Professional Pilot Paper – Options module

Advanced Financial Management

Paper P4

Time allowed
Reading and planning: 15 minutes
Writing: 3 hours

This paper is divided into two sections:

Section A – THIS ONE question is compulsory and MUST be attempted

Section B – TWO questions ONLY to be attempted

Do NOT open this paper until instructed by the supervisor.
During reading and planning time only the question paper may be annotated. You must NOT write in your answer booklet until instructed by the supervisor.
This question paper must not be removed from the examination hall.

ACCA

The Association of Chartered Certified Accountants

Section A: This ONE question is compulsory and MUST be attempted

1 Tramont Co is a listed company based in the USA and manufactures electronic devices. One of its devices, the X-IT, is produced exclusively for the American market. Tramont Co is considering ceasing the production of the X-IT gradually over a period of four years because it needs the manufacturing facilities used to make the X-IT for other products.

The government of Gamala, a country based in south-east Asia, is keen to develop its manufacturing industry and has offered Tramont Co first rights to produce the X-IT in Gamala and sell it to the USA market for a period of four years. At the end of the four-year period, the full production rights will be sold to a government backed company for Gamalan Rupiahs (GR) 450 million after tax (this amount is not subject to inflationary increases). Tramont Co has to decide whether to continue production of the X-IT in the USA for the next four years or to move the production to Gamala immediately.

Currently each X-IT unit sold makes a unit contribution of $20. This unit contribution is not expected to be subject to any inflationary increase in the next four years. Next year's production and sales estimated at 40,000 units will fall by 20% each year for the following three years. It is anticipated that after four years the production of X-IT will stop. It is expected that the financial impact of the gradual closure over the four years will be cost neutral (the revenue from sale of assets will equal the closure costs). If production is stopped immediately, the excess assets would be sold for $2.3 million and the costs of closure, including redundancy costs of excess labour, would be $1.7 million.

The following information relates to the production of the X-IT moving to Gamala. The Gamalan project will require an initial investment of GR 230 million, to pay for the cost of land and buildings (GR 150 million) and machinery (GR 80 million). The cost of machinery is tax allowable and will be depreciated on a straight line basis over the next four years, at the end of which it will have a negligible value.

Tramont Co will also need GR 40 million for working capital immediately. It is expected that the working capital requirement will increase in line with the annual inflation rate in Gamala. When the project is sold, the working capital will not form part of the sale price and will be released back to Tramont Co.

Production and sales of the device are expected to be 12,000 units in the first year, rising to 22,000 units, 47,000 units and 60,000 units in the next three years respectively.

The following revenues and costs apply to the first year of operation:
- Each unit will be sold for $70;
- The variable cost per unit comprising of locally sourced materials and labour will be GR 1,350, and;
- In addition to the variable cost above, each unit will require a component bought from Tramont Co for $7, on which Tramont Co makes $4 contribution per unit;
- Total fixed costs for the first year will be GR 30 million.

The costs are expected to increase by their countries' respective rates of inflation, but the selling price will remain fixed at $70 per unit for the four-year period.

The annual corporation tax rate in Gamala is 20% and Tramont Co currently pays corporation tax at a rate of 30% per year. Both countries' corporation taxes are payable in the year that the tax liability arises. A bi-lateral tax treaty exists between the USA and Gamala, which permits offset of overseas tax against any US tax liability on overseas earnings. The USA and Gamalan tax authorities allow losses to be carried forward and written off against future profits for taxation purposes.

Tramont Co has decided to finance the project by borrowing the funds required in Gamala. The commercial borrowing rate is 13% but the Gamalan government has offered Tramont Co a 6% subsidised loan for the entire amount of the initial funds required. The Gamalan government has agreed that it will not ask for the loan to be repaid as long as Tramont Co fulfils its contract to undertake the project for the four years. Tramont Co can borrow dollar funds at an interest rate of 5%.

Tramont Co's financing consists of 25 million shares currently trading at $2.40 each and $40 million 7% bonds trading at $1,428 per $1,000. Tramont Co's quoted beta is 1.17. The current risk free rate of return is estimated at 3% and the market risk premium is 6%. Due to the nature of the project, it is estimated that the beta applicable to the project if it is all-equity financed will be 0.4 more than the current all-equity financed beta of Tramont Co. If the Gamalan project is undertaken, the cost of capital applicable to the cash flows in the USA is expected to be 7%.

The spot exchange rate between the dollar and the Gamalan Rupiah is GR 55 per $1. The annual inflation rates are currently 3% in the USA and 9% in Gamala. It can be assumed that these inflation rates will not change for the foreseeable future. All net cash flows arising from the project will be remitted back to Tramont Co at the end of each year.

There are two main political parties in Gamala: the Gamala Liberal (GL) Party and the Gamala Republican (GR) Party. Gamala is currently governed by the GL Party but general elections are due to be held soon. If the GR Party wins the election, it promises to increase taxes of international companies operating in Gamala and review any commercial benefits given to these businesses by the previous government.

Required:

(a) Prepare a report for the Board of Directors (BoD) of Tramont Co that

(i) Evaluates whether or not Tramont Co should undertake the project to produce the X-IT in Gamala and cease its production in the USA immediately. In the evaluation, include all relevant calculations in the form of a financial assessment and explain any assumptions made.

It is suggested that the financial assessment should be based on present value of the operating cash flows from the Gamalan project, discounted by an appropriate all-equity rate, and adjusted by the present value of all other relevant cash flows. (27 marks)

(ii) Discusses the potential change in government and other business factors that Tramont Co should consider before making a final decision. (8 marks)

Professional marks for format, structure and presentation of the report for part (a) (4 marks)

(b) Although not mandatory for external reporting purposes, one of the members of the BoD suggested that adopting a triple bottom line approach when monitoring the X-IT investment after its implementation, would provide a better assessment of how successful it has been.

Discuss how adopting aspects of triple bottom line reporting may provide a better assessment of the success of the X-IT. (6 marks)

(c) Another member of the BoD felt that, despite Tramont Co having a wide range of shareholders holding well-diversified portfolios of investments, moving the production of the X-IT to Gamala would result in further risk diversification benefits.

Discuss whether moving the production of the X-IT to Gamala may result in further risk diversification for the shareholders already holding well diversified portfolios. (5 marks)

(50 marks)

Section B – TWO questions ONLY to be attempted

2 Alecto Co, a large listed company based in Europe, is expecting to borrow €22,000,000 in four months' time on 1 May 2013. It expects to make a full repayment of the borrowed amount nine months from now. Assume it is 1 January 2013 now. Currently there is some uncertainty in the markets, with higher than normal rates of inflation, but an expectation that the inflation level may soon come down. This has led some economists to predict a rise in interest rates and others suggesting an unchanged outlook or maybe even a small fall in interest rates over the next six months.

