Answers

Section C

31   Tin Co

(a)   Financial statement data

	$000
Profit before interest and tax	1,597
Finance costs (interest)	(315)
Taxation	(282)
Profit after tax	1,000
Equity	
Ordinary shares	2,500
Retained earnings	5,488
Long-term liabilities	
7% loan notes	4,500
Total equity and long-term liabilities	12,488

Other information

Current share price ($/share)	5·00
Rights issue discount (%)	20
Current EPS ($/share) (given)	0·40
Current PER (times) (given)	12·5

(i)   Rights issue price ($/share)   4·00
         TERPS ($/share)   4·83   [(5 x $5) + (1 x $4)]/6

(ii)

	$000
Increased PBIT	1,916
Finance costs (interest)	(315)
Revised profit before tax	1,601
Taxation at 22%	(352)
Revised profit after tax	1,249
Increased number of shares	3,000,000
Revised EPS ($/share) using equity	0·42 (1,249/3,000)

(iii)

	$000
Increased PBIT	1,916
Finance costs (interest)	(475) (= 315 + 160)
Revised profit before tax	1,441
Taxation at 22%	(317)
Revised profit after tax	1,124
Current number of shares	2,500,000
Revised EPS ($/share) using debt	0·45 (1,124/2,500)

(iv)   Revised share prices ($/share)

Using equity = 12·5 x 0·42 =   5·25
Using debt = 12·5 x 0·45 =   5·63

(v)   Discussion

Gearing
Current D/E using BV = 4,500/(2,500 + 5,488) = 4,500/7,988 = 56·3%
Equity finance D/E using BV = 4,500/(7,988 + 2,000) = 4,500/9,988 = 45·1%
Debt finance D/E using BV = (4,500 + 2,000)/7,988 = 6,500/7,988 = 81·4%
Sector average D/E using BV = 60·5%

The gearing of Tin Co at 56·3% is just below the sector average gearing of 60·5%. If equity finance were used, gearing would fall even further below the sector average at 45·1%. If debt finance were used, gearing would increase above the sector average to 84·4%.

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Interest cover
Current interest cover $= 1{,}597/315 = 5{\cdot}1$ times
Interest cover using equity finance $= 1{,}916/315 = 6{\cdot}1$ times
Interest cover using debt finance $= 1{,}916/475 = 4{\cdot}0$ times
Sector average interest cover $= 9$ times

Interest cover calculations show that raising equity finance would make the interest cover of Tin Co look much safer. Interest cover of $4{\cdot}0$ times looks quite risky.

Share price changes
The shareholders of Tin Co experience a capital gain of $0·63 per share ($5·63 – $5·00) if debt finance is used, compared to a capital gain of $0·42 per share ($5·25 – $4·83) if equity finance is used. Although using debt finance looks more attractive, it comes at a price in terms of increased financial risk. It might be decided, on balance, that using equity finance looks to be the better choice.

(b) The forms of Islamic finance equivalent to a rights issue and a loan note issue are mudaraba and sukuk respectively. Musharaka is similar to venture capital and hence is not seen as equivalent to a rights issue, which is made to existing shareholders. Ijara, which is similar to lease finance, might be an alternative to a loan note issue, depending on the nature of the planned business expansion.

Mudaraba
A mudaraba contract is between a capital partner (rab al mal) and an expertise partner (mudarab) for the undertaking of business operations. The business operations must be compliant with Sharia'a law and are run on a day-to-day basis by the mudarab. The rab al mal has no role in relation to the day-to-day operations of the business.

Profits from the business operations are shared between the partners in a proportion agreed in the contract. Losses are borne by the rab al mal alone, as provider of the finance, up to the limit of the capital provided.

Sukuk
Conventional loan notes are not allowed under Sharia'a law because there must be a link to an underlying tangible asset and because interest (riba) is forbidden by the Quran. Sukuk are linked to an underlying tangible asset, ownership of which is passed to the sukuk holders, and do not pay interest.

Since the sukuk holders take on the risks and rewards of ownership, sukuk also has an equity aspect. As owners, sukuk holders will bear any losses or risk from the underlying asset. In terms of rewards, sukuk holders have a right to receive the income generated by the underlying asset and have a right to dismiss the manager of the underlying asset, if this is felt to be necessary.

Ijara
In this form of Islamic finance, the lessee uses a tangible asset in exchange for a regular rental payment to the lessor, who retains ownership throughout the period of the lease contract. The contract may allow for ownership to be transferred from the lessor to the lessee at the end of the lease period.

