3.1646, then read up for the interest rate. This is 10%.

6 C - You need to work out the expected return first; return * probability. Then you want to work out the deviation away from the expected return for each of the observations. Because this contains negative numbers we square the deviations (if you simply add up the deviations you get 50). We take the squared deviations and multiply by the probability. Add these numbers. This gives the variance, which we take the square root of to give the standard deviation (because we had squared the deviations earlier in the calculation).

rtn	prob	rtn*prob =Exp rtn	rtn - Er	(rtn-Er)^2	prob(rtn-Er)^2
500	0.1	50	-125	15625.0	1562.5
550	0.2	110	-75	5625.0	1125.0
600	0.4	240	-25	625.0	250.0
725	0.2	145	100	10000.0	2000.0
800	0.1	80	175	30625.0	3062.5
	1	625		Variance =	8000.0
				Std Dev =	**89.44**

7 C - The rightist or traditional view on dividends favoured the payment of large early dividends, this was the 'early resolution of uncertainty'. The early dividend was preferred to an uncertain dividend in the future (if the company retained the earnings and invested).

8 B - The equity in a geared company can be regarded as a call option. The most sensitive option variable is the volatility. If an asset becomes more volatile, the option increases in value, so a fall in volatility will reduce the value of the geared company.

9 A - This is a future value problem. You need the money in the future and there are multiple cash flows, so it is a future value annuity problem. Write out the expression FVA = CF*FVAIF$_{i,n}$, in the question we have FVA (£70k), *i* (8%), and *n* (6 years), we are missing the CF, so rearrange to solve for the missing CF;

CF = FVA/FVAIF$_{i,n}$ you get the annuity factor from table 4, text appendix.

CF = £80,000/7.3359, but because you are starting the saving today, this becomes an annuity due and you need to multiply the annuity factor by (1+i) to reflect that fact.

CF = £80,000/7.3359*1.08

CF = £80,000/7.92277 = £8,835

10 C - The PV of the cash flows is 161.5, the PI is 161.5/120 = 1.346.

11 C - You use interest rate parity to calculate this. The formula is;

Forward = (1+Forn i/r)/(1+Domestic i/r) * spot exchange rate
Where the Domestic interest rate is the interest rate of the country with the single unit in the quote. Here the domestic currency is the $. The calculation is;

$\frac{1.05}{1.02}$ * 0.5263 = £0.54178/$1

12 A - You need to build up a beta for the project. First you need to work out the ungeared beta for the parent company;

$\beta u = (\beta e * E/V) + (\beta d * D/V)$

$\beta u = (1.4 * 0.75) + (0.15 * 0.25) = 1.0875$

This is the ungeared beta for the company, but this does not represent the risk of the project. The project has a different risk profile to the parent, so we need to adjust for the revenue volatility and fixed cost differences between the parent and project.

$$\text{Project beta} = \beta u * \frac{\text{Project revenue volatility}}{\text{Company revenue volatility}}$$

$= 1.0875 * (1.2/1.4) = 0.932$

Then we need to adjust for the fixed costs;

$$\text{Project beta} = \text{adjusted beta} * \frac{(1+\text{project fixed costs})}{(1+\text{company fixed costs})}$$

$= 0.932 * (1.4/1.5) = 0.870$

This is the ungeared beta for the project and would be used to work out the WACC for the project (used directly if the project is funded with 100% equity. If debt is used, you would be given a debt beta in the question (this would be a case question, not an MCQ) and you would have to work out the equity beta and then these would be used to calculate the costs of equity and debt).

13 C We need to work out the change in net working capital. Current assets are regarded as cash outflows, they are a use of cash, whereas current liabilities are effectively a source of cash, you are not paying the bills today, they are delayed.

If we subtract; CL – CA, we get
-5000, -7250, -6500, -750 for years 0 – 3.
We need the change in net working capital, so;
For year 0 = -5000, for year 1 the change is an additional 2250, so -2250, for year 2, the change is a fall of 750, so we don't need so much working capital, this is a positive, +750, and then for the final year, there is a fall of 5750, so +5750.
The entries will be -5000, -2250, 750, 5750, so for year 2 the entry will be 750.

14 B (1+R) = (1+N)/(1+I) = 1.09/1.05 = 1.038095 for the first year, 1.105/1.05 = 1.05238 for the second year. The real return for the two years is expressed as an annualised rate, so we multiply 1+ the real returns together and take the square root to get the annualised rate. 1.038095*1.05238 = 1.09247, square root = 1.0452 = 4.52%

15 D The YTM will be greater than 6% because you will make a gain on the bond. Use the rough and ready YTM to get an estimate of the rate (annual income on bond +or- the annual capital gain on the bond). The gain is 7.4 over 4 years = 1.85 per year. Add this to 6% = approx 8%. Use 8% to discount the cash flows, this gives 93.38. This means 8% is too low. The YTM is above 8%, but probably not by a large amount. 8.92% is too high, but you may have to discount with this to confirm. The actual YTM is 8.246%, which is none of the above.

16. B, 1.94.
Adjust for revenue volatility;
Rev adj β = βu * (New div rev vol/ company rev vol)
= 1.6 * (1.4/1.2)
= 1.867

Adjust for fixed costs
New div βu
= rev adj βu * (1 + New div fixed costs % / 1 + company fixed cost%)
= 1.867 * (1.30/1.25)
= 1.94

17. A. Use put-call parity
Put + underlying share value = Call + PV exercise price
Put = Call + PVX – S0
Put = 42 + $600/1.06^{0.25}$ – 615
Put = 18.3p

18. D, r = (D1/ P0) + g
= (20/500) + 0.10
= 0.14

19. C, the value of the firm is not affected by the capital structure.

20. D, divs are taxed, investors incur transactions charges if they have to sell their shares to raise cash, and the company faces flotation fees if they sell new equity.

