FIN357
Fixed Income Securities

Question 1 (20 marks)

The table below shows the terms of Xcel Telecoms Ltd bonds. Both bonds were issued 10 years ago.

	Floating Rate Note	7% Fixed Rate Note
Issue size	$200 million	$200 million
Original maturity	30 years	20 years
Current price	99	95
Current Coupon	6% (rate resets yearly)	7%
Call Protection	1st 10 years	1st 10
Call Price	103	105
Yield to maturity	--	8%
Price range since issue	$97 to $102	$88 to $110

(a) Discuss why the price range of the floating rate note is narrower than the price range of the fixed rate note.

(5 marks)

(b) Explain why the price of the floating rate note is seldom the par value?

(5 marks)

(c) Explain why the floating rate note investor would not care much about the call price? (5 marks)

(d) Evaluate the probability of a call for the fixed-rate note. Is it high or low?

(5 marks)

Question 2 (20 marks)

The Super Fund owns the following two 30-year original maturity mortgage-backed securities shown in the table below. The fund uses the 10-year US Treasury yield as a relative measure to gauge the level of current 30-year home mortgage rates. Over the past four years, the 10-year US Treasury yield has declined below 5.50% three times, subsequently rising above 6.50 % each time. The 10-year US treasury yield is currently at 6.50%.

Issue	Coupon	Weighted Average Maturity (months)	Price	Current Month CPR
MBS -1	7.50%	355	100	5
MBS-2	7.50%	260	100	12

(a) Analyse the effect on prepayments of each of the following three factors:
    (i)   coupon rate of the mortgage
    (ii)   age of the mortgage
    (iii)   seasonality

(9 marks)

(b) Describe how principal prepayment risks is measured. Based on the table above which security will experience a higher percentage of principal prepayment?

(5 marks)

(c) Appraise the reasons why prepayments are likely to be more stable for automobile receivables asset-backed securities when compared to similar-duration mortgage-backed securities.

(6 marks)

Question 3 (20 marks)

Super Chicken Sdn Bhd is a listed company that is the largest egg producer in Malaysia. It intends to expand its operations to Indonesia and is launching, in Singapore, a 10-year US$100 million bond issue at a coupon rate of LIBOR + 8%. The bond will be collateralised by the assets of 10 farms in Malaysia as well as the assets of 10 farms that will be developed in two years in Indonesia.

As the bond analyst for the Singapore Bond Fund, you have been instructed to look into the merits and demerits of the bond issue.

(a) Explain what type of bond is the 10-year Superchicken US$ bond paying a coupon of LIBOR+8%?

(2 marks)

(b) Besides interest rate and reinvestment risks, distinguish and discuss 3 types of risks that a Singapore investor who invests in this bond faces.

(12 marks)

(c)   Analyse the quality of the collateral that is attached to this bond.

(6 marks)

Question 4 (20 marks)

You are given the following US Treasury Note yield curve data:

Years to Maturity	Par Coupon Yield to Maturity	Calculated Spot Rate	Calculated 1-year Forward Rate
1	5.00%	5.00%	5.00%
2	5.20%	5.21%	5.42%
3	6.00%	6.05%	7.75%
4	7.00%	7.16%	10.56%
5	7.00%		

(a)   Compute the five-year spot rate and forward rate assuming annual compounding.

(6 marks)

(b)   Explain why, for financial assets like coupon-paying bonds, it is not a good idea to value the asset using a single discount rate.

(4 marks)