Major maintenance and insurance are the responsibility of the lessor, while minor or day-to-day maintenance is the responsibility of the lessee. The lessor may choose to appoint the lessee as their agent to undertake all maintenance, both major and minor.

32 Copper Co

(a) (i) ENPV calculation

Year	PV of Y1 CF $000	prob	PV of Y2 CF $000	prob	Total PV $000	joint prob	PV x JP $000	NPV $000
PV of cash flow 1	893	0·1	1,594	0·3	2,487	0·03	74·6	(1,013)
			2,391	0·6	3,284	0·06	197·0	(216)
			3,985	0·1	4,878	0·01	48·8	1,378
PV of cash flow 2	1,786	0·5	1,594	0·3	3,380	0·15	507·0	(120)
			2,391	0·6	4,177	0·30	1,253·1	677
			3,985	0·1	5,771	0·05	288·6	2,271
PV of cash flow 3	2,679	0·4	1,594	0·3	4,273	0·12	512·8	773
			2,391	0·6	5,070	0·24	1,216·8	1,570
			3,985	0·1	6,664	0·04	266·6	3,164
						Sum of PV	4,365	
						Investment	(3,500)	
						ENPV =	865	

Workings

Year	1	PV	2	PV
Cash flow 1	1,000	893	2,000	1,594
Cash flow 2	2,000	1,786	3,000	2,391
Cash flow 3	3,000	2,679	5,000	3,985

(ii)	Negative NPV probability	24%	Sum of joint probabilities with negative NPVs
(iii)	Most likely outcome ($000)	677·0	Highest joint probability

(iv) Comment

The mean (expected) NPV is positive and so it might be thought that the proposed investment is financially acceptable. However, the mean (expected) NPV is not a value expected to occur because of undertaking the proposed investment, but a mean value from undertaking the proposed investment many times. There is no clear decision rule associated with the mean (expected) NPV.

A decision on financial acceptability must also consider the risk (probability) of a negative NPV being generated by the investment. At 24%, this might appear too high a risk to be acceptable. The risk preferences of the directors of Copper Co will inform the decision on financial acceptability; there is no decision rule to be followed here.

(b) Simulation

Simulation is a computer-based method of evaluating an investment project whereby the probability distributions associated with individual project variables and interdependencies between project variables are incorporated.

Random numbers are assigned to a range of different values of a project variable to reflect its probability distribution. Each simulation run randomly selects values of project variables using random numbers and calculates a mean (expected) NPV.

A picture of the probability distribution of the mean (expected) NPV is built up from the results of repeated simulation runs. The project risk can be assessed from this probability distribution as the standard deviation of the expected returns, together with the most likely outcome and the probability of a negative NPV.

Adjusted payback

If risk and uncertainty are considered to be the same, payback can be used to adjust for risk and uncertainty in investment appraisal.

As uncertainty (risk) increases, the payback period can be shortened to increase the emphasis on cash flows which are nearer to the present time and hence less uncertain. Conversely, as uncertainty (risk) decreases, the payback period can be lengthened to decrease the emphasis on cash flows which are nearer to the present time.

Discounted payback adjusts for risk in investment appraisal in that risk is reflected by the discount rate employed. Discounted payback can therefore be seen as an adjusted payback method.

Risk-adjusted discount rates

The risk associated with an investment project can be incorporated into the discount rate as a risk premium over the risk-free rate of return.

The risk premium can be determined on a subjective basis, for example, by recognising that launching a new product is intrinsically riskier than replacing an existing machine or a small expansion of existing operations.

The risk premium can be determined theoretically by using the capital asset pricing model in an investment appraisal context. A proxy company equity beta can be ungeared and the resulting asset can be regeared to reflect the financial risk of the investing company, giving a project-specific equity beta which can be used to find a project-specific cost of equity or a project-specific discount rate.

(Examiner note: Only two methods were required to be discussed.)

