Version OC/6.1 WITH ANSWERS

EGT3
ENGINEERING TRIPOS PART IIB

Thu 8 May 2025 9:30am–11:10am

Module 4E6

ACCOUNTING AND FINANCE

Answer not more than two questions.

Answer not more than one question from each section.

All questions carry the same number of marks.

The approximate percentage of marks allocated to each part of a question is indicated in the right margin.

*Write your candidate number **not** your name on the cover sheet.*

STATIONERY REQUIREMENTS
Single-sided script paper

SPECIAL REQUIREMENTS TO BE SUPPLIED FOR THIS EXAM
Engineering Data Book
CUED approved calculator allowed

10 minutes reading time is allowed for this paper at the start of the exam.

You may not start to read the questions printed on the subsequent pages of this question paper until instructed to do so.

You may not remove any stationery from the Examination Room.

Version OC/6.1 WITH ANSWERS

SECTION A

*Answer not more than **one** question from this section*

1 Financial Statements and Accrual Accounting. The following transactions occurred for a newly formed consulting firm during its first year of operations:

(i) The owner invested £50,000 in cash to start the business.

(ii) The firm purchased office furniture for £10,000, paying £4,000 in cash and financing the rest with a loan.

(iii) The firm provided consulting services worth £20,000. Clients paid £12,000 immediately, while the rest remains unpaid.

(iv) The firm incurred salaries and other expenses totaling £7,000, of which £5,500 was paid immediately.

(v) The firm declared and paid a £3,000 dividend to the owner.

Using this information, answer the following items:

(a) Prepare **journal entries** for each transaction by filling up Table 1. Assume no depreciation, no sales returns & allowances, no interest, and no taxes. [15%]

(b) Prepare **T-accounts** consolidating each account present in the journal entries, except for Owner's Equity. Tag each entry with its corresponding item number, e.g., **i:** £50,000 for recording the receipt of cash from the owner. [15%]

(c) Prepare an **Income Statement** for the first year and the Owner's Equity T-account. [15%]

(d) Prepare a **Balance Sheet** at the end of the first year. [15%]

(e) Prepare a **Statement of Cash Flows** for the first year. [15%]

(cont.

(f) Explain the difference between **cash accounting** and **accrual accounting**. Which one better represents firm performance? Explain why. [25%]

Table 1

Item	**Account**	**Debit (£)**	**Credit (£)**
i			
ii			
iii			
iv			
v			

(a)

Item	Account	Debit (£)	Credit (£)
i	Cash	50,000	
	Owner's Capital		50,000
ii	Office Furniture	10,000	
	Cash		4,000
	Loan Payable		6,000
iii	Accounts Receivable	8,000	
	Cash	12,000	
	Consulting Revenue		20,000
iv	Salaries Expense	7,000	
	Cash		5,500
	Salaries Payable		1,500
v	Owner's Capital	3,000	
	Cash		3,000
OR			
v	Owner's Capital	3,000	
	Dividends payable		3,000
	Dividends payable	3,000	
	Cash		3,000

(cont.

(b).

Cash

Debit (Dr)	Credit (Cr)
i: £50,000	
iii: £12,000	
	ii: £4,000
	iv: £5,500
	v: £3,000
£49,500	

Loans payable

Debit (Dr)	Credit (Cr)
	ii: £6,000
	£6,000

Office Furniture (PP&E)

Debit (Dr)	Credit (Cr)
ii: £10,000	
£10,000	

Accounts Receivable

Debit (Dr)	Credit (Cr)
iii: £8,000	
£8,000	

Salaries Expenses

Debit (Dr)	Credit (Cr)
iv: £7,000	
£7,000	

Salaries Payable

Debit (Dr)	Credit (Cr)
	iv: 1,500
	£1,500

Revenue	
Debit (Dr)	**Credit (Cr)**
	iii: £20,000
	£20,000

(c).

Income Statement	
Revenue	**Amount (£)**
Consulting Revenue	20,000
Expenses	
Salaries Expense	7,000
Net Income	13,000

Owner's Equity	
Debit (Dr)	**Credit (Cr)**
	i: £50,000
	Retained Earnings: £13,000
v: £3,000	
	£60,000

(d).

Assets	**Amount (£)**
Cash	49,500
Accounts Receivable	8,000
Office Furniture (PP&E)	10,000
Total Assets	67,500
Liabilities	
Salaries Payable	1,500
Loan Payable	6,000
Total Liabilities	7,500
Owner's Equity	
Owner's Capital	60,000
Total Liabilities and Equity	67,500

(cont.

(e) Either the indirect or direct methods are acceptable.