Although Alecto Co is of the opinion that it is equally likely that interest rates could increase or fall by 0.5% in four months, it wishes to protect itself from interest rate fluctuations by using derivatives. The company can borrow at LIBOR plus 80 basis points and LIBOR is currently 3.3%. The company is considering using interest rate futures, options on interest rate futures or interest rate collars as possible hedging choices.

The following information and quotes from an appropriate exchange are provided on Euro futures and options. Margin requirements may be ignored.

Three month Euro futures, €1,000,000 contract, tick size 0.01% and tick value €25
March 96.27
June 96.16
September 95.90

Options on three month Euro futures, €1,000,000 contract, tick size 0.01% and tick value €25. Option premiums are in annual %.

Calls			Strike	Puts		
March	**June**	**September**		**March**	**June**	**September**
0.279	0.391	0.446	96.00	0.006	0.163	0.276
0.012	0.090	0.263	96.50	0.196	0.581	0.754

It can be assumed that settlement for both the futures and options contracts is at the end of the month. It can also be assumed that basis diminishes to zero at contract maturity at a constant rate and that time intervals can be counted in months.

Required:

(a) Briefly discuss the main advantage and disadvantage of hedging interest rate risk using an interest rate collar instead of options. (4 marks)

(b) Based on the three hedging choices Alecto Co is considering and assuming that the company does not face any basis risk, recommend a hedging strategy for the €22,000,000 loan. Support the recommendation with appropriate comments and relevant calculations in €. (17 marks)

(c) Explain what is meant by basis risk and how it would affect the recommendation made in part (b) above. (4 marks)

(25 marks)

3 Doric Co has two manufacturing divisions: parts and fridges. Although the parts division is profitable, the fridges division is not, and as a result its share price has declined to $0.50 per share from a high of $2.83 per share around three years ago. Assume it is now 1 January 2013 .

The board of directors are considering two proposals:

(i) To cease trading and close down the company entirely, or;

(ii) To close the fridges division and continue the parts division through a leveraged management buyout.. The new company will continue with manufacturing parts only, but will make an additional investment of $50 million in order to grow the parts division after-tax cash flows by 3.5% in perpetuity. The proceeds from the sale of the fridges division will be used to pay the outstanding liabilities. The finance raised from the management buy-out will pay for any remaining liabilities, the funds required for the additional investment, and to purchase the current equity shares at a premium of 20%. The fridges division is twice the size of the parts division in terms of its assets attributable to it.

Extracts from the most recent financial statements:
Financial Position as at 31 December 2012

	$m
Non-Current Assets	110
Current Assets	220
Share capital ($0.40 per share par value)	40
Reserves	10
Liabilities (Non-current and current)	280

Income Statement for the year ended 31 December 2012			$m
Sales revenue:	Parts division		170
	Fridges division		340
Costs prior to depreciation, interest payments and tax:		Parts division	(120)
		Fridges division	(370)
Depreciation, tax and interest			(34)
Loss			(14)

If the entire company's assets are sold, the estimated realisable values of assets are as follows:

	$m
Non-current assets	100
Current assets	110

The following additional information has been provided

Redundancy and other costs will be approximately $54 million if the whole company is closed, and pro rata for individual divisions that are closed. These costs have priority for payment before any other liabilities in case of closure. The taxation effects relating to this may be ignored.

Corporation tax on profits is 20% and it can be assumed that tax is payable in the year incurred. Annual depreciation on non-current assets is 10% and this is the amount of investment needed to maintain the current level of activity. The new company's cost of capital is expected to be 11%.

Required:

(a) Briefly discuss the possible benefits of Doric Co's parts division being divested through a management buy-out. (4 marks)

(b) Estimate the return the liability holders and the shareholders would receive in the event that Doric Co is closed and all its assets sold. (3 marks)

(c) Estimate the additional amount of finance needed and the value of the new company, if only the assets of fridges division are sold and the parts division is divested through a management buy-out. Briefly discuss whether or not the management buy-out would be beneficial. (10 marks)

(d) Doric Co's directors are of the opinion that they could receive a better price if the fridges division is sold as a going concern instead of its assets sold separately. They have been told that they need to consider two aspects when selling a company or part of a company: (i) seeking potential buyers and negotiating the sale price; and, (ii) due diligence.

Discuss the issues that should be taken into consideration with each aspect. (8 marks)

(25 marks)

4 GNT Co is considering an investment in one of two corporate bonds. Both bonds have a par value of $1,000 and pay coupon interest on an annual basis. The market price of the first bond is $1,079.68. Its coupon rate is 6% and it is due to be redeemed at par in five years. The second bond is about to be issued with a coupon rate of 4% and will also be redeemable at par in five years. Both bonds are expected to have the same gross redemption yields (yields to maturity) The yield to maturity of a company's bond is determined by its credit rating.

GNT Co considers duration of the bond to be a key factor when making decisions on which bond to invest.

Required:

(a) Estimate the Macaulay duration of the two bonds GNT Co is considering for investment. (9 marks)

(b) Discuss how useful duration is as a measure of the sensitivity of a bond price to changes in interest rates. (8 marks)

(c) Among the criteria used by credit agencies for establishing a company's credit rating are the following: industry risk, earnings protection, financial flexibility and evaluation of the company's management.

Briefly explain each criterion and suggest factors that could be used to assess it. (8 marks)

(25 marks)

Formulae

Modigliani and Miller Proposition 2 (with tax)

$$k_e = k_e^i + (1 - T)(k_e^i - k_d)\frac{V_d}{V_e}$$

The Capital Asset Pricing Model

$$E(r_i) = R_f + \beta_i(E(r_m) - R_f)$$

The asset beta formula

$$\beta_a = \left[\frac{V_e}{(V_e + V_d(1 - T))}\beta_e\right] + \left[\frac{V_d(1 - T)}{(V_e + V_d(1 - T))}\beta_d\right]$$

The Growth Model

$$P_o = \frac{D_o(1 + g)}{(r_e - g)}$$

Gordon's growth approximation

$$g = br_e$$

The weighted average cost of capital

$$WACC = \left[\frac{V_e}{V_e + V_d}\right]k_e + \left[\frac{V_d}{V_e + V_d}\right]k_d(1 - T)$$

The Fisher formula

$$(1 + i) = (1 + r)(1 + h)$$

Purchasing power parity and interest rate parity

$$S_1 = S_0 x \frac{(1 + h_c)}{(1 + h_b)} \qquad F_0 = S_0 x \frac{(1 + i_c)}{(1 + i_b)}$$