				Marks	*Marks*
Section C					
31	**(a)**	**(i)**	Rights issue price	1	
			TERP	1	
					2
		(ii)	Increased PBIT	0·5	
			Revised PBT	0·5	
			Revised PAT	1	
			Number of shares	1	
			Revised EPS	1	
					4
		(iii)	Increased interest	1	
			Revised PAT	1	
			Revised EPS	1	
					3
		(iv)	Equity share price	0·5	
			Debt share price	0·5	
					1
		(v)	Financial analysis	1	
			Gearing	1	
			Interest cover	1	
			Share price effects	1	
					4
	(b)		First finance source	2	
			Second finance source	2	
			Additional detail	2	
					6
					20
32	**(a)**	**(i)**	Initial PVs	1	
			Total PVs	2	
			CF1 Joint prob	1	
			CF2 Joint prob	1	
			CF3 Joint prob	1	
			ENPV	2	
					8
		(ii)	Negative NPV prob		1
		(iii)	Most likely NPV		1
		(iv)	Comment on ENPV	1	
			Comment on risk	1	
					2
	(b)		First method	4	
			Second method	4	
					8
					20

F9 Examiner's commentary on March/June 2018 sample questions

This commentary has been written to accompany the published sample questions and answers and is written based on the observations of markers. The aim is to provide constructive guidance for future candidates and their tutors, giving insight into what the marking team is looking for, and flagging pitfalls encountered by candidates who sat these questions.

Question 31(a)(i)

The scenario was that a company needed to evaluate equity finance from a rights issue and debt finance from a loan note issue as financing sources for a planned business expansion. The five parts of this question are the successive stage of this evaluation. This first question asked candidates to calculate the theoretical ex rights price per share (TERPS).

Some candidates made errors with respect to the form of the rights issue, for example using 'five for one' rather than the 'one for five' form given in the question. Some candidates could not calculate the rights issue price correctly. Some candidates wasted valuable time by calculating values that had not been requested, such as the monetary value of the rights per existing share.

Question 31(a)(ii)

This question asked candidates to calculate the revised earnings per share (EPS) if equity finance were used.

Better candidates understood how to calculate the revised profit after tax (PAT) for the business expansion by calculating revised figures for profit before interest and tax (PBIT), and for tax, then dividing PAT by the revised number of shares.

Errors that were made included:

- Not recalculating the tax, even after increasing PBIT, with interest unchanged
- Not increasing PBIT for the business expansion
- Miscalculating the revised number of shares.

One error that was particularly surprising was where candidates used retained earnings from the statement of financial position instead of PBIT from the statement of profit or loss as the basis for their calculations, suggesting a poor understanding of financial statements. F9 candidates are expected to have a good applied knowledge of ratio analysis and financial statement analysis, and candidates should review their understanding of all financial ratios in preparing for the examination.

Question 31(a)(iii)

This question asked candidates to calculate the revised earnings per share (EPS) if debt finance were used.

Better candidates understood the need to calculate the increased PBIT, subtract from this figure the increased interest charge (on both existing debt and new debt) to give a revised PBT, calculate revised tax and revised PAT, then divide by the current number of shares.

Errors made by candidates, mirroring those in the previous question, included:

- Miscalculating the increased interest charge
- Not recalculating tax having increased PBIT
- Using the number of shares for a rights issue instead of the current number of shares.

Question 31(a)(iv)

This question required candidates to calculate revised share prices under the two financing choices.

Candidates could reasonably assume that the price/earnings ratio (PER) of the company would be constant since the expansion was of existing business operations and so the company's business risk would not change. Candidates could then multiply the already-calculated EPS figures by the existing PER to give the revised share prices.

Candidates in general were able to calculate the revised share prices, although some candidates only calculated one share price and some candidates calculated net asset value (NAV) per share in the belief that was the required share price.

A general point about the first four questions is that the required calculations could all be practised in revising for the examination.

Question 31(a)(v)

This question required candidates to use calculations to evaluate whether equity or debt finance should be selected.

The first point to note here is the requirement to use calculations. A general discussion about the different features of equity and debt would get very little, if any, reward here because the requirement is for calculations.

What calculations should be used though? The question scenario gives average debt/equity ratios and interest cover ratios for similar companies, so calculating these ratios on a before-and-after basis under the two financing choices was sensible. Many candidates correctly calculated relevant interest cover ratios. The debt/equity ratio under debt financing was often calculated correctly, while the ratio where most errors occurred was the debt/equity ratio under equity financing.

Many candidates in evaluating the two financing choices did not consider adequately the objective of shareholder wealth maximisation. Capital gains could be calculated under both financing choices, the equity finance comparison being between the TERPS and the related PER-revised share price, and the debt finance comparison being between the current share price and the related PER-revised share price. Candidates' comments in this area tended to consider share prices or EPS figures rather than capital gains, and the TERPS was often not mentioned at all.