21. B, \$1.35, the formula is fwd = $(1+Forn)^t/(1+Dom)^t$ * Spot rate $1.015^{0.5}/1.03^{0.5}$ * \$1.36 = \$1.35/€1.

22. C, maintaining purchasing power across time requires that the expected spot exchange rate be consistent with the inflation expected in the two countries.

23. B, $(1.093)^5 / (1.087)^3 =$ 1.2145, this is a two year return, need to express as an annual return, take square root = 1.102. Two year forward rate starting in three years = 10.2%. Rule for id of fwd rate notation: first number is the start date (in this case year 3), second number is the length of the forward rate period (in this case 'two year forward rate'). The notation is ${}_3f_5$ (the 5 is simply the two year length of the forward rate being added on to the start date).

24. C, $(1.07)^2 / 1.05 =$ 1.09038 = 9.04%

25. B, net fixed assets are part of the long term assets of the company, working capital focuses on assets & liabilities of under one year in length.

26. B is the correct answer – apply the following formula;
£r = $[(2*£D*£T)/i]^{0.5}$ where D = cash sum, T = transaction cost, i = interest rate.

27. C is the correct answer. Use formula 10.2 as shown below;

Expected cash balance change (c)	10000
Transaction cost (T)	90
Interest differential (i)	5%
Minimum cash balance (£M)	80000
Number of times cash balance can change in 1 day (t)	1
s^2 = £c^2 x t	100,000,000
£R = [(3xTxs^2)/4(i/365)]^0.33 +£M	116,661
Upper limit £U = £M+3(£R-£M)	189,984

28. C is the correct answer. First you need to calculate the interest cost of not taking the discount.
This is i = $[1+(\text{discount\%}/1\text{-discount \%})]^{365/\text{discount days}} - 1$

Inserting the numbers, $[1+ (0.02/1-0.02)]^{365/30} – 1 = 27.865\%$
The cost of not taking the discount is 30/45 * £300,000 * (0.27865 – 0.08) = £49,729

29. A is the correct answer. The formula is Beta = $\sigma_j\rho_{jm}/ \sigma_m$ ie, the standard deviation of the stock times the correlation of the stock and the market, divided by the standard deviation of the market. In the question you are given the variance of the market, so you need to take the square root to get the standard deviation.

30. B is the correct answer. This is an EPS-EBIT problem. We take the EBIT and subtract the interest payment (80*0.05 = 4), giving the pre-tax income. Tax this at 30% leaving the after tax earnings. Divide this by the number of shares (60m) to give 4.1¢ as the answer. The dividend is not relevant to the calculation. The dividend is paid out of earnings (eps).

Debt	80
Interest rate	5%
EBIT	7.5
Interest	-4
Pre tax	3.5
Tax	-1.05
After tax earnings	2.45
Shares	60
EPS	0.041

31. C is the correct answer. The bond cash flows are £7 for the first three years and £107 for year 4. These are discounted by the relevant interest rate for each year, eg, $£107/1.08^4$.

32. D is the correct answer. The effective interest rate is $(1+(i/m)^m - 1$, where i is the interest rate and m is the number of compounding periods per year. Here it is $(1+(0.07/365))^{365} - 1$, which equals 7.25%. To find out the sum just put the cash sum in front of the brackets and raise the value to mt, where t is the number of years (don't subtract 1 at the end of the calculation – that works out the interest rate, what you are doing here is working out the compound growth factor).

$£8000*(1+(0.07/365))^{365*4}$ = £10,585.

33. C is the correct answer. The equity weight is 67% and the equity beta is;
Bu = (Be*(E/(E+D))+(Bd*(D/(E+D)), solve for Be, which = 1.6925.
Now you can calculate re = 4% +1.6925(6%) = 14.155%.
The debt rate is 4% + 0.2(6%) = 5.2%.
Then calculate WACC
WACC = (0.67*0.14155) + (0.33*0.052)*(1 – 0.30)
WACC = 0.106852 = 10.69%

34. A is the correct answer. The is an equivalent annual annuity problem and we need to work out the PV of the annual running costs, add this to machine cost and divide by the annuity factor for each machine. As shown below;

	Years	cost	operating costs	Annuity	10%	Annuity factor
A	3	10000	2000	1	0.909091	
B	5	13000	1500	2	0.826446	
WACC	10%			3	0.751315	2.486852
	PV Total	EAC		4	0.683013	
PV cycle A	14974	6021		5	0.620921	3.790787
PV cycle B	18686	4929				

35. A is the correct answer. The lease cash flows are; + Equipment value (not buying it), - Depreciation tax shield (don't get it if you lease), - Lease payment (you need to pay this annually for the equipment), + Lease tax shield (you get a tax break on the lease). Net these off and multiply the lease cash flows (excluding year 0 equipment) by the five year present value annuity factor for the after tax cost of debt (7%). This give you £651, it is positive, so the PV of the lease cash flows are lower than the cost of buying, so you should lease the equipment.

	0	1	2	3	4	5
Equip	10000					
Depn tax shield		-600	-600	-600	-600	-600
Lease pmnt		-2400	-2400	-2400	-2400	-2400
Lease tax shield		720	720	720	720	720
Lease cash flows	10000	-2280	-2280	-2280	-2280	-2280

The cost of capital for the lease is the after tax cost of debt = 10% * (1- 0.30) = 7%

NPV of lease = 10,000 + (PVAIF 7%, 5yrs * -2280)

= 10,000 + (4.1002 * -2280) = £651.