Modified Internal Rate of Return

$$MIRR = \left[\frac{PV_R}{PV_I} \right]^{\frac{1}{n}} \left(1 + r_e\right) - 1$$

The Black-Scholes option pricing model

$$c = P_a N(d_1) - P_e N(d_2) e^{-rt}$$

Where:

$$d_1 = \frac{\ln(P_a / P_e) + (r + 0.5s^2)t}{s\sqrt{t}}$$

$$d_2 = d_1 - s\sqrt{t}$$

The Put Call Parity relationship

$$p = c - P_a + P_e e^{-rt}$$

Present Value Table

Present value of 1 i.e. $(1 + r)^{-n}$

Where r = discount rate
n = number of periods until payment

Discount rate (r)

Periods (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0·990	0·980	0·971	0·962	0·952	0·943	0·935	0·926	0·917	0·909	1
2	0·980	0·961	0·943	0·925	0·907	0·890	0·873	0·857	0·842	0·826	2
3	0·971	0·942	0·915	0·889	0·864	0·840	0·816	0·794	0·772	0·751	3
4	0·961	0·924	0·888	0·855	0·823	0·792	0·763	0·735	0·708	0·683	4
5	0·951	0·906	0·863	0·822	0·784	0·747	0·713	0·681	0·650	0·621	5
6	0·942	0·888	0·837	0·790	0·746	0·705	0·666	0·630	0·596	0·564	6
7	0·933	0·871	0·813	0·760	0·711	0·665	0·623	0·583	0·547	0·513	7
8	0·923	0·853	0·789	0·731	0·677	0·627	0·582	0·540	0·502	0·467	8
9	0·914	0·837	0·766	0·703	0·645	0·592	0·544	0·500	0·460	0·424	9
10	0·905	0·820	0·744	0·676	0·614	0·558	0·508	0·463	0·422	0·386	10
11	0·896	0·804	0·722	0·650	0·585	0·527	0·475	0·429	0·388	0·350	11
12	0·887	0·788	0·701	0·625	0·557	0·497	0·444	0·397	0·356	0·319	12
13	0·879	0·773	0·681	0·601	0·530	0·469	0·415	0·368	0·326	0·290	13
14	0·870	0·758	0·661	0·577	0·505	0·442	0·388	0·340	0·299	0·263	14
15	0·861	0·743	0·642	0·555	0·481	0·417	0·362	0·315	0·275	0·239	15

(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0·901	0·893	0·885	0·877	0·870	0·862	0·855	0·847	0·840	0·833	1
2	0·812	0·797	0·783	0·769	0·756	0·743	0·731	0·718	0·706	0·694	2
3	0·731	0·712	0·693	0·675	0·658	0·641	0·624	0·609	0·593	0·579	3
4	0·659	0·636	0·613	0·592	0·572	0·552	0·534	0·516	0·499	0·482	4
5	0·593	0·567	0·543	0·519	0·497	0·476	0·456	0·437	0·419	0·402	5
6	0·535	0·507	0·480	0·456	0·432	0·410	0·390	0·370	0·352	0·335	6
7	0·482	0·452	0·425	0·400	0·376	0·354	0·333	0·314	0·296	0·279	7
8	0·434	0·404	0·376	0·351	0·327	0·305	0·285	0·266	0·249	0·233	8
9	0·391	0·361	0·333	0·308	0·284	0·263	0·243	0·225	0·209	0·194	9
10	0·352	0·322	0·295	0·270	0·247	0·227	0·208	0·191	0·176	0·162	10
11	0·317	0·287	0·261	0·237	0·215	0·195	0·178	0·162	0·148	0·135	11
12	0·286	0·257	0·231	0·208	0·187	0·168	0·152	0·137	0·124	0·112	12
13	0·258	0·229	0·204	0·182	0·163	0·145	0·130	0·116	0·104	0·093	13
14	0·232	0·205	0·181	0·160	0·141	0·125	0·111	0·099	0·088	0·078	14
15	0·209	0·183	0·160	0·140	0·123	0·108	0·095	0·084	0·074	0·065	15

Annuity Table

Present value of an annuity of 1 i.e. $\frac{1-(1+r)^{-n}}{r}$

Where r = discount rate
n = number of periods

Discount rate (r)

Periods (n)	1%	2%	3%	4%	5%	6%	7%	8%	9%	10%	
1	0·990	0·980	0·971	0·962	0·952	0·943	0·935	0·926	0·917	0·909	1
2	1·970	1·942	1·913	1·886	1·859	1·833	1·808	1·783	1·759	1·736	2
3	2·941	2·884	2·829	2·775	2·723	2·673	2·624	2·577	2·531	2·487	3
4	3·902	3·808	3·717	3·630	3·546	3·465	3·387	3·312	3·240	3·170	4
5	4·853	4·713	4·580	4·452	4·329	4·212	4·100	3·993	3·890	3·791	5
6	5·795	5·601	5·417	5·242	5·076	4·917	4·767	4·623	4·486	4·355	6
7	6·728	6·472	6·230	6·002	5·786	5·582	5·389	5·206	5·033	4·868	7
8	7·652	7·325	7·020	6·733	6·463	6·210	5·971	5·747	5·535	5·335	8
9	8·566	8·162	7·786	7·435	7·108	6·802	6·515	6·247	5·995	5·759	9
10	9·471	8·983	8·530	8·111	7·722	7·360	7·024	6·710	6·418	6·145	10
11	10·368	9·787	9·253	8·760	8·306	7·887	7·499	7·139	6·805	6·495	11
12	11·255	10·575	9·954	9·385	8·863	8·384	7·943	7·536	7·161	6·814	12
13	12·134	11·348	10·635	9·986	9·394	8·853	8·358	7·904	7·487	7·103	13
14	13·004	12·106	11·296	10·563	9·899	9·295	8·745	8·244	7·786	7·367	14
15	13·865	12·849	11·938	11·118	10·380	9·712	9·108	8·559	8·061	7·606	15

