34.10 Peter plans to buy a holiday villa in five years time for cash. He estimates the cost will be $1.5m. He plans to set aside the same amount of funds each year for 5 years starting immediately earning a rate of 10% interest per annum compound.

To the nearest $100, how much does he need to set aside each year?

A $223,400
B $245,600
C $359,800
D $395,600 **(2 marks)**

(Total = 20 marks)

35 MCQ bank – Allowing for tax and inflation **36 mins**

35.1 SW Co has a 31 December year end and pays corporation tax at a rate of 30%, 12 months after the end of the year to which the cash flows relate. It can claim tax allowable depreciation at a rate of 25% reducing balance. It pays $1m for a machine on 31 December 20X4. SW Co's cost of capital is 10%.

What is the present value on 31 December 20X4 of the benefit of the first portion of tax allowable depreciation?

A $250,000
B $227,250
C $68,175
D $75,000 **(2 marks)**

35.2 A company receives a perpetuity of $20,000 per annum in arrears, and pays 30% corporation tax 12 months after the end of the year to which the cash flows relate.

At a cost of capital of 10%, what is the after tax present value?

A $140,000
B $145,454
C $144,000
D $127,274 **(2 marks)**

35.3 A project has the following projected cash inflows.

Year 1	100,000
Year 2	125,000
Year 3	105,000

Working capital is required to be in place at the start of each year equal to 10% of the cash inflow for that year. The cost of capital is 10%.

What is the present value of the working capital?

A $ Nil
B $(30,036)
C $(2,735)
D $33,000 **(2 marks)**

35.4 AW Co needs to have $100,000 working capital in place immediately for the start of a 2 year project. The amount will stay constant in real terms. Inflation is running at 10% per annum, and AW Co's money cost of capital is 12%.

What is the present value of the cash flows relating to working capital?

A $(21,060)
B $(20,300)
C $(108,730)
D $(4,090) **(2 marks)**

35.5 NCW Co is considering investing $10,000 immediately in a 1 year project with the following cash flows.

Income	$100,000
Expenses	$35,000

The cash flows will arise at the end of the year. The above are stated in current terms. Income is subject to 10% inflation, expenses will not vary. The real cost of capital is 8% and general inflation is 2%.

Using the money cost of capital to the nearest whole %, what is the net present value of the project?

A $68,175
B $60,190
C $58,175
D $78,175 **(2 marks)**

35.6 AM Co will receive a perpetuity starting in 2 years' time of $10,000 per annum, increasing by the rate of inflation (which is 2%).

What is the present value of this perpetuity assuming a money cost of capital of 10.2%?

A $90,910
B $125,000
C $115,740
D $74,403 **(2 marks)**

35.7 FW Co is expecting a net of tax receipt of $10,000 (in real terms) in 1 year's time.

If FW Co expects inflation to increase, what impact will this have on the present value of that receipt?

A Nil
B Reduce
C Increase
D Cannot say **(2 marks)**

35.8 Shadowline Co has a money cost of capital of 10%. If inflation is 4%, what is Shadowline Co's real cost of capital?

A 6%
B 5.8%
C 14%
D 14.4% **(2 marks)**

35.9 Juicy Co is considering investing in a new industrial juicer for use on a new contract. It will cost $150,000 and will last 2 years. Juicy Co pays corporation tax at 30% (as the cash flows occur) and, due to the health benefits of juicing, the machine attracts 100% tax allowable depreciation immediately.

Given a cost of capital of 10%, what is the minimum value of the pre-tax contract revenue receivable in 2 years to recover the net cost of the juicer?

A $150,000
B $105,000
C $127,050
D $181,500 **(2 marks)**

35.10 Which of the following are true about the 'inflation' figure that is included in the money cost of capital?

A It is historic and specific to the business.
B It is historic general inflation suffered by the investors.
C It is expected and specific to the business.
D It is expected general inflation suffered by the investors. **(2 marks)**

(Total = 20 marks)

36 MCQ bank – Project appraisal and risk 18 mins

36.1 Which of the following are true in respect of using expected values in net present value calculations?

1 Appropriate for one-off events
2 Hides risk
3 Probably won't actually occur
4 Eliminates uncertainty

A 1, 2 and 3 only
B 3 and 4 only
C 2 and 3 only
D 1, 2 and 4 **(2 marks)**

36.2 Sales volumes are expected to be either 20,000 units with 60% probability or they are expected to be 25,000 units. Price will either be $10 (0.3 probability) or else $15. Margins are expected to be 30% or 40% of sales with an even chance of each.

What is the expected total cost?

A $103,950
B $193,050
C $297,000
D $105,000 **(2 marks)**

36.3 SAC Co has a cost of capital of 8% and is appraising project Gamma. It has the following cash flows.

T0	Investment	100,000
T1-5	Net cash inflow	40,000

What is the adjusted payback period for this project?

