Strategic Professional – Options

Advanced Financial Management (AFM)

Mock Examination

AFM

Time allowed: 3 hours 15 minutes

This question paper is divided into two sections:

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

Section B – BOTH questions are compulsory and MUST be attempted

Formulae and tables are on pages 8 –11.

Do NOT open this question paper until instructed by the supervisor.

This question paper must not be removed from the examination hall.

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

Question 1

Lime Co is a private company, based in Artland, which owns a chain of restaurants and hotels across the country. Lime Co's strategy of acquiring companies in different business sectors across the globe has so far diversified its risk until a recent board of directors (BoD) meeting, which revealed that a recent acquisition of Asian Co, an event management company in Asia, has brought major losses and has resulted in higher gearing levels in Asia. In the meeting, the matter is of serious concern that whether Asian Co must be sold before any further acquisitions take place, or not. A complete financial review and a comprehensive summary is presented to the BoD justifying that appropriate measures and factors have been considered prior to acquisition of Asian Co. A final decision is to be made as the acquisition failed to achieve its objectives and the problems have resulted in financial distress. The credit rating of Asian Co has downgraded from A to BBB according to credit agency rating. The directors are very concerned about this decision by the agency as this would directly impact the valuation of Asian Co's bonds and the future cost of debt.

Despite incurring losses, Asian Co has explored opportunities arising in Asia in the upcoming years. It has proposed Lime Co that an investment in a different business sector would help generate surplus cash flows. Tulip Co is one of the companies which currently provides services in that business sector.

Investment Project by Asian Co

Asian Co, however, has tried to convince the Lime Co's BoD that Asia is currently investing massively in leisure industry, which will create recreations and expand the tourism industry, resulting in rapid growth in the near future. Asian Co is considering entering the tourism market through a four year project. Asian Co suggests that the investment must be done on a now or never basis or the market will saturate and due to increased competition it will no more be feasible to remain in the industry.

The initial cost of the project is expected to be $ 20,000,000. The expected post-tax cash flows to generate over the four year project life are:

Year	**1**	**2**	**3**	**4**
Post-tax Cash Flows ($000s)	3,203	4,675	10,045	15,325

Currently, BoD being skeptical about further investing in Asian Co, has asked to delay and granted an option to invest in the project after two years as immediate investment would be risky due to the project volatility of 25% attached to its net present value.

Other Information

Asian Co market value of equity is estimated to be $22 million. Asian Co non-current liabilities of $20 million consists solely of 8% redeemable bond which has a nominal value of $100 and a redemption premium of 4% in four years' time. The government of Asia has issued four bonds. Since the bonds are all government bonds, it is assumed that the bonds are of the same risk class. Taxation can be ignored on government bond. The coupon is payable on annual basis.

(c) Behavioural finance attempts to explain how decision makers take financial decisions in real life, and why their decisions might not appear to be rational every time and, hence, have unpredictable consequences

Discuss the behavioural factors which might influence the investor's decision making and therefore a company's financial strategies.

(5 marks)

(50 marks)

Section B – BOTH questions are compulsory and MUST be attempted

Question 2

Dawn Co is a listed company which manufactures and sells food products around the world. It wants to acquire Sweet Co, an unlisted company producing premium quality, cakes and sweets. Dawn Co proposes to pay for the acquisition using one of the three methods. The relevant information is given below.

Financial information related to Dawn Co, Sweet Co and the combined company

Dawn Co
Dawn Co has 3,000 million shares in issue trading at $2 each.

Sweet Co
Extract from the most recent statement of profit or loss

	$ million
Sales Revenue	750.2
Profit before Interest and Tax	150.0
Interest	65.3
Tax	16.9
Profit after Tax	67.8

Sweet Co has 430 million shares in issue and the current market value of its debt is $525 million. Tax allowable depreciation and non-cash expenses of $42.2 million has been deducted already. Sweet Co makes an annual investment of $24.6 million in non-current assets and working capital to continue its operations at the current level. Three years ago, Sweet Co's profit after tax was $61.8 million. It has steadily grown to the current level and will likely continue for the foreseeable future. Sweet Co's cost of capital is estimated to be 10%.