Statement of Cash Flows	
Cash Flows from Operating Activities	**Amount (£)**
Net Income	13,000
Adjustments for Non-Cash Transactions:	
Increase in Accounts Receivable	(8,000)
Increase in Salaries Payable	1,500
Net Cash Provided by Operating Activities	6,500
Cash Flows from Investing Activities	
Purchase of Office Furniture	(10,000)
Net Cash Used in Investing Activities	(10,000)
Cash Flows from Financing Activities	
Owner's Capital Contribution	50,000
Loan Payable	6,000
Dividends Paid	(3,000)
Net Cash Provided by Financing Activities	53,000
Net Increase in Cash	49,500
Cash at Beginning of the Year	0
Cash at End of the Year	49,500

Statement of Cash Flows	
Cash Flows from Operating Activities	**Amount (£)**
Cash Received from Customers	12,000
Cash Paid for Salaries	(5,500)
Net Cash Provided by Operating Activities	6,500
Cash Flows from Investing Activities	
Purchase of Office Furniture	(10,000)
Net Cash Used in Investing Activities	(10,000)
Cash Flows from Financing Activities	
Owner's Capital Contribution	50,000
Loan Payable	6,000
Dividends Paid	(3,000)
Net Cash Provided by Financing Activities	53,000
Net Increase in Cash	49,500
Cash at Beginning of the Year	0
Cash at End of the Year	49,500

(f)
In Cash Accounting transactions are recorded only when cash is received or paid. Revenue is recognized when cash is collected, and expenses are recorded when payments are made. In Accrual Accounting transactions are recorded when they are incurred, regardless of cash flow. Revenue is recognized when it is earned, even if payment is pending, and expenses are recognized when they are incurred, even if they have not yet been paid. Accrual accounting provides a better representation of firm performance because it matches revenues with the expenses incurred to generate those revenues, providing a more accurate picture of profitability. It avoids distortions that can arise from the timing of cash flows and is preferred under US Generally Accepted Accounting Principles (US GAAP) and International Financial Reporting Standards (IFRS).

2 Revenue Recognition and Fraud Detection. A software company, *CUEDSolutions Ltd*, sells a bundled product consisting of a software license, ongoing technical support, and software updates. Customers pay £1,200 upfront for a one-year package. The company records the full £1,200 as revenue in the month of purchase. Recently, auditors raised concerns about *CUEDSolutions Ltd*'s financial statements, suspecting aggressive revenue recognition.

(a) Explain the **principles of revenue recognition** and assess whether *CUEDSolutions Ltd* is correctly applying them. [20%]

(b) How should *CUEDSolutions Ltd* allocate the revenue from the bundled product over time? Provide an example of a **proper revenue recognition allocation**. Explain your assumptions for the proposed allocation. [40%]

(c) Discuss how improper revenue recognition can be used to **manipulate financial statements** and list at least three warning signs that auditors or investors should look for. [40%]

(a)
Revenue should be recognized when it is earned and realizable. Thus, the company must have delivered the goods or provided the services and the amount of revenue must be measurable and collectible with reasonable certainty. In the case of *CUEDSolutions Ltd*, recognizing the full £1,200 upfront is incorrect because services are provided over a year.

(b)
Instead of recording £1,200 upfront, *CUEDSolutions Ltd* should allocate revenue based on the standalone selling prices of each component. Example allocation (the amounts are estimated based on the price of the standalone product and services subject to an allocation ratio.):

•£600 for the software license (Recognized immediately)

•£300 for technical support (Recognized monthly over 12 months, since the support is provided for one year)

•£300 for software updates (Recognized monthly over 12 months, since updates are provided for one year)

(c)
Overstating revenue by recognizing it too early inflates net income and misleads investors. One could also understate revenue as a buffer for the next year; managers can delay revenue recognition or manipulate the allowance for doubtful accounts (AFDA) to achieve this. Warning signs for auditors and investors include:

(a) Unusually high revenue growth compared to competitors.

(b) Disproportionate increases in receivables relative to sales.

(c) Changes in the method to estimate AFDA.

(d) Changes in revenue recognition policies.

(e) Related party transactions.

SECTION B

*Answer not more than **one** question from this section*

3 (a) At the end of June 2001, the yield to maturity on U.S. government bonds maturing in 2006 was about 4.8 percent.

