2023 EXAMINATIONS

Lancaster University

PART II (SECOND AND FINAL YEAR)

ACCOUNTING AND FINANCE

AcF 302 CORPORATE FINANCE

(Duration: 2 hours plus 15 minutes reading)

Answer **ALL** questions from Section A.

Answer **ALL** questions from Section B.

Answer **ONE** question from Section C.

This exam is closed book

A table with the cumulative probabilities of the standard normal distribution is included at the end of the examination paper.

A list of important formulae is included at the end of the examination paper.

The use of standard calculators with scientific, and standard arithmetic and statistical functions, is permitted.

Section A

Section A consists of Questions 1 to 10. Answer **ALL** questions in this section.

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1) Which of the following statements is FALSE?

1. With a constant interest coverage policy, the value of the interest tax shield is proportional to the project's cash flows.
2. When a company has a target leverage ratio and is borrowing to finance a project, if the company's debt is risk free, the interest tax shields on this debt should be discounted using the risk-free interest rate.
3. In the real option context, the strike price of the option corresponds to the current market value of the asset.

A) Statement 2.
B) Statement 3.
C) Statements 2 and 3.
D) Statements 1, 2 and 3.

2) Which of the following statements is FALSE?

1. At-the-money real options have a positive value.
2. In-the-money real options have a positive value.
3. Out-of-the-money real options have a negative value.

A) Statement 1.
B) Statement 3.
C) Statements 1 and 3.
D) Statements 2 and 3.

3) Which of the following statements is TRUE?

1. In the flow-to-equity valuation method, the project's free cash flows are discounted using the equity cost of capital.
2. Firms with a target leverage ratio adjust their leverage to maintain a constant equity-to-value ratio.
3. When a firm has permanent debt, we can discount the interest tax shields using the cost of debt.

A) Statement 1.
B) Statement 2.
C) Statements 2 and 3.
D) Statements 1, 2 and 3.

4) Which of the following statements is FALSE?

A) Researchers have hypothesized that boards with a majority of outside directors are better monitors of managerial effort and actions.
B) Studies have found that firms with independent boards make fewer value-creating acquisitions but are more likely to act in shareholders' interests if targeted in an acquisition.
C) One early study showed that a board was more likely to fire the firm's CEO for poor performance if the board had a majority of outside directors.
D) Although the firm's stock price increases on the announcement of its addition of an independent board member, the increased firm value appears to come from the potential for the board to make better decisions on acquisitions and CEO turnover rather than from improvements in the firm's operating performance.

5) Which of the following statements is FALSE?

A) A public warehouse is a business that exists for the sole purpose of storing and tracking the inflow and outflow of the inventory.
B) A warehouse arrangement is the riskiest collateral arrangement from the standpoint of the lender.
C) Because the warehouser is a professional at inventory control, there is likely to be little loss due to damaged goods or theft, which in turn lowers insurance costs.
D) A field warehouse is operated by a third party, but is set up on the borrower's premises in a separate area so that the inventory collateralizing the loan is kept apart from the borrower's main plant.

6) Which of the following statements is FALSE?

A) The preferred stock issued by young companies typically does not pay regular cash dividends.
B) The preferred stock issued by young companies usually gives the owner an option to convert it into common stock on some future date, so it is often called callable preferred stock.
C) If the company runs into financial difficulties, the preferred stockholders have a senior claim on the assets of the firm relative to any common stockholders.
D) Preferred stock issued by mature companies such as banks usually has a preferential dividend and seniority in any liquidation and sometimes special voting rights.

7) Which of the following statements regarding vertical integration is FALSE?

A) Vertically integrated companies may be large, but unlike other large corporations, since they remain focused in one industry, they are easy to run.
B) A company might not be happy with how its products are being distributed, so it might decide to take control of its distribution channels.
C) A company might conclude that it can enhance its product if it has direct control of the inputs required to make the product.
D) The principal benefit of vertical integration is coordination. By putting two companies under central control, management can ensure that both companies work toward a common goal.

8) Which of the following statements is FALSE?