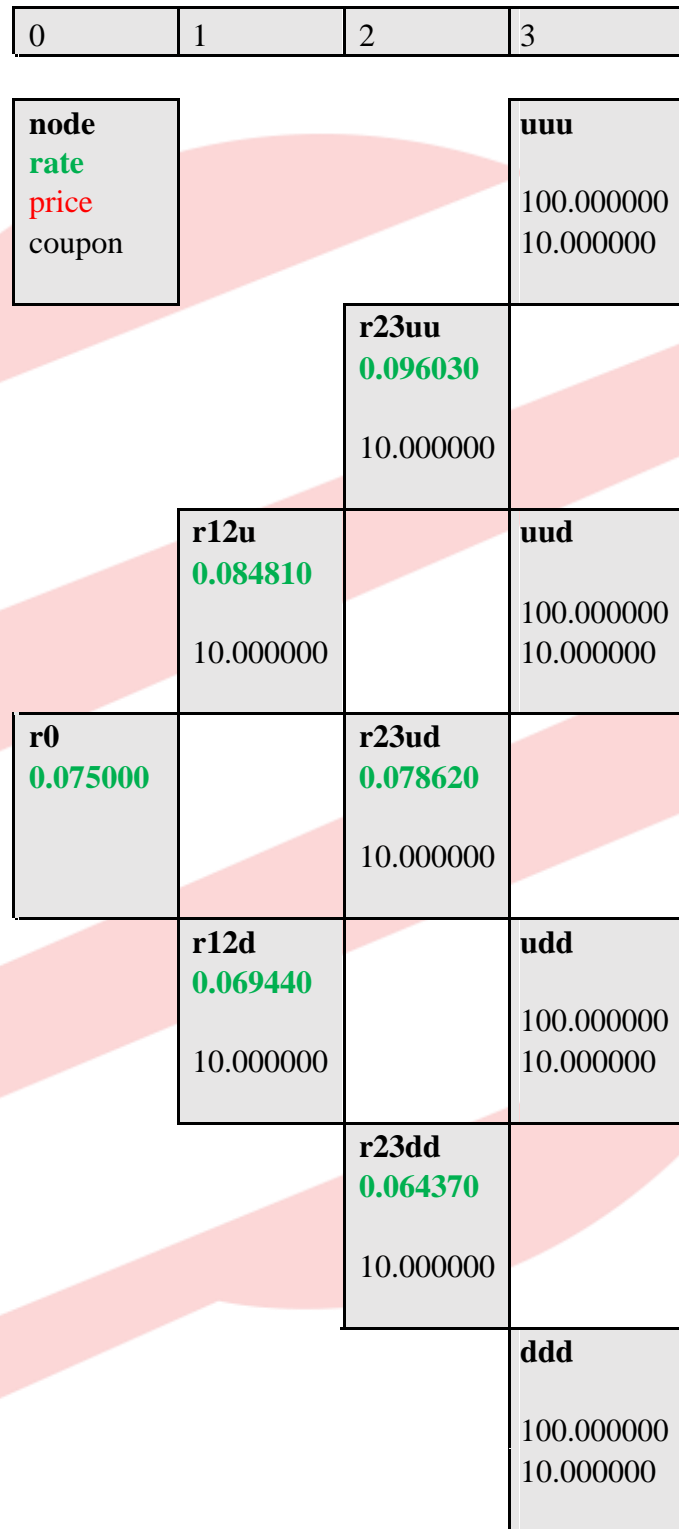(c)   You are given the following data for two bonds, ABC and XYZ:

Characteristic	**ABC**	**XYZ**
Market price	101.75	101.75
Maturity date	June 1, 2025	June 1, 2025
Call date	Noncallable	June 1, 2020
Annual coupon	6.25%	7.35%
Interest payment	Semiannual	Semiannual
Effective duration	7.35	5.40
Yield to maturity	6.02%	7.10%
Credit rating	AA	AA

(i)   Assess the magnitudes of the modified durations of ABC and XYZ, relative to their respective effective durations.

(3 marks)

(ii)   Compute the percentage price change forecasted for ABC and XYZ of an interest rate decline of 50 basis points over the next 6 months.

(3 marks)

(iii)   Suppose the actual prices at the end of 6 months were 105.55 and 104.14 for ABC and XYZ, respectively. Evaluate and explain why the actual price change would be greater for ABC and why the actual price change would be less for XYZ.

(4 marks)

Question 5 (20 marks)

(a)   Based on the binomial tree below which is based on 10% interest rate volatility, illustrate the steps you use to derive the value of the bond at time 0.

(7 marks)

0	1	2	3

node **rate** price coupon			**uuu** 100.000000 10.000000
		r23uu **0.096030** 10.000000	
	r12u **0.084810** 10.000000		**uud** 100.000000 10.000000
r0 **0.075000**		**r23ud** **0.078620** 10.000000	
	r12d **0.069440** 10.000000		**udd** 100.000000 10.000000
		r23dd **0.064370** 10.000000	
			ddd 100.000000 10.000000

(b) Suppose the bond is callable at a price of 102 from year 1. Compute the value of the callable bond at time 0.

(7 marks)

(c) Suppose the interest rate volatility increases. Explain how it affects the value of the callable bond in part (b).

(6 marks)

---- END OF ASSIGNMENT ----