A 2.5 years
B Just under 3 years
C 2 years
D Just over 4 years **(2 marks)**

36.4 A project has the following cash flows.

T0	Outflow	$110,000
T1-4	Inflow	$40,000

At the company's cost of capital of 10% the NPV of the project is $16,800.

Applying sensitivity analysis to the cost of capital, what percentage change in the cost of capital would cause the project NPV to fall to zero.?

A 70%
B 17%
C 5%
D 41% **(2 marks)**

36.5 What is the main advantage of using simulations to assist in investment appraisal?

A A clear decision rule
B More than one variable can change at a time
C Statistically more accurate than other methods
D Being diagrammatic it is easier to understand **(2 marks)**

(Total = 10 marks)

37 MCQ bank – Specific investment decisions 36 mins

37.1 PD Co is deciding whether to replace its delivery vans every year or every other year. The initial cost of a van is $20,000. Maintenance costs would be nil in the first year, and $5,000 at the end of the second year. Second-hand value would fall from $10,000 to $8,000 if it held on to the van for two years instead of just one. PD Co's cost of capital is 10%.

How often should PD Co replace their vans, and what is the annual equivalent cost ('EAC') of that option?

	Replace every	EAC ($)
A	1	10,910
B	1	12,002
C	2	10,093
D	2	8,761

(2 marks)

37.2 Which of the following relate to finance leases as opposed to operating leases?

1 Maintained and insured by the lessor
2 Asset appears on statement of financial position of lessee
3 Equipment leased for a shorter period than its expected useful life

A 2 only
B 1 and 2 only
C 2 and 3 only
D 1 and 3 only

(2 marks)

37.3 AB Co is considering either leasing an asset or borrowing to buy it, and is attempting to analyse the options by calculating the net present value of each. When comparing the two, AB Co is uncertain whether they should include interest payments in their option to 'borrow and buy' as it is a future, incremental cash flow associated with that option. They are also uncertain which discount rate to use in the net present value calculation for the lease option.

How should AB Co treat the interest payments and what discount rate should they use?

	Include Interest?	Discount rate
A	Yes	After tax cost of the loan if they borrow and buy
B	Yes	AB Co's weighted average cost of capital
C	No	After tax cost of the loan if they borrow and buy
D	No	AB Co's weighted after cost of capital

(2 marks)

37.4 Which of the following is always true about capital rationing?

1 A soft constraint is flexible
2 Projects being divisible is an unrealistic assumption

	Statement 1	*Statement 2*
A	True	True
B	True	False
C	False	True
D	False	False

(2 marks)

The following information relates to questions 37.5 and 37.6.

NB Co is faced with an immediate capital constraint of $100 million available to invest.

It is considering investing in 4 divisible projects:

$m	Initial cost	NPV
Project 1	40	4
Project 2	30	5
Project 3	50	6
Project 4	60	5

37.5 What is the NPV generated from the optimum investment programme?

A $11 million
B $13 million
C $9 million
D $15 million **(2 marks)**

37.6 What is the NPV generated from the optimum investment programme if the projects were indivisible?

A $11 million
B $13 million
C $6 million
D $12 million **(2 marks)**

37.7 Which of the following is potentially a benefit to the lessee if they lease as opposed to buy?

A Avoiding tax exhaustion
B Attracting lease customers that may not have been otherwise possible
C Exploiting a low cost of capital
D Potential future scrap proceeds **(2 marks)**

37.8 A professional kitchen is attempting to choose between gas and electricity for its main heat source. Once a choice is made, the kitchen intends to keep to that source indefinitely. Each gas oven has a net present value (NPV) of $50,000 over its useful life of 5 years. Each electric oven has an NPV of $68,000 over its useful life of 7 years. The cost of capital is 8%.

Which should the kitchen choose and why?

A Gas because its average NPV per year is higher than electric
B Electric because its NPV is higher than gas
C Electric because its equivalent annual benefit is higher
D Electric because it lasts longer than gas **(2 marks)**

37.9 Which of the following are typically benefits of a shorter replacement cycle?

1 Higher scrap value
2 Better company image and efficiency
3 Lower annual depreciation
4 Less time to benefit from owning the asset

A 1 and 2 only
B 1 and 3 only
C 1, 2 and 4 only
D 2, 3 and 4 only **(2 marks)**

37.10 Which of the following are potentially practical ways of attempting to deal with a capital constraint?

1 Lease
2 Joint venture
3 Delay one or more of the projects

A 1 and 3 only
B 2 and 3 only
C 1 and 2 only
D 1, 2 and 3 **(2 marks)**

(Total = 20 marks)

38 Calvic Co

27 mins

Cavic Co services custom cars and provides its clients with a courtesy car while servicing is taking place. It has a fleet of 10 courtesy cars which it plans to replace in the near future. Each new courtesy car will cost $15,000. The trade-in value of each new car declines over time as follows:

Age of courtesy car (years)	1	2	3
Trade-in value ($/car)	11,250	9,000	6,200

Servicing and parts will cost $1,000 per courtesy car in the first year and this cost is expected to increase by 40% per year as each vehicle grows older. Cleaning the interior and exterior of each courtesy car to keep it up to the standard required by Cavic's clients will cost $500 per car in the first year and this cost is expected to increase by 25% per year.