A) Because investment in permanent working capital is required so long as the firm remains in business, it constitutes a long-term investment.
B) Because temporary working capital represents a short-term need, the firm should finance this portion of its investment with short-term financing.
C) Temporary working capital is the difference between the lowest level of investment in short-term assets and the permanent working capital investment.
D) The matching principle states that short-term needs should be financed with short-term debt and long-term needs should be financed with long-term sources of funds.

9) Which of the following statements is FALSE?

A) In the event of default, the assets not pledged as collateral for outstanding bonds cannot be used to pay off the holders of subordinated debentures until all more senior debt has been paid off.
B) Because more than one debenture might be outstanding, the bondholder's priority in claiming assets in the event of default, known as the bond's seniority, is important.
C) When a firm conducts a subsequent debenture issue that has lower priority than its outstanding debt, the new debt is known as a subordinated debenture.
D) Most debenture issues contain clauses restricting the company from issuing new debt with equal or lower priority than existing debt.

10) Which of the following statements regarding risk arbitrage is FALSE?

A) Once a tender offer is announced, the uncertainty about whether the takeover will succeed reduces the volatility of the stock price. This uncertainty creates an opportunity for investors to speculate on the outcome of the deal without bearing the risk of volatility.
B) Traders known as risk-arbitrageurs, who believe that they can predict the outcome of a deal, take positions based on their beliefs.
C) A potential profit arises from the difference between the target's stock price and the implied offer price, and is referred to as the merger-arbitrage spread.
D) It is not true arbitrage because there is a risk that the deal will not go through. If the takeover did not ultimately succeed, the risk-arbitrageur would eventually have to unwind his position at whatever market prices prevailed.

(3 marks for each question)

(Total 30 marks)

Section B

Answer **ALL** questions in this section.

Question 11

Minajet plc is considering a project that will contribute £4 million in free cash flows the first year, growing by 3% per year thereafter. The project will cost £30 million. Minajet has an equity cost of capital of 12% and a debt cost of capital of 6%. The firm maintains a constant debt-to-equity ratio of 50%. Minajet's corporate tax rate is 21%; the tax rate on interest income is 24%; and the tax rate on equity income is 20%.

REQUIRED:

a) Calculate the NPV of the project using both the Weighted Average Cost of Capital (WACC) method and the Adjusted Present Value (APV) method.

(10 marks)

b) Suppose that Deltajet, a company operating in the same industry as Minajet, is all equity financed. Deltajet has an equity cost of capital of 11% and a current market capitalization of £85 million. The company's free cash flows are expected to grow at 2% per year forever. The management of the company has decided to add debt for the first time to its capital structure and to maintain a 25% debt-to-value ratio going forward. Deltajet's corporate tax rate is 21%; the tax rate on interest income is 24%; and the tax rate on equity income is 20%. If Deltajet's debt cost of capital is 6%, what will Deltajet's levered value be?

(5 marks)

Question 12

You founded your own firm four years ago. You initially contributed £350,000 of your own money and in return you received 3 million shares of stock. Since then, you have sold an additional 400,000 shares of stock to angel investors. You are now considering raising capital from a venture capital firm. This venture capital firm would invest £3.2 million and would receive 1.2 million newly issued shares in return.

REQUIRED:

a) What is the post-money valuation of your firm?

(4 marks)

b) What percentage of the firm will the venture capitalist own?

(2 marks)

c) Suppose that there is an additional round of financing. In that round, a new venture capitalist invests £4.5 million and receives 1.5 million newly issued shares in return. What is the pre-money valuation of your firm after this financing round?

(4 marks)

Question 13

BigBuy plc has earnings per share of £2. It has 9 million shares outstanding and is trading at £19 per share. BigBuy plc is thinking of buying Poundrealm, which has earnings per share of £1.25, 5.2 million shares outstanding, and a price per share of £13. BigBuy plc will pay for Poundrealm by issuing new shares. There are no expected synergies from the transaction. If BigBuy plc offers an exchange ratio such that, at current pre-announcement share prices for both firms, the offer represents a 22% premium to buy Poundrealm,

REQUIRED:

a) Calculate the price per share of the combined corporation after the merger.

(5 marks)

b) What is the price per share of the BigBuy plc immediately after the announcement?

(1 mark)

c) What is the price per share of the target company immediately after the announcement?

(2 marks)

d) What is the actual premium the bidder will pay?