(n)	11%	12%	13%	14%	15%	16%	17%	18%	19%	20%	
1	0·901	0·893	0·885	0·877	0·870	0·862	0·855	0·847	0·840	0·833	1
2	1·713	1·690	1·668	1·647	1·626	1·605	1·585	1·566	1·547	1·528	2
3	2·444	2·402	2·361	2·322	2·283	2·246	2·210	2·174	2·140	2·106	3
4	3·102	3·037	2·974	2·914	2·855	2·798	2·743	2·690	2·639	2·589	4
5	3·696	3·605	3·517	3·433	3·352	3·274	3·199	3·127	3·058	2·991	5
6	4·231	4·111	3·998	3·889	3·784	3·685	3·589	3·498	3·410	3·326	6
7	4·712	4·564	4·423	4·288	4·160	4·039	3·922	3·812	3·706	3·605	7
8	5·146	4·968	4·799	4·639	4·487	4·344	4·207	4·078	3·954	3·837	8
9	5·537	5·328	5·132	4·946	4·772	4·607	4·451	4·303	4·163	4·031	9
10	5·889	5·650	5·426	5·216	5·019	4·833	4·659	4·494	4·339	4·192	10
11	6·207	5·938	5·687	5·453	5·234	5·029	4·836	4·656	4·486	4·327	11
12	6·492	6·194	5·918	5·660	5·421	5·197	4·988	4·793	4·611	4·439	12
13	6·750	6·424	6·122	5·842	5·583	5·342	5·118	4·910	4·715	4·533	13
14	6·982	6·628	6·302	6·002	5·724	5·468	5·229	5·008	4·802	4·611	14
15	7·191	6·811	6·462	6·142	5·847	5·575	5·324	5·092	4·876	4·675	15

Standard normal distribution table

	0·00	0·01	0·02	0·03	0·04	0·05	0·06	0·07	0·08	0·09
0·0	0·0000	0·0040	0·0080	0·0120	0·0160	0·0199	0·0239	0·0279	0·0319	0·0359
0·1	0·0398	0·0438	0·0478	0·0517	0·0557	0·0596	0·0636	0·0675	0·0714	0·0753
0·2	0·0793	0·0832	0·0871	0·0910	0·0948	0·0987	0·1026	0·1064	0·1103	0·1141
0·3	0·1179	0·1217	0·1255	0·1293	0·1331	0·1368	0·1406	0·1443	0·1480	0·1517
0·4	0·1554	0·1591	0·1628	0·1664	0·1700	0·1736	0·1772	0·1808	0·1844	0·1879
0·5	0·1915	0·1950	0·1985	0·2019	0·2054	0·2088	0·2123	0·2157	0·2190	0·2224
0·6	0·2257	0·2291	0·2324	0·2357	0·2389	0·2422	0·2454	0·2486	0·2517	0·2549
0·7	0·2580	0·2611	0·2642	0·2673	0·2704	0·2734	0·2764	0·2794	0·2823	0·2852
0·8	0·2881	0·2910	0·2939	0·2967	0·2995	0·3023	0·3051	0·3078	0·3106	0·3133
0·9	0·3159	0·3186	0·3212	0·3238	0·3264	0·3289	0·3315	0·3340	0·3365	0·3389
1·0	0·3413	0·3438	0·3461	0·3485	0·3508	0·3531	0·3554	0·3577	0·3599	0·3621
1·1	0·3643	0·3665	0·3686	0·3708	0·3729	0·3749	0·3770	0·3790	0·3810	0·3830
1·2	0·3849	0·3869	0·3888	0·3907	0·3925	0·3944	0·3962	0·3980	0·3997	0·4015
1·3	0·4032	0·4049	0·4066	0·4082	0·4099	0·4115	0·4131	0·4147	0·4162	0·4177
1·4	0·4192	0·4207	0·4222	0·4236	0·4251	0·4265	0·4279	0·4292	0·4306	0·4319
1·5	0·4332	0·4345	0·4357	0·4370	0·4382	0·4394	0·4406	0·4418	0·4429	0·4441
1·6	0·4452	0·4463	0·4474	0·4484	0·4495	0·4505	0·4515	0·4525	0·4535	0·4545
1·7	0·4554	0·4564	0·4573	0·4582	0·4591	0·4599	0·4608	0·4616	0·4625	0·4633
1·8	0·4641	0·4649	0·4656	0·4664	0·4671	0·4678	0·4686	0·4693	0·4699	0·4706
1·9	0·4713	0·4719	0·4726	0·4732	0·4738	0·4744	0·4750	0·4756	0·4761	0·4767
2·0	0·4772	0·4778	0·4783	0·4788	0·4793	0·4798	0·4803	0·4808	0·4812	0·4817
2·1	0·4821	0·4826	0·4830	0·4834	0·4838	0·4842	0·4846	0·4850	0·4854	0·4857
2·2	0·4861	0·4864	0·4868	0·4871	0·4875	0·4878	0·4881	0·4884	0·4887	0·4890
2·3	0·4893	0·4896	0·4898	0·4901	0·4904	0·4906	0·4909	0·4911	0·4913	0·4916
2·4	0·4918	0·4920	0·4922	0·4925	0·4927	0·4929	0·4931	0·4932	0·4934	0·4936
2·5	0·4938	0·4940	0·4941	0·4943	0·4945	0·4946	0·4948	0·4949	0·4951	0·4952
2·6	0·4953	0·4955	0·4956	0·4957	0·4959	0·4960	0·4961	0·4962	0·4963	0·4964
2·7	0·4965	0·4966	0·4967	0·4968	0·4969	0·4970	0·4971	0·4972	0·4973	0·4974
2·8	0·4974	0·4975	0·4976	0·4977	0·4977	0·4978	0·4979	0·4979	0·4980	0·4981
2·9	0·4981	0·4982	0·4982	0·4983	0·4984	0·4984	0·4985	0·4985	0·4986	0·4986
3·0	0·4987	0·4987	0·4987	0·4988	0·4988	0·4989	0·4989	0·4989	0·4990	0·4990

This table can be used to calculate $N(d)$, the cumulative normal distribution functions needed for the Black-Scholes model of option pricing. If $d_i > 0$, add 0·5 to the relevant number above. If $d_i < 0$, subtract the relevant number above from 0·5.

End of Question Paper

Answers

1 (a) REPORT TO THE BOARD OF DIRECTORS, TRAMONT CO

EVALUATION OF WHETHER THE PRODUCTION OF X-IT SHOULD MOVE TO GAMALA

This report evaluates the possibility of moving the production of the X-IT to Gamala from the USA. Following the initial evaluation the report discusses the key assumptions made, the possible impact of a change in the government in Gamala after the elections due to take place shortly and other business factors that should be considered before a final decision is made.

Initially a base case net present value calculation is conducted to assess the impact of the production in Gamala. This is then adjusted to show the impact of cash flows in the USA as a result of the move, the immediate impact of ceasing production and the impact of the subsidy and the tax shield benefits from the loan borrowing.

Based on the calculations presented in the appendix, the move will result in a positive adjusted present value of just over $2.4 million. On this basis, the initial recommendation is that the production of X-IT should cease in the USA and the production moved to Gamala instead.

Assumptions

It is assumed that the borrowing rate of 5% is used to calculate the benefits from the tax shield. It could be argued that the risk free rate of 3% could be used as the discount rate instead of 5% to calculate the present value of benefits from the tax shields and the subsidies.