(i) Value a bond with a 6 percent coupon maturing in June 2006. The bond's face value is \$10,000. Assume annual coupon payments and annual compounding. [20%]

(ii) How does your answer change if the bond has semi-annual coupons and a semi-annual discount rate of 2.4 percent? [20%]

(iii) For both cases, calculate and discuss how the bond's value would change if interest rates fell to 3.5 percent per year? [20%]

(i)

$$PV = \sum_{t=1}^{5} \frac{\$600}{1.048^t} + \frac{\$10{,}000}{1.048^5} = \$10,522.42$$

(ii)

$$PV = \sum_{t=1}^{10} \frac{\$300}{1.024^t} + \frac{\$10{,}000}{1.024^{10}} = \$10,527.85$$

(iii)

$$PV = \sum_{t=1}^{5} \frac{\$600}{1.035^t} + \frac{\$10{,}000}{1.035^5} = \$11,128.76$$

$$PV = \sum_{t=1}^{10} \frac{\$300}{1.0175^t} + \frac{\$10{,}000}{1.0175^{10}} = \$11,137.65$$

(b) A two-year bond pays a coupon rate of 10 percent and has a face value of \$1,000. If the bond is initially sold for \$960, what is its approximate yield to maturity? Explain. Hint: This may require some trial-and-error calculations. [40%]

Using trial and error:

At $r = 12\% \longrightarrow PV = \sum_{t=1}^{2} \frac{\$100}{1.12^t} + \frac{\$1{,}000}{1.12^2} = \$966.20$

At $r = 13\% \longrightarrow PV = \sum_{t=1}^{2} \frac{\$100}{1.13^t} + \frac{\$1{,}000}{1.13^2} = \$949.96$

At $r = 12.5\% \longrightarrow PV = \sum_{t=1}^{2} \frac{\$100}{1.125^t} + \frac{\$1{,}000}{1.125^2} = \$958.02$

At $r = 12.4\% \longrightarrow PV = \sum_{t=1}^{2} \frac{\$100}{1.124^t} + \frac{\$1{,}000}{1.124^2} = \$959.65$

Therefore, the yield to maturity is approximately 12.4%.

4 A widget manufacturer currently produces 200,000 units a year. It buys widget lids from an outside supplier at a price of \$2 a lid. The plant manager believes that it would

be cheaper to make these lids rather than buy them. Direct production costs are estimated to be $1.50 a lid. The necessary machinery would cost $150,000. This investment could be written off for tax purposes using the eight-year tax depreciation schedule given below. The plant manager estimates that the operation would require additional working capital of $30,000 but argues that this sum can be ignored since it is recoverable at the end of the 10 years. The company pays tax at a rate of 35 percent and the opportunity cost of capital is 15 percent.

(a) Calculate the NPV if the company continues to buy the lids from an outside supplier. [20%]

(b) Calculate the NPV if the company decides to make the lids in-house rather than buy them. [60%]

(c) Discuss which option would be advisable for the company to pursue. [20%]

Use the Tax Depreciation Schedule in Table 2. State clearly any additional assumptions that you need to make.

Table 2

1	2	3	4	5	6	7	8
14.29%	24.49%	17.49%	12.49%	8.93%	8.93%	8.93%	4.45%

(cont.

Assume the following:

•The firm will manufacture widgets for at least 10 years.

•There will be no inflation or technological change.

•The 15 percent cost of capital is appropriate for all cash flows and is a real, after-tax rate of return.

•All operating cash flows occur at the end of the year.

Note: Since purchasing the lids can be considered a one-year 'project,' the two projects have a common chain life of 10 years.
Compute NPV for each project as follows:

(a)

$$\text{NPV(purchase)} = -\sum_{t=1}^{10} \frac{(2 \times 200,000) \times (1 - 0.35)}{1.15^t} = -\$1,304,880$$

(b)

$$\begin{aligned}\text{NPV(make)} = &-150,000 - 30,000 - \sum_{t=1}^{10} \frac{(1.50 \times 200,000) \times (1 - 0.35)}{1.15^t} \\ &+ [0.35 \times 150,000] \times \left(\frac{0.1429}{1.15^1} + \frac{0.2449}{1.15^2} + \frac{0.1749}{1.15^3} + \frac{0.1249}{1.15^4} \right. \\ &\left. + \frac{0.0893}{1.15^5} + \frac{0.0893}{1.15^6} + \frac{0.0893}{1.15^7} + \frac{0.0445}{1.15^8} \right) + \frac{30,000}{1.15^{10}} \\ = &-\$1,118,328\end{aligned}$$

(c)
Thus, the widget manufacturer should make the lids.

Please note students will be expected to show the steps in their calculations, which include:

•Calculate the after-tax cost of buying the lids

•Take into account the capital expenditure in year 0

•Take into account the working capital requirement injected in year 0

•Calculate the after-tax cost of making the lids

•Calculate the depreciation tax shields using the capital expenditure, the tax rate and the depreciation schedule provided

•Take into account the recovery of the working capital at the end of the project

•Use the appropriate discounting to calculate the present values

END OF PAPER