(2 marks)

(Total 35 marks)

Section C

Answer **EITHER** Question 14 **OR** Question 15.

Answer all parts of the chosen question.

Question 14

a) Galaxy Industries is considering a new project. The project may begin today or in exactly three years. The project will cost £12 million to start today. There is a 60% chance that the cost of starting the project in three years will be the same and a 40% chance that the cost will increase by 10%. You expect the project to generate £1,000,000 in free cash flow per year forever. The risk-free rate is 5%. The appropriate cost of capital for this project is 10%. The variance of the project's cash flows is 16%. What should the company do with this project?

(10 marks)

b) Martin House has earnings per share (EPS) of £3.50, 5 million shares outstanding, and a share price of £30. Martin House is considering buying Home Developments, which has earnings per share of £2.00, 1.5 million shares outstanding, and a share price of £20. Martin House will pay for Home Developments by issuing new shares. There are no expected synergies from the transaction.

REQUIRED:

i. If Martin House pays no premium to acquire Home Developments, what will the earnings per share be after the merger?

(5 marks)

ii. Assume that Martin House pays no premium to acquire Home Developments. Calculate Martin House's price-earnings (P/E) ratio **both pre- and post-merger**.

(3 marks)

c) Taggart Transcontinental needs a $100,000 loan for the next 30 days. Taggart has three alternatives available:

Alternative #1: Forgo the discount on its trade credit agreement that offers terms of 2/5 net 35.

Alternative #2: Borrow the money from Bank A, which has offered to lend the firm all the funds required for one month at an APR of 9%. The bank will require a (no-interest) compensating balance of 10% of the face-value of the loan and will charge a $200 loan origination fee, which means that Taggart must borrow even more than the $100,000 they need.

Alternative #3: Borrow the money from Bank B, which has offered to lend the firm all the funds needed for one month at an APR of 12%. The loan has a 1% origination fee.

REQUIRED:

i. Calculate the effective annual rate of the three alternatives.

(6 marks)

ii. Which of the three alternatives should you choose to fund your financial needs? Why?

(2 marks)

iii. How would your answer change if you could borrow no more than $100,000 from each of the alternatives?

(4 marks)

d) Do convertible bonds have a higher or lower yield than otherwise identical bonds without the option to convert? Why?

(5 marks)

Question 15

a) Matrix Innovations has just invented a new type of e-reader; the company has given the go ahead to try to produce it commercially. It will take five years to find out whether the e-reader is commercially viable, and they estimate that the risk-neutral probability of the development stage being successful is 30%. Development will cost £10 million per year, paid at the beginning of each year. If development is successful and they decide to produce the e-reader, a factory will be built immediately. The factory will cost £1,000 million to put in place and will generate cash flows of £70 million at the end of every year in perpetuity (i.e., first cash flow at t=6). The current five-year risk-free interest rate is 9% per year. Assume that the yield on a perpetual risk-free bond will either be 8.5%, 7.5%, 6.5%, 5.5% or 4.5% in five years and that the risk-neutral probability of each possible rate is the same. The company has the option to sell the e-reader prototype to a competitor for £300 million in year 5 if the development stage is successful. They can sell the prototype for £10 million if the development stage is not successful. What is the NPV of this project today?

(10 marks)

b) Your firm is considering purchasing or leasing a new HGV for delivery of frozen food. The purchase price of the HGV is £75,000. If you lease the HGV, annual payments will be £17,000, with the first of four payments due today. The firm's pre-tax borrowing cost is 8% and the effective tax rate is 22%.

Consider the following cash flows:

	Year				
	0	1	2	3	4
FCF_Buy	-75000	5250	5250	5250	5250
FCF_Lease	-17000	-17000	-17000	-17000	

REQUIRED:

i. If this is a true tax lease, decide if the firm should buy or lease the HGV. Show all your calculations and explain your decision.

(5 marks)

ii. If this is a non-tax lease (and the FCF of buying and leasing were correct), should the firm buy or lease the truck? Show all your calculations and explain your decision.

(5 marks)

c) Discuss the role of takeovers in corporate governance.

(5 marks)

d) In the context of seasoned equity offerings, explain the difference between a cash offer and a rights offer.

(5 marks)

e) Describe the four types of public debt that companies typically issue.