In adjusted present value calculations, the tax shield benefit is normally related to the debt capacity of the investment, not the actual amount of debt finance used. Since this is not given, it is assumed that the increase in debt capacity is equal to the debt finance used.

It has been assumed that many of the input variables, such as for example the tax and capital allowances rates, the various costs and prices, units produced and sold, the rate of inflation and the prediction of future exchange rates based on the purchasing power parity, are accurate and will change as stated over the four-year period of the project. In reality any of these estimates could be subject to change to a greater or lesser degree and it would appropriate for Tramont Co to conduct uncertainty assessments like sensitivity analysis to assess the impact of the changes to the initial predictions.

(Note: credit will be given for alternative relevant assumptions)

Government Change

From the facts of the case it would seem that a change of government could have a significant impact on whether or not the project is beneficial to Tramont Co. The threat to raise taxes may not be too significant as the tax rates would need to increase to more than 30% before Tramont Co would lose money. However, the threat by the opposition party to review 'commercial benefits' may be more significant.

Just over 40% of the present value comes from the tax shield and subsidy benefits. If these were reneged then Tramont Co would lose a significant of the value attached to the project. Also the new government may not allow remittances every year, as is assumed in part (i). However this may not be significant since the largest present value amount comes from the final year of operation.

Other Business Factors

Tramont Co should consider the possibility of becoming established in Gamala, and this may lead to follow-on projects. The real options linked to this should be included in the analysis.

Tramont Co's overall corporate strategy should be considered. Does the project fit within this strategy? Even if the decision is made to close the operation in the USA, there may be other alternatives and these need to be assessed.

The amount of experience Tramont Co has in international ventures needs to be considered. For example, will it be able to match its systems to the Gamalan culture? It will need to develop strategies to deal with cultural differences. This may include additional costs such as training which may not have been taken into account.

Tramont Co needs to consider if the project can be delayed at all. From part (i), it can be seen that a large proportion of the opportunity cost relates to lost contribution in years 1 and 2. A delay in the commencement of the project may increase the overall value of the project.

Tramont Co needs to consider the impact on its reputation due to possible redundancies. Since the production of X-IT is probably going to be stopped in any case, Tramont Co needs to communicate its strategy to the employees and possibly other stakeholders clearly so as to retain its reputation. This may make the need to consider alternatives even more important.

(Note: credit will be given for alternative relevant comments)

Conclusion
Following from a detailed sensitivity analysis, analysis of a possible change in the government and an evaluation of the financial benefits accruing from the other business factors discussed above, the BoD can make a decision of whether to move the production to Gamala or not. This initial evaluation suggests that moving the production of the X-IT to Gamala would be beneficial.

Report compiled by:

Date:

Appendix
Gamalan Project Operating Cash Flows
(All amounts in GR/$ 000's)

Year	Now	1	2	3	4
Sales revenue (w2)		48,888	94,849	214,442	289,716
Local variable costs (w3)		(16,200)	(32,373)	(75,385)	(104,897)
Imported component (w4)		(4,889)	(9,769)	(22,750)	(31,658)
Fixed costs		(30,000)	(32,700)	(35,643)	(38,851)
Profits before tax		(2,201)	20,007	80,664	114,310
Taxation (w5)		0	0	(7,694)	(18,862)
Investment	(230,000)				450,000
Working capital	(40,000)	(3,600)	(3,924)	(4,277)	51,801
Cash flows (GR)	(270,000)	(5,801)	16,083	68,693	597,249
Exchange rate (w1)	55.00	58.20	61.59	65.18	68.98
Cash flows ($)	(4,909)	(100)	261	1,054	8,658
Discount factor for 9.6% (w6) *(Full credit given if 10% is used as the discount rate)*		0.912	0.832	0.760	0.693
Present values ($)	(4,909)	(91)	217	801	6,000

Net present value (NPV) of the cash flows from the project is approx. $2,018,000.

Adjusted present value (APV)	$000s
NPV of cash flows	2,018
Impact of additional tax in USA, opportunity cost (revenues foregone from current operations) and additional contribution from component exported to project (net of tax) (w7)	(1,237)
Closure revenues and costs ($2,300,000 – $1,700,00)	600
Tax shield Benefit of subsidy (w8)	1,033
Total APV	2,414

Workings

1 Exchange rates

Year	1	2	3	4
GR/$1	55 x 1.09/1.03 = 58.20	58.20 x 1.09/1.03 = 61.59	61.59 x 1.09/1.03 = 65.18	65.18 x 1.09/1.03 = 68.98

2 Sales revenue (GR 000's)

Year	1	2	3	4
Price x units x exchange rate	70 x 12,000 x 58.20 = 48,888	70 x 22,000 x 61.59 = 94,849	70 x 47,000 x 65.18 = 214,442	70 x 60,000 x 68.98 = 289,716

3 Local variable costs (GR 000's)

Year	1	2	3	4
Cost x units x inflation after year 1	1,350 x 12,000 = 16,200	1,350 x 22,000 x 1.09 = 32,373	1,350 x 47,000 x 1.09^2 = 75,385	1,350 x 60,000 x 1.09^3 = 104,897

4 Imported Component (GR 000's)

Year	1	2	3	4
Price x units x inflation after year 1 x exchange rate	7 x 12,000 x 58.20 = 4,889	7 x 22,000 x 1.03 x 61.59 = 9,769	7 x 47,000 x 1.03^2 x 65.18 = 22,750	7 x 60,000 x 1.03^3 x 68.98 = 31,658

5 Taxation

Year	1	2	3	4
Profits before tax	(2,201)	20,007	80664	114,310
Tax allowable depreciation	(20,000)	(20,000)	(20,000)	(20,000)
Profit/(loss) after depreciation	(22,201)	7	60,664	94,310
Taxable profits	0	0	38,470	94,310
Taxation (20%)	0	0	(7,694)	(18,862)

6 Gamala project all-equity financed discount rate

Tramont Co equity beta = 1.17
MVe = $2.40 x 25m shares = $60m
MVd = $40m x $1,428/$1,000 = $57.12m

Tramont Co asset beta (assuming debt is risk free)
1.17 x 60m/(60m + 57.12m x 0.7) = 0.70

Project asset beta = 0.70 + 0.40 = 1.10
Project all-equity financed discount rate = 3% + 6% x 1.1 = 9.6%

