KASNEB

PART 3

SECTION 5

FIXED INCOME INVESTMENT ANALYSIS

REVISED ON: MARCH 2019

STUDY PACK

GENERAL OBJECTIVE

This paper is intended to equip the candidate with knowledge, skills and attitudes that will enable him/her to value, analyse and determine risk associated with fixed income securities.

14.0 LEARNING OUTCOMES

A candidate who passes this paper should be able to:

- Identify various types of fixed income instruments
- Assess various types of risks associated with fixed income instruments
- Analyse interest rate volatility using the term structure of interest rate approach
- Value and analyse fixed income instruments
- Value bonds using interest rate models
- Determine the value of bonds using yield and spread analysis
- Apply pricing strategies and evaluate the risk of fixed income securities
- Apply the models to determine credit default rates.

CONTENT

14.1 Overview of fixed income securities

- Basic features of fixed income securities
- Types of fixed income securities
- Bond indenture; affirmative and negative covenants; effect of legal, regulatory and tax considerations on the issuance and trading of fixed income securities
- Structure of cash flows of fixed income securities; contingency provisions affecting the timing and/or nature of cash flows of fixed income securities
- Risks associated with fixed income securities

14.2 Markets of fixed income securities: Issuance, trading and funding

- Classifications of global fixed income markets
- Interbank offered rates as reference rates in floating-rate debt; mechanisms available for issuing bonds in primary markets; secondary markets for bonds; securities issued by sovereign governments, non-sovereign governments, government agencies and supranational entities; debt securities issued by corporations; short-term funding alternatives available to banks; repurchase agreements (repos)

14.3 Fundamentals of fixed income valuation

- Determination of price of the bond given a market discount rate
- Relationships among a bond's price, coupon rate, maturity and market discount rate (yield-to- maturity)
- Bonds price quotation: spot rates; flat price(clean price), accrued interest and the full price of a bond(dirty price)
- Matrix pricing of a bond
- Yield measures for fixed-rate bonds, floating-rate notes and money market instruments
- Term structure of interest rate: pure expectation theory, liquidity preference theory, market segmentation theory; implications of the yield curve for the yield-curve theories
- Spot curves, yield curve on coupon bonds, par curve and forward curve
- Forward rates; determination of spot rates from forward rates, forward rates from spot rates and the price of a bond using forward rates; yield spread measures
- Bond refinancing/refunding

14.4 Fixed income risk and return

- Return from investing in a fixed-rate bond
- Bond duration measures: Macaulay duration, modified duration and effective durations, portfolio duration ; money duration of a bond and price value of a basis point (PVBP)
- Effective duration as a measure of interest rate risk for bonds with embedded options
- Key rate duration as a measure of sensitivity of bonds to changes in the shape of the benchmark yield curve
- Effect of a bond's maturity, coupon, embedded options and yield level to its interest rate risk
- Bond convexity: approximate convexity; effective convexity; determination of percentage price change of a bond for a specified change in yield, given the bond's approximate duration and convexity
- Effect of term structure of yield volatility on the interest rate risk of a bond; relationships among a bond's holding period return, its duration and the investment horizon
- Effect of changes in credit spread and liquidity on yield-to-maturity of a bond and how duration and convexity can be used to estimate the price effect of the changes

14.5 Credit risk management

- Credit risk and credit-related risks affecting corporate bonds; seniority rankings of corporate bonds; potential violation of the priority of claims in a bankruptcy proceeding; corporate issuer credit ratings; issue credit ratings ; rating agency practice of "notching"; risks in relying on ratings from credit rating agencies; components of traditional credit analysis
- Financial ratios used in credit analysis; credit quality of a corporate bond issuer given key financial ratios of the issuer and the industry
- Factors influencing the level and volatility of yield spreads; determination of return impact of spread changes; special considerations when evaluating the credit of high yield, sovereign and municipal debt issuers and issues

14.6 The term structure and interest rate dynamics

- Relationships among spot rates, forward rates, yield to maturity, expected and realised returns on bonds and the shape of the yield curve
- Forward pricing and forward rate models: determination of forward and spot prices and rates using those models
- Assumptions concerning the evolution of spot rates in relation to forward rates implicit in active bond portfolio management; the strategy of riding the yield curve
- Swap rate curve: its use in valuation by market participants; determination and interpretation of the swap spread for a default-free bond; the Z-spread; treasury and Euro dollar(TED) spread and London interbank offer rate(LIBOR) – OIS spreads
- Review of traditional theories of the term structure of interest rates; the implications of each theory to forward rates and the shape of the yield curve
- Modern term structure models and their use; measuring the bond's exposure to each of the factors driving the yield curve and how these exposures can be used to manage yield curve risks; maturity structure of yield volatilities and their effect on price volatility