(5 marks)

(Total 35 marks)

END OF PAPER

Formula Sheet

Present value of a perpetuity

$$PV = \frac{C}{r}$$

Present value of a growing perpetuity

$$PV = \frac{C_1}{r - g}$$

Present value of an annuity

$$PV = \frac{C}{r}\left(1 - \frac{1}{(1+r)^T}\right)$$

Present value of an annuity due

$$PV = C\left(1 + \frac{1}{r}\left(1 - \frac{1}{(1+r)^{T-1}}\right)\right)$$

Effective annual rate

$$EAR = \left(1 + \frac{i}{m}\right)^m - 1$$

Weighted Average Cost of Capital

$$r_{wacc} = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D (1 - \tau_c)$$

Project-based WACC

$$r_{wacc} = r_U - d\tau_c r_D$$

Project-based WACC with Annual Debt Adjustment

$$r_{wacc} = r_U - d\tau_c r_D \frac{1 + r_U}{1 + r_D}$$

Unlevered Cost of Capital

$$r_U = \frac{E}{E+D} r_E + \frac{D}{E+D} r_D$$

Cost of Equity

$$r_E = r_U + \frac{D}{E}(r_U - r_D)$$

Debt Capacity

$$D_t = d \times V_t^L$$

Adjusted Present Value

$$V^L = APV = V^U + PV(\text{Interest Tax Shield})$$

Free Cash Flow to Equity

$$FCFE = FCF - (1 - \tau_c) \times (\text{Interest Payments}) + (\text{Net Borrowing})$$

Free Cash Flow

$$FCF = EBIT(1 - \tau_c) + Depreciation - Capex - \Delta NWC$$

Levered Value with a Constant Interest Coverage Ratio

$$V_L = (1 + \tau_c k)V_U$$

Annually Adjusted Debt

$$PV(\tau_c \times Int_t) = \frac{\tau_c \times Int_t}{(1 + r_U)^{t-1}(1 + r_D)} = \frac{\tau_c \times Int_t}{(1 + r_U)^t} \times \left(\frac{1 + r_U}{1 + r_D}\right)$$

$$r_{wacc} = r_U - d\,\tau_c\, r_D \frac{1 + r_U}{1 + r_D}$$

Personal Taxes

$$\tau^* = 1 - \frac{(1 - \tau_c)(1 - \tau_e)}{(1 - \tau_i)}$$

$$r_D^* \equiv r_D \frac{(1 - \tau_i)}{(1 - \tau_e)}$$

Unlevered Cost of Capital (CAPM)

$$r_U = r_f + \beta_U(E[R_{mkt}] - r_f)$$

Black-Scholes Formula

$$C = S^x N(d_1) - PV(K)N(d_2)$$

$$d_1 = \frac{\ln[S^x/PV(K)]}{\sigma\sqrt{T}} + \frac{\sigma\sqrt{T}}{2}$$

$$d_2 = d_1 - \sigma\sqrt{T}$$

Failure Cost Index

$$\text{FCI} = \frac{1 - PV(\text{success})}{PV(\text{investment})}$$

Leasing

PV(Lease payments) = Price of the Asset – PV(residual value of the asset)

$FCF(Buy)_t$ = - $CapEx_t$ + $Depreciation\ tax\ shield_t$

$FCF(Lease)_t$= - $Lease\ payments_t$ + $Income\ tax\ savings_t$

$Incremental\ free\ cash\ flow_t$ = FCF (Lease – Buy)$_t$ = $FCF(Lease)_t$ – $FCF(Buy)_t$

Lease equivalent loan = PV ($FCF(Lease – Buy)_1$ + …+ $FCF(Lease – Buy)_T$)

Valuation and the takeover process

Amount Paid = Target's Pre-Bid Market Cap. + Acquisition Premium

Value Acquired = Target stand alone value + PV(Synergies)

$$Exchange\ ratio = \frac{x}{N_T} < \frac{P_T}{P_A}\left(1 + \frac{S}{T}\right)$$

Cumulative probability [$N(d)$] that a normally distributed variable will be less than d standard deviations above the mean.

d	0	0.01	0.02	0.03	0.04	0.05	0.06	0.07	0.08	0.09
0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952