7 Additional tax, additional contribution and opportunity cost ($ 000's)

Year	1	2	3	4
Additional tax Taxable profits x 1/ exchange rate x 10%	0	0	38,470 x 1/65.18 x 10% = (59)	94,310 x 1/68.98 x 10% = (137)
Opportunity cost Units x contribution x (1–tax)	40 x $20 x 0.7 = (560)	32 x $20 x 0.7 = (448)	25.6 x $20 x 0.7 = (358)	20.48 x $20 x 0.7 = (287)
Additional contribution Units x contribution x inflation x (1–tax)	12 x $4 x 0.7 = 34	22 x $4 x 1.03 x 0.7 = 63	47 x $4 x 1.03^2 x 0.7 = 140	60 x $4 x 1.03^3 x 0.7 = 184
Total cash flows	(526)	(385)	(277)	(240)
PV of cash flows Discount at 7%	(492)	(336)	(226)	(183)

NPV is approx. $(1,237,000)

8 Tax shield and subsidy benefits ($/GR 000's)

Year	1	2	3	4
Annual tax shield (GR) Interest x loan x tax rate	6% x 270m x 20% = 3,240	3,240	3,240	3,240
Annual subsidy benefit (GR) Interest gain x loan x (1–tax rate)	7% x 270m x 0.8 = 15,120	15,120	15,120	15,120
Total tax shield + subsidy benefits (GR)	18,360	18,360	18,360	18,360
Exchange rate (GR/$1)	58.20	61.59	65.18	68.98
Cash flows ($)	315	298	282	266
PV of cash flows Discount at 5%	300	270	244	219

NPV of tax shield and subsidy benefit is approx. $1,033,000

(b) A triple bottom line (TBL) report provides a quantitative summary of performance in terms of economic or financial impact, impact on the environment and impact on social performance. TBL provides the measurement tool to assess a corporation's or project's performance against its objectives.

The principle of TBL reporting is that true performance should be measured in terms of a balance between economic (profits), environmental (planet) and social (people) factors; with no one factor growing at the expense of the others. The contention is that a corporation that accommodates the pressures of all the three factors in its strategic investment decisions will enhance shareholder value, as long as the benefits that accrue from producing such a report exceeds the costs of producing it.

For example, in the case of the X-IT, reporting on the impact of moving the production to Gamala, in terms of the impact on the employees and environment in the USA and in Gamala will highlight Tramont Co as a good corporate citizen, and thereby increase its reputation and enable it to attract and retain high performing, high calibre employees. It can also judge the impact on the other business factors mentioned in the report above.

(Note: credit will be given for alternative relevant answers)

(c) Shareholders holding well-diversified portfolios will have diversified away unsystematic or company specific risk, and will only face systematic risk, ie risk that can not be diversified away. Therefore a company can not reduce risk further by undertaking diversification within the same system or market. However, further risk reduction may occur if the diversification is undertaken by the company, on behalf of the shareholders, into a system or market where they themselves do not invest. Some studies indicate that even shareholders holding well-diversified portfolios may benefit from risk diversification where companies invest in emerging markets.

In the case of Tramont Co and the X-IT, it is not clear whether diversification benefits will result in the investment in Gamala. The benefits are dependent on the size of the investment, and on the nature of the business operations undertaken in Gamala by Tramont Co. And whether these operations mirror an investment in a significantly different system or market. If the investment is large, the operations are similar to undertaking a a Gamalan company. Tramont Co's shareholders who do not hold similar companies' shares in their portfolios may then gain risk diversification benefits from the Gamalan investment.

2 (a) The main advantage of using a collar instead of options to hedge interest rate risk is lower cost. A collar involves the simultaneous purchase and sale of both call and put options at different exercise prices. The option purchased has a higher premium when compared to the premium of the option sold, but the lower premium income will reduce the higher premium payable. With a normal uncovered option, the full premium is payable.

However the disadvantage of this is that, whereas with a hedge using options the buyer can get full benefit of any upside movement in the price of the underlying asset, with a collar hedge the benefit of the upside movement is limited or capped as well.

(b) Using Futures

Need to hedge against a rise in interest rates, therefore go short in the futures market. Alecto Co needs June contracts as the loan will be required on 1 May.

No. of contracts needed = €22,000,000/ €1,000,000 x 5 months / 3 months = 36.67 say 37 contracts.

Basis
Current price (on 1/1) – futures price = total basis
(100 – 3.3) – 96.16 = 0.54
Unexpired basis = 2/6 x 0.54 = 0.18

If interest rates increase by 0.5% to 3.8%	
Cost of borrowing funds = 4.6% x 5/12 x €22,000,000 =	€421,667
Expected futures price = 100 – 3.8 – 0.18 = 96.02	
Gain on the futures market = (9616 – 9602) x €25 x 37 =	€12,950
Net cost =	€408,717

Effective interest rate = 408,717 / 22,000,000 x 12/5 = 4.46%

If interest rates decrease by 0.5% to 2.8%	
Cost of borrowing funds = 3.6% x 5/12 x €22,000,000 =	€330,000
Expected futures price = 100 – 2.8 – 0.18 = 97.02	
Loss on the futures market = (9616 – 9702) x €25 x 37 =	€79,550
Net cost =	€409,550

Effective interest rate = 409,550 / 22,000,000 x 12/5 = 4.47%

(Note: Net cost should be the same. Difference is due to rounding the number of contracts)

Using Options on Futures

Need to hedge against a rise in interest rates, therefore buy put options. As before, Alecto Co needs 37 June put option contracts (€22,000,000/€1,000,000 x 5 months/3 months).

If interest rates increase by 0.5% to 3.8%		
Exercise Price	96.00	96.50
Futures Price	96.02	96.02
Exercise ?	No	Yes
Gain in basis points	0	48
Underlying cost of borrowing (from above)	€421,667	€421,667
Gain on options (0 and €25x48x37)	€0	€44,400
Premium		
16.3 x €25 x 37	€15,078	
58.1x €25 x 37		€53,743
Net cost	**€436,745**	**€431,010**
Effective interest rate	4.76%	4.70%

If interest rates decrease by 0.5% to 2.8%

Exercise Price	96.00	96.50
Futures Price	97.02	97.02
Exercise ?	No	No
Gain in basis points	0	0
Underlying cost of borrowing (from above)	€330,000	€330,000
Gain on options	€0	€0
Premium		
16.3 x €25 x 37	€15,078	
58.1 x €25 x 37		€53,743
Net cost	€345,078	€383,743
Effective interest rate	3.76%	4.19%

Using a collar

Buy June put at 96.00 for 0.163 and sell June call at 96.50 for 0.090.
Premium payable = 0.073

If interest rates increase by 0.5% to 3.8%

	Buy put	Sell Call
Exercise Price	96.00	96.50
Futures Price	96.02	96.02
Exercise ?	No	No
Underlying cost of borrowing (from above)		€421,667
Premium		
7.3 x €25x37		€6,753
Net cost		€428,420
Effective interest rate		4.67%

If interest rates decrease by 0.5% to 2.8%

	Buy put	Sell Call
Exercise Price	96.00	96.50
Futures Price	97.02	97.02
Exercise ?	No	Yes
Underlying cost of borrowing (from above)	€330,000	
Premium		
7.3 x €25 x 37	€6,753	
Loss on exercise (52 x €25 x 37)	€48,100	
Net cost	€384,853	
Effective interest rate	4.20%	

Hedging using the interest rate futures market fixes the rate at 4.47%, whereas with options on futures or a collar hedge, the net cost changes. If interest rates fall in the future then a hedge using options gives the most favourable rate. However, if interest rates increase then a hedge using futures gives the lowest interest payment cost and hedging with options give the highest cost, with the collar hedge in between the two. If Alecto Co's aim is to fix its interest rate whatever happens to interest rates then the preferred instrument would be futures.