Combined company
If Dawn Co acquires Sweet Co, it is expected that the combined company's sales revenue will be $7,450 million in the first year and its annual pre-tax operating profit margin on sales will be 16.2% for the foreseeable future. Its sales revenue will grow by 4.05% every year for the next three years. It can be assumed that the combined company annual depreciation will be equivalent to the investment required to maintain the company at current operational levels. Moreover, in order to increase the sales revenue levels every year, the combined company will require an additional investment in assets of $100 million in the first year and $0.61 for every $1 increase in sales revenue for each of the next three years.

After the first four years, it is expected that the combined company's free cash flows will grow by 2% annually for the foreseeable future. The combined company's cost of capital is estimated to be 8%. It expected that the combined company's market value of debt to equity ratio will be remain at 40:60 after the acquisition has taken place. Both Dawn Co's and Sweet Co's corporation tax payable on profits is at an annual rate of 20%. It can be assumed that corporation tax is payable in the same year in which profits arise.

Acquisition offers

Dawn Co proposed that Sweet Co acquisition be made through one of the following payment methods:

1. A cash payment offer of $4.00 for each Sweet Co share, or
2. Through a share-for-share exchange, where two shares of Dawn Co are exchanged for one Sweet Co share, or
3. By a mixed offer of a cash payment of $2·05 per share and one Dawn Co share for each Sweet Co share.

(a) Calculate the value of equity of Dawn Co and of Sweet Co before the acquisition, in addition of the combined company after the acquisition

(12 marks)

(b) Estimate the percentage gain in value for each Dawn Co share and Sweet Co share, under each of the cash, the share-for-share, and the mixed offers

(9 marks)

(c) Evaluate the likely reaction of Dawn Co's shareholders to the acquisition offers

(4 marks)

(25 marks)

Question 3

Kamala Co is a large multinational company with its headquarters in UK and a base currency of Sterling Pound (£). It has numerous subsidiary companies around the globe. The foreign exchange exposure as a result of transactions between Kamala Co and its subsidiary companies is managed by each company individually. Kamala Co is suggested to consider multilateral netting to manage the foreign exchange exposure using spot mid-rates.

The following cash flows arise in three months' time between Kamala Co and three of its subsidiary companies. The subsidiary companies are Jambo Co, based in the United States (currency US$), Canto Co, based in Australia (currency AUD) and Joki Co, based in Japan (currency JPY).

Owed by	**Owed to**	**Amount**
Kamala Co	Jambo Co	US$ 5·5 million
Kamala Co	Canto Co	AUD 1·3 million
Joki Co	Canto Co	AUD 3·7 million
Joki Co	Jambo Co	US$ 1·8 million
Canto Co	Jambo Co	US$ 1·9 million
Canto Co	Kamala Co	AUD 3·7 million
Jambo Co	Joki Co	JPY 280 million
Jambo Co	Kamala Co	US$ 2.2 million
Jambo Co	Kamala Co	US$ 1.3 million

Exchange rates available to Kamala Co

	US$/£1	**AUD/£1**	**JPY/£1**
Spot	1·2738–1·2762	1· 8390–1·8410	134·91–136·71
3-month forward	1· 2796–1·2837	1· 8352–1·8378	132·15–134·05

Currency futures (Contract size £52,500, Quotation: US$ per £1)

2-month expiry	1.3632
5-month expiry	1.3695

Currency options available to Kamala Co
(Contract size £52,500, Exercise price quotation: US$/£1, Premium: cents per £1)

	Call Options		**Put Options**	
Exercise price	**3-month expiry**	**5-month expiry**	**3-month expiry**	**5-month expiry**
1.36	6·61	7·31	9.20	9.85
1.38	5.97	6.55	8.70	9.32

It can be assumed that the futures and option contracts mature at the end of the relevant month

Annual interest rates available to Kamala Co and subsidiaries

	Borrowing rate	**Investing rate**
UK	4·3%	2·6%
United States	4·9%	3·2%

Required:

(a) Advise Kamala Co on, and recommend, an appropriate hedging strategy for the US$ cash flows it is due to receive or pay in three months, from Jambo Co. Show all relevant calculations to support the advice given.

(14 marks)

(b) Calculate, using multilateral netting, the inter-group and inter-company currency transfers made by Kamala Co and its three subsidiary companies for the cash flows due in three months.

(7 marks)

(c) Explain the key differences between a Salam contract, in the light of Islamic finance principles, and a future contract.

(4 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

[P.T.O.

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