While calculations can be revised and practised through repetition, the thinking behind this kind of evaluation is more difficult to prepare for. One guiding principle that can be a real help is the relationship between risk and return. Debt financing carries the higher risk here (financial risk, measured by gearing and interest cover) and offers the higher return to the shareholder, while equity finance offers the lower risk and the lower return.

Question 31(b)

This question required candidates to discuss TWO Islamic finance sources that could be considered as alternatives to a rights issue and a loan note issue.

The first point to note is that only TWO sources were to be discussed, so the third choice and beyond would not gain any additional marks, while wasting valuable time in the exam.

The second point to note is the requirement to discuss Islamic sources of finance. Those candidates who lacked knowledge of Islamic finance choices, for example who discussed overdraft finance or the nature of an initial public offering, were unlikely to gain any marks here. Candidates needed to discuss Islamic finance sources covered in the syllabus, such as Mudaraba and Sukuk.

The third point to note is that the requirement referred to a rights issue and a loan note issue. These are long-term sources of finance and so the Islamic finance sources discussed also needed to be long term, which excluded Murabaha.

Overall, answers to this question were sometimes confused, discussing general principles such as forbidding riba or prescribed business activities, rather than discussing clearly the features of individual Islamic finance sources.

Question 32 (a)(i)

This question required candidates to calculate the mean (expected) NPV of an investment project. Candidates were required to use a joint probability table.

Some candidates chose not to use a joint probability table and calculated the ENPV from the average annual cash flows instead. Perhaps these candidates decided that only the value of the ENPV was important, or perhaps they did not know what a joint probability table was, or perhaps they thought they were saving time. Because using a joint probability statement was a requirement, candidates who did not satisfy this requirement could not obtain all of the marks. Candidates must meet the requirements of a question if they wish to gain marks.

Some candidates made errors because they did not understand clearly that probabilities are multiplied together to produce joint probabilities, while cash flows are added together to produce total cash flows. With three probabilities applied to year one cash flows and three probabilities applied to year two cash flows, there were nine different total cash flows and NPVs over the two-year period, with nine associated joint probabilities. Three of the NPVs were negative. Some candidates made the mistake of multiplying cash flows by their associated probabilities within each year before adding these to give total cash flow. Some candidates wrongly treated initial investment as a year one cash flow before discounting it.

Some candidates thought that using probabilities meant that discounting was not needed and labelled their calculated cash flows as NPVs or PVs (present values) when they were in future value terms, not present value terms.

Question 32 (a)(ii)

This question required candidates to calculate the probability of a negative NPV.

As mentioned earlier, three of the NPVs in the joint probability table were negative so the probability of a negative NPV could be found by adding the joint probabilities of these three NPVs. Some candidates made the surprising error of calculating the sensitivity of the project ENPV to a change in year one cash flow and called this the probability of a negative NPV. Some candidates did not understand that a probability is a percentage value and calculated a monetary value, which they called the probability of a negative NPV.

Question 32 (a)(iii)

This question required candidates to calculate the NPV of the most likely outcome.

The NPV of the most likely outcome could be found from the joint probability table by selecting the NPV with the highest joint probability. A number of candidates who had not

prepared a joint probability table in calculating the ENPV were able to work their way to the correct answer by considering the cash flows associated with the highest probabilities in each year.

Question 32 (a)(iv)

This question required candidates to comment on the project's financial acceptability.

The most frequent comment made by candidates on the project's financial acceptability was that it was acceptable because the NPV was positive. This answer showed awareness of the NPV decision rule, but a lack of awareness that in this case, the ENPV is a mean or average value. It is the NPV that would arise if the investment project were repeated many times. Because here the investment project can only be undertaken once, it is essential when making the investment decision to also consider risk, which is why a discussion of financial acceptability must in this case also consider the probability of a negative NPV and the NPV of the most likely outcome, together with the risk appetite of the company.

Question 32 (b)

Here candidates were required to discuss TWO out three named methods of adjusting for risk and uncertainty in investment appraisal.

As the requirement was for TWO methods of adjusting for risk and uncertainty in investment appraisal to be discussed, candidates who discussed a third method were just wasting valuable examination time. Eight marks were on offer, hence it is reasonable to assume that four marks were offered for each of two methods discussed. Better answers maintained their focus on the requirement of the question and were not diverted into, for example, discussing the difference between systematic risk and unsystematic risk, or the difficulty of finding the value of the equity risk premium when using the capital asset pricing model.