This recommendation is made without considering margin and other transactional costs, and basis risk, which is discussed below. These need to be taken into account before a final decision is made.

(Note: credit will be given for alternative approaches to the calculations in part (b)).

(c) Basis risk occurs when the basis does not diminish at a constant rate. In this case, if a futures contract is held till it matures then there is no basis risk because at maturity the derivative price will equal the underlying asset's price. However, if a contract is closed out before maturity (here the June futures contracts will be closed two months prior to expiry) there is no guarantee that the price of the futures contract will equal the predicted price based on basis at that date. For example, in part (b) above the predicted futures price in four months assumes that the basis remaining is 0.18, but it could be more or less. Therefore the actual price of the futures contract could be more or less.

This creates a problem in that the effective interest rate for the futures contract above may not be fixed at 4.47%, but may vary and therefore the amount of interest that Alecto Co pays may not be fixed or predictable. On the other hand it could be argued that the basis risk will probably be smaller than the risk exposure to interest rates without hedging and therefore although some risk will exist, its impact will be smaller.

3 (a) Possible benefits of disposing a division through a management buy-out may include:

Management buy-out costs maybe less compared with other forms of disposal such as selling individual assets of the division or selling it to a third party.

It may be the quickest method in raising funds compared to the other methods.

There would be less resistance from the managers and employees making the process smoother and easier to accomplish than if both divisions were to be closed down.

It may offer a better price. The current management and employees possibly have the best knowledge of the division and are able to make it successful. Therefore they may be willing to pay more for it.

(Note: Credit will be given for alternative relevant benefits)

(b)

Close the company	**$m**
Sale of all assets	210
Less redundancy and other costs	(54)
Net proceeds from sale of all assets	156
Total liabilities	280

The liability holders will receive $0.56 per $1 owing to them ($156m/$280m). Shareholders will receive nothing.

(c)

	$m
Value of selling fridges division (2/3 x 210)	140
Redundancy and other costs (2/3 x 54)	(36)
Funds available from sale of division	104
Amount of current and non-current liabilities	280
Amount of management buy-out funds needed to pay current and non-current liabilities (280 – 104)	176
Amount of management buy-out funds needed to pay shareholders	60
Investment needed for new venture	50
Total funds needed for management buy-out	286

Estimating value of new company after buy-out	**$m**
Sales revenue	170
Costs	(120)
Profits before depreciation	50
** Depreciation ((1/3 x $100m + $50m) x 10%)	(8.3)
Tax (20%)	(8.3)
** Cash flows before interest payment	33.4

** It is assumed that the depreciation is available on the re-valued non-current assets plus the new investment. It is assumed that no additional investment in non-current assets or working capital is needed, even though cash flows are increasing.

Estimate of value based on perpetuity = $33.4 (1.035) / (0.11 – 0.035) = $461m

This is about 61% in excess of the funds invested in the new venture, and therefore the buy-out is probably beneficial. However, the amounts are all estimates and a small change in some variables like the growth rate or the cost of capital can have a large impact on the value. Also the assumption of cash flow growth in perpetuity may not be accurate. It is therefore advisable to undertake a sensitivity analysis.

(d) Potential buyers will need to be sought through open tender or through an intermediary. Depending upon the nature of the business being sold a single bidder may be sought or preparations made for an auction of the business. Doric Co's suppliers and distributors may be interested, as may be competitors in the same industry. High levels of discretion are required in the search process to protect the value of the business from adverse competitive action. Otherwise, an interested and dominant competitor may open a price war in order to force down prices and hence the value of the fridges division prior to a bid.

Once a potential buyer has been found, access should be given so that they can conduct their own due diligence. Up-to-date accounts should be made available and all legal documentation relating to assets to be transferred made available. Doric

Co should undertake its own due diligence to check the ability of the potential purchaser to complete a transaction of this size. Before proceeding, it would be necessary to establish how the purchaser intends to finance the purchase, the timescale involved in their raising the necessary finance and any other issues that may impede a clean sale. Doric Co's legal team will need to assess any contractual issues on the sale, the transfer of employment rights, the transfer of intellectual property and any residual rights and responsibilities to Doric Co.

A sale price will be negotiated which is expected to maximise the return. The negotiation process should be conducted by professional negotiators who have been thoroughly briefed on the terms of the sale, the conditions attached and all of the legal requirements. The consideration for the sale, the deeds for the assignment of assets and terms for the transfer of staff and their accrued pension rights will also all be subject to agreement.

4 (a) In order to calculate the duration of the two bonds, the present value of the annual cash flows and the price or value at which the bonds are trading at need to be determined. To determine the present value of the annual cash flows, they need to be discounted by the gross redemption yield.

Gross Redemption Yield (GRY)

Try 5%
$60 \times 1.05^{-1} + 60 \times 1.05^{-2} + 60 \times 1.05^{-3} + 60 \times 1.05^{-4} + 1060 \times 1.05^{-5} =$
$60 \times 4.3295 + 1000 \times 0.7835 = 1,043.27$

Try 4%
$60 \times 4.4518 + 1000 \times 0.8219 = 1,089.01$

GRY = 4 + [(1,089.01 - 1,079.68) / (1,089.01 – 1,043.27)] = 4.2%

Bond 1 (PV of cash flows)

$60 \times 1.042^{-1} + 60 \times 1.042^{-2} + 60 \times 1.042^{-3} + 60 \times 1.042^{-4} + 1060 \times 1.042^{-5}$

PV of cash flows (years 1 to 5) = 57.58 + 55.26 + 53.03 + 50.90 + 862.91 = 1,079.68

Market price = $1,079.68

Duration = [57.58x1 + 55.26x2 + 53.03x3 + 50.90x4 + 862.91x5] / 1,079.68 = 4.49 years

Bond 2 (PV of Coupons and Bond Price)