14.7 The arbitrage-free valuation framework

- Overview of arbitrage-free valuation of a fixed-income instrument
- Computation of the arbitrage-free value of an option-free, fixed-rate coupon bond

- Binomial interest rate tree framework: the backward induction valuation methodology and computation of the value of a fixed-income instrument given its cash flow at each node; process of calibrating a binomial interest rate tree to match a specific term structure
- Pricing using the zero-coupon yield curve and pricing using an arbitrage-free binomial lattice; path wise valuation in a binomial interest rate framework and computation of the value of a fixed-income instrument given its cash flows along each path
- Monte Carlo forward-rate simulation and its application

14.8 Valuation and analysis of bonds with embedded options

- Overview of fixed-income securities with embedded options
- Relationships between the values of a callable or putable bond, the underlying option-free (straight) bond and the embedded option; Use of the arbitrage-free framework to value a bond with embedded options
- Effect of interest rate volatility on the value of a callable or putable bond
- Effect of changes in the level and shape of the yield curve on the value of a callable bond
- Determination of the value of a callable or putable bond from an interest rate tree; option - adjusted spreads (OAS); effect of interest rate volatility on option-adjusted spreads
- Effective duration of callable, putable and straight bonds; use of one-sided durations and key rate durations to evaluate the interest rate sensitivity of bonds with embedded options
- Effective convexities of callable, putable and straight bonds
- Determination of the value of a capped or floored floating-rate bond
- Defining features of a convertible bond; components of a convertible bond's value; valuation of convertible bond in an arbitrage-free framework; risk–return characteristics of a convertible bond, straight bond and underlying common stock.

14.9 Credit analysis models

- Overview of credit analysis models; probability of default, loss given default, expected loss and present value of the expected loss and relative importance of each across the credit spectrum
- Credit scoring and credit ratings ; ordinal rankings
- Strengths and weaknesses of credit ratings

- Structural models of corporate credit risk: reasons for equity being viewed as a call option on the company's assets; reduced form models of corporate credit risk
- Reasons for debt being valued as the sum of expected discounted cash flows after adjusting for risk
- Assumptions, strengths and weaknesses of both structural and reduced form models of corporate credit risk
- Determinants of the term structure of credit spreads; present value of the expected loss on a bond over a given time horizon
- Credit analysis required for asset-backed securities
- Credit analysis of corporate debt

14.10 Emerging issues and trends

TOPIC **PAGE**

CHAPTER ONE

OVERVIEW OF FIXED INCOME SECURITIES

Fixed Income Investments are financial assets or securities that promise a fixed rate of return. E.g. Bonds & Preference shares.

Bonds

This is a fixed income investment issued by the Government or a corporate firm.

Properties of Bonds

Main properties of Bonds

1. Coupon Rate

   Is the interest rate the issuer promises to pay the holder. It will determine the cash flows that investors receive.

2. Par Value / Face / Redemption Value

   This is the amount that the issuer promises to pay the holder at maturity period. The per value influence the cash flow that investor receives.

3. Currency denomination

   This is the currency in which the bond is issued. There are 2 main types

   A. A bond issued in the USD is known as **dollar denominated bond.**
   B. The bond issued in any other currency other than the USD is known as **non – dollar denominated bond.**

4. Maturity

   Is the period it takes for the issuer to pay the final interest + principal amount. Maturity is important because:-

   i. It indicates **the period** it takes for the holder to receive the final interest + principal amount.
   ii. The **price volatility** of the bond is a function of maturity.
   iii. It influences the **Yield to Maturity** .i.e. the longer t is the higher the YTM & vice versa.

5. Issuer / Quality of Issuer

   He determines the risk that the holder or investors are exposed to. The risk is normally determined by the credit rating of the bond. The higher the rating the lower the risk & vice versa.

6. Embedded Option

Are **provisions** in the bond contract that may benefit the issuer or the holder of the F.

Income investment- It is called embedded option because it **is part & parcel** of the bond hence it cannot be separated from the bond.

May 2014 Q3c and JUNE 2010 Q4b&c

Provisions that benefit the issuer

(a) **Call Provisions**

They enable the issuer to recall the bond or refine the bond before maturity period. The issuer will call the bond in the period of declining interest rate.

