THE UNIVERSITY OF THE WEST INDIES
CAVE HILL

EXAMINATIONS OF APRIL/MAY 2015.

CODE AND NAME OF COURSE: MGMT3076- MANAGING FINANCIAL INSTITUTIONS

DATE AND TIME: DURATION: 2 HOURS

INSTRUCTIONS TO CANDIDATES: This paper has 3 pages and 6 questions.

Answer any three (3) questions. Each is worth twenty five (25) marks.

QUESTION 1 (25 marks)

a) With the aid of a diagram, discuss how economic transactions between household savers of funds and corporate users of funds would occur in a world without financial institutions, and explain two functions performed by financial institutions. **[10]**

b) Identify and discuss the five risks common to all financial institutions. **[10]**

c) With the aid of a diagram, explain the loanable funds theory, and discuss how monetary policy actions made by the central bank impacts on interest rates. **[5]**

QUESTION 2 (25 marks)

a) Discuss the repricing model and identify the performance variable it focuses on. In addition, briefly explain why the repricing model does not accurately measure a financial institution's interest rate risk exposure. **[5]**

b) A financial institution has an 8% bond in issue, redeemable in 5 years time at a premium of 10% (on $100 face value). Assuming that the current required interest rate is 10%, calculate the (Macaulay) duration of the bond. **[5]**

c) Suppose that the manager of a financial institution calculates the duration of the financial institution's assets at 5 years and its liabilities at 3 years. Also suppose that the manager learns from the firm's economic forecasting unit that interest rates are expected to rise from 10 percent to 11 percent in the immediate future; that is

$$\Delta R = 1\% = 0.01$$
$$1 + R = 1.10$$

P.T.O

Question 2 (cont'd)

The financial institutions balance sheet is assumed to be:

ASSETS ($ millions)	LIABILITIES ($millions)
Assets = 100	Liabilities = 90
	Equity = 10
100	100

Required:

i. Calculate the potential loss to equity holders. **[5]**
ii. Prepare the market value balance sheet after the rise in rates by 1 percent. **[5]**
iii. Briefly discuss the ways in which the bank can immunize its balance sheet against interest rate movements. **[5]**

QUESTION 3 (25 marks)

a) Discuss the 5 C's of credit. **[10]**

b) Explain the purpose of credit scoring models and briefly discuss how these models assist can a financial institution manager in better administering credit. **[7]**

c) Suppose that a financial institution is considering the financial ratios of a potential client firm. These ratios are presented below:

Working capital/ total assets	$X_1 = 0.30$
Retained earnings/ total assets	$X_2 = 0.00$
Earnings before interest and taxes/ total assets	$X_3 = -0.30$
Market value of equity/ book value of long term debt	$X_4 = 0.15$
Sales/ total assets	$X_5 = 2.10$

The financial institution is considering using the Altman discriminant function shown below to assess the creditworthiness of the potential client firm:

$$Z = 1.2\,X_1 + 1.4\,X_2 + 3.3\,X_3 + 0.6\,X_4 + 1.0\,X_5$$

Required:

Briefly discuss Altman's credit scoring model. Using the discriminant function above, determine whether the firm should accept or reject the potential client based on estimated default risk. **[8]**

P.T.O

QUESTION 4 (25 marks)

a. Discuss the RAROC Model and briefly explain how this model uses the concept of duration to measure the risk exposure of a loan. [8]

b. Discuss how loan portfolio risk differs from individual loan risks, and briefly identify and explain the benefits of loan portfolio diversification. [10]

c. Suppose that a financial institution holds two loans with the following characteristics.

Loan	X_i	Annual Spread between loan rate and FI's Costs of Funds	Annual Fees	Loss to FI Given Default	Expected Default Frequency	
1	0.45	5.5%	2.25%	30%	3.5%	$\rho_{12} = -0.15$
2	0.55	3.5	1.75	20	1.0	

Required:

Using Moody's Analytics Portfolio Manager, calculate the return and risk on the two-asset portfolio. [7]

QUESTION 5 (25 marks)

a. Identify the five functions of a financial institution's capital. [5]

b. Explain what are contagious runs. In addition, briefly discuss some of the potentially serious adverse social welfare effects of contagious runs. Finally, explain whether all types of financial institutions face the same risk of contagious runs. [10]

c. Discuss the moral hazard problem. Briefly explain how deposit insurance programmes contribute to this problem, and identify and explain three ways a deposit insurance contract could be structured to reduce moral hazard. [10]

QUESTION 6 (25 marks)

a. Discuss the Basel Agreement. [10]

b. Identify and explain the major features of the Basel III capital requirements. Explain the process of calculating credit risk-adjusted on-balance sheet assets. [8]

c. Explain what are derivative contracts, and identify their value to managers of financial institutions. [7]

END OF QUESTION PAPER

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	0·941	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	0·305	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	10·37	9·787	9·253	8·760	8·306	7·887	7·499	7·139	6·805	6·495	11
12	11·26	10·58	9·954	9·385	8·863	8·384	7·943	7·536	7·161	6·814	12
13	12·13	11·35	10·63	9·986	9·394	8·853	8·358	7·904	7·487	7·103	13
14	13·00	12·11	11·30	10·56	9·899	9·295	8·745	8·244	7·786	7·367	14
15	13·87	12·85	11·94	11·12	10·38	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

Duration Model

$$D = \frac{\sum_{t=1}^{N} CF_t \times DF_t \times t}{\sum_{t=1}^{N} CF_t \times DF_t} = \frac{\sum_{t=1}^{N} PV_t \times t}{\sum_{t=1}^{N} PV_t}$$

$$\frac{\Delta P}{P} = -D\left[\frac{\Delta R}{1+R}\right]$$

$$\Delta E = -[D_A - D_L k] \times A \times \frac{\Delta R}{1+R}$$

Modern Portfolio Theory

$$\overline{R}_p = \sum_{i=1}^{n} X_i \overline{R}_i$$

$$\sigma_p^2 = \sum_{i=1}^{n} X_i^2 \sigma_i^2 + \sum_{i=1}^{n} \sum_{j=1}^{n} X_i X_j \sigma_{i,j}$$

$$= \sum_{i=1}^{n} \sum_{j=1}^{n} X_i X_j \rho_{i,j} \sigma_i \sigma_j$$

Moody's Analytics (KMV) Portfolio Manager Model

$$R_i = AIS_i - E(L_i) = AIS_i - [EDF_i \times LGD_i]$$

$$\sigma_i = UL_i = \sigma_{Di} \times LGD_i = [EDF_i(1-EDF_i)]^{1/2} \times LGD_i$$