Price = $40 \times 1.042^{-1} + 40 \times 1.042^{-2} + 40 \times 1.042^{-3} + 40 \times 1.042^{-4} + 1040 \times 1.042^{-5}$

PV of cash flows (years 1 to 5) = 38.39 + 36.84 + 35.36 + 33.93 + 846.63 = 991.15

Market Price = $991.15

Duration = [38.39x1 + 36.84x2 + 35.36x3 + 33.93x4 + 846.63x5] / 991.15 = 4.63 years

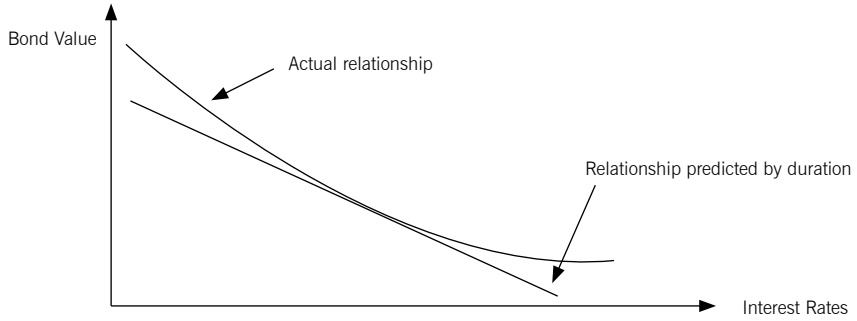
(b) The sensitivity of bond prices to changes in interest rates is dependent on their redemption dates. Bonds which are due to be redeemed at a later date are more price-sensitive to interest rate changes, and therefore are riskier.

Duration measures the average time it takes for a bond to pay its coupons and principal and therefore measures the redemption period of a bond. It recognises that bonds which pay higher coupons effectively mature 'sooner' compared to bonds which pay lower coupons, even if the redemption dates of the bonds are the same. This is because a higher proportion of the higher coupon bonds' income is received sooner. Therefore these bonds are less sensitive to interest rate changes and will have a lower duration

Duration can be used to assess the change in the value of a bond when interest rates change using the following formula:

$\Delta P = [-D \times \Delta i \times P] / [1 + i]$, where P is the price of the bond, D is the duration and i is the redemption yield.

However, duration is only useful in assessing small changes in interest rates because of convexity. As interest rates increase the price of a bond decreases and vice versa, but this decrease is not proportional for coupon paying bonds, the relationship is non-linear. In fact the relationship between the changes in bond value to changes in interest rates is in the shape of a convex curve to origin, see below.



Duration, on the other hand, assumes that the relationship between changes in interest rates and the resultant bond is linear. Therefore duration will predict a lower price than the actual price and for large changes in interest rates this difference can be significant.

Duration can only be applied to measure the approximate change in a bond price due to interest changes, only if changes in interest rates do not lead to a change in the shape of the yield curve. This is because it is an average measure based on the gross redemption yield (yield to maturity). However, if the shape of the yield curve changes, duration can no longer be used to assess the change in bond value due to interest rate changes.

(Note: Credit will be given for alternative benefits/limitations of duration)

(c) Industry risk measures the resilience of the company's industrial sector to changes in the economy. In order to measure or assess this, the following factors could be used:

- Impact of economic changes on the industry in terms how successfully the firms in the industry operate under differing economic outcomes;
- How cyclical the industry is and how large the peaks and troughs are;
- How the demand shifts in the industry as the economy changes.

Earnings protection measures how well the company will be able to maintain or protect its earnings in changing circumstances. In order to assess this, the following factors could be used:

- Differing range of sources of earnings growth;
- Diversity of customer base;
- Profit margins and return on capital.

Financial flexibility measures how easily the company is able to raise the finance it needs to pursue its investment goals. In order to assess this, the following factors could be used:

- Evaluation of plans for financing needs and range of alternatives available;
- Relationships with finance providers, e.g. banks;
- Operating restrictions that currently exist in the form of debt covenants.

Evaluation of the company's management considers how well the managers are managing and planning for the future of the company. In order to assess this, the following factors could be used:

- The company's planning and control policies, and its financial strategies;
- Management succession planning;
- The qualifications and experience of the managers;
- Performance in achieving financial and non-financial targets.

					Marks
1	**(a)**	**(i)**	Estimated future rates based on purchasing power parity		1
			Sales revenue, variable costs, component cost and fixed costs (in GR)		4
			Taxable profits and taxation		2
			Investment, terminal value and working capital		2
			Cash flows in GR		1
			Cash flows in $		1
			Discount rate of all-equity financed project		2
			Base case PVs and NPV		2
			PV of additional contribution, additional tax and opportunity cost		4
			PV of tax shield and subsidy benefits		4
			Closure costs and benefits		1
			Initial comments		1–2
			Assumptions and sensitivity analysis		2–3
				Max	27
		(ii)	Implications of change of government		2–3
			Other business factors (1 to 2 marks per factor)		5–6
				Max	8
			Professional Marks		
			Report format		1
			Layout, presentation and structure		3
				Total	4
	(b)		1 mark per relevant point	Total	6
	(c)		General commentary regarding benefits of risk diversification		2–3
			Relating specifically to Tramont Co and the Gamalan investment		2–3
				Max	5
				Total	**50**
2	**(a)**		Discussion of the main advantage		2
			Discussion of the main disadvantage		2
				Total	4
	(b)		Recommendation to go short if futures are used and purchase puts if options are used		1
			Calculation of number of contracts and remaining basis		2
			Futures contracts calculations		4
			Options contracts calculations		4
			Collar approach and calculations		4
			Supporting comments and conclusion		2–3
				Max	17
	(c)		Explanation of basis risk		2–3
			Effect of basis risk on recommendation made		2–3
				Max	4
				Total	**25**

				Marks
3	**(a)**	1 mark per benefit discussed	Max	4
	(b)	Calculation of funds used to pay proportion of liability holders		2
		Comment		1
			Total	3
	(c)	Calculation of funds required from MBO		4
		Calculation of value of the business		4
		Discussion		2–3
			Max	10
	(d)	Due diligence		3–4
		Potential buyers and sale price		4–5
			Max	8
			Total	**25**
4	**(a)**	Calculation of the gross redemption yield		2
		PV of cash flows and duration of bond 1		3
		PV of cash flows and duration of bond 2		4
			Total	9
	(b)	Duration as a single measure of sensitivity of interest rates		3–4
		Explanation of convexity		2–3
		Explanation of the change in the shape of the yield curve and other limitations		2–3
			Max	8
	(c)	For each of the four criteria – 2 marks for explanation and suggestion of factors	Total	8
			Total	**25**