Cavic Co has a cost of capital of 10%. Ignore taxation and inflation.

Required

(a) Using the equivalent annual cost method, calculate whether Cavic Co should replace its fleet after one year, two years, or three years. **(10 marks)**

(b) Discuss the causes of capital rationing for investment purposes. **(5 marks)**

(Total = 15 marks)

39 Trecor Co (Specimen paper 2007, amended)

27 mins

Trecor Co plans to buy a new machine to meet expected demand for a new product, Product T. This machine will cost $250,000 and last for four years, at the end of which time it will be sold for $5,000. Trecor Co expects demand for Product T to be as follows:

Year	*1*	*2*	*3*	*4*
Demand (units)	35,000	40,000	50,000	25,000

The selling price for Product T is expected to be $12.00 per unit and the variable cost of production is expected to be $7.80 per unit. Incremental annual fixed production overheads of $25,000 per year will be incurred. Selling price and costs are all in current price terms.

Selling price and costs are expected to increase as follows:

	Increase
Selling price of Product T:	3% per year
Variable cost of production:	4% per year
Fixed production overheads:	6% per year

Other information

Trecor Co has a real cost of capital of 5.7% and pays tax at an annual rate of 30% one year in arrears. It can claim tax allowable depreciation on a 25% reducing balance basis. General inflation is expected to be 5% per year.

Required

Calculate the net present value of buying the new machine and comment on your findings (work to the nearest $1,000). **(15 marks)**

53 Filtrex Co

27 mins

(a) Filtrex Co is a medium-sized, all equity-financed, unquoted company which specialises in the development and production of water- and air-filtering devices to reduce the emission of effluents. Its small but ingenious R & D team has recently made a technological breakthrough which has revealed a number of attractive investment opportunities. It has applied for patents to protect its rights in all these areas. However, it lacks the financial resources required to exploit all of these projects, whose required outlays and post-tax NPVs are listed in the table below. Filtrex's managers consider that delaying any of these projects would seriously undermine their profitability, as competitors bring forward their own new developments. All projects are thought to have a similar degree of risk.

Project	*Required outlay*	*NPV*
	$	$
A	150,000	65,000
B	120,000	50,000
C	200,000	80,000
D	80,000	30,000
E	400,000	120,000

The NPVs have been calculated using as a discount rate the 18% post-tax rate of return which Filtrex requires for risky R & D ventures. The maximum amount available for this type of investment is $400,000, corresponding to Filtrex's present cash balances, built up over several years' profitable trading. Projects A and C are mutually exclusive and no project can be sub-divided. Any unused capital will either remain invested in short-term deposits or used to purchase marketable securities, both of which offer a return well below 18% post-tax.

Required

(i) Advise Filtrex Co, using suitable supporting calculations, which combination of projects should be undertaken in the best interests of shareholders; and

(ii) Suggest what further information might be obtained to assist a fuller analysis. **(9 marks)**

(b) Explain how, apart from delaying projects, Filtrex Co could manage to exploit more of these opportunities. **(6 marks)**

(Total = 15 marks)

54 Warden Co (12/11, amended)

27 mins

Warden Co plans to buy a new machine. The cost of the machine, payable immediately, is $800,000 and the machine has an expected life of five years. Additional investment in working capital of $90,000 will be required at the start of the first year of operation. At the end of five years, the machine will be sold for scrap, with the scrap value expected to be 5% of the initial purchase cost of the machine. The machine will not be replaced.

Production and sales from the new machine are expected to be 100,000 units per year. Each unit can be sold for $16 per unit and will incur variable costs of $11 per unit. Incremental fixed costs arising from the operation of the machine will be $160,000 per year.

Warden Co has an after-tax cost of capital of 11% which it uses as a discount rate in investment appraisal. The company pays profit tax one year in arrears at an annual rate of 30% per year. Tax allowable depreciation and inflation should be ignored.

Required

(a) Calculate the net present value of investing in the new machine and advise whether the investment is financially acceptable. **(7 marks)**

(b) (i) Explain briefly the meaning of the term 'sensitivity analysis' in the context of investment appraisal. **(2 marks)**

(ii) Calculate the sensitivity of the investment in the new machine to a change in selling price and to a change in discount rate, and comment on your findings. **(6 marks)**

(Total = 15 marks)