(b) **Cap provision**

It sets the upper limit on the interest rate. Once the cap rate is attained, the interest rate cannot go beyond the cap rate for a floating rate security hence this provision protects the issuer against paying higher interest rate.

CHAPTER TWO

MARKETS OF FIXED INCOME SECURITIES: ISSUANCE, TRADING AND FUNDING

MECHANISM FOR PLACING BONDS IN THE PRIMARY MARKETS

The primary market is a market where securities are issued for the first time.
The primary market for debt functions in manners similar to the primary market for equities.
Typically an investment banker is involved in advising the debt issue & in distributing the debt securities to investors.
When the investment banker actually purchases the entire issue & resells it, they are said to have underrated the issue.
This arrangement is stamped as a firm commitment while the deal is stamped a bought deal.

In underwritten offering of debt securities, the underwriter will typically put together a syndicate of other investment bankers to aid in distributing securities.
The underwriters can reduce their risk by pre-selling as much of the offering as possible to their institutional clients & hedging the interest rate risk exposure of the issue for the period they anticipate owning the securities.
An alternative is for the investment banker to agree to sell all the issue they can and this is stamped "doing the offering on a best efforts basis"
In the above described process since the price paid for the issue & the anticipated sale price is determined between the lead investment bank and the issuing company the offering is stamped a negotiated offering.
Auction Process is another Approach:- An issuer of debt securities determines the size and terms of auction issue and several investment banks or underwriting syndicates of multiple investment banks bid on what interest rate they require to sell it.
The syndicate with the lowest I.R will be awarded the deal.

In the US, securities to be offered to the public investors must be registered with the SEC (Securities Exchange Commission). When a new issue of debt securities is not registered for sale to the public, it still may be sold to a small number of investors
This is called a private placement or rule 144A offering.

SECONDARY MARKET FOR BONDS

Includes;

- Exchange
- An over the counter deal market
- Electronic trading network

Traditionally most security trading in debt securities was transacted in a dealer market with brokers / dealers buying & selling bonds for & from their inventories.
More recently, electronic trading network have become an important part for the second market bonds.

OVERVIEW OF BOND SECTORS & INSTRUMENTS

Government securities, county, central Gov't
Bonds issued are referred to as sovereign debt / bond. Sovereign debts are issued in the currency of the issuing country but can be issued in other currencies as well.

Primary methods used by central government to issue sovereign debt.
Dec 2014 (a)
Basically there are 4 primary methods used by central government to issue sovereign debt.

(i) Regular cycle option: Single price
Under this method, the debt is auctioned periodically according to a cycle & the highest price at which the entire issue to be sold or auctioned can be sold is awarded to all bidders.

(ii) Regular cycle auction: Multiple prices.
Under this method winning bidders receive the bond at the prices that they bid.

(iii) An Adhoc Auction System

This refers to a method where central government auctions new securities when it determines that market conditions are advantageous.

(iv) A tap System

Refers to the issuance & auction of bonds identical to previously issued bonds. Under this system, bonds are sold periodically not according to a regular cycle.

May 2012 Q1a

CHAPTER THREE

FUNDAMENTALS OF FIXED INCOME VALUATION

YIELD MEASURES

Debt securities that make explicit interest payment have 3 sources of return

(i) Periodic coupon interest payments made by the issuer.
(ii) The recovery of principal along with any capital gain or loss that occurs when the bond matures.
(iii) Re – investment income or the income carried from re – investing periodic coupon payment

NB: A good yield measure should consider all the 3 (three) above consideration

(i) Current Yield

This is an annualized rate of return. It's the simplest of all return measures but offers limited information. This measure looks at just one source of return i.e. the bond annual interest gain or loss or investment income formulae.

$$\text{Current yield} = \frac{\text{Annual cash coupon paymen}}{\text{Bond price}} \text{ x } 100$$

Example
Consider a 10 year 1000 per value, 6% semiannual pay bond that is currently trading at Shs. 802.07. Calculate the current yield.

Solution
Annual Cash Flow = 6/100 x 100 = 60

Current yield = 60/802.07 x100 = 7.5%

(ii) Modified Current yield

This yield measure was introduced due to the limitation of current yield. This is because this measure considers capital gain or loss. Modified current yield is equal to yield to maturity.

$$\text{Modified current yield} = \text{current yield} + \frac{\text{Par Value} - \text{Market Value}}{\text{Maturity (years)}}$$

NB The above formula can only be used to compute Y.T.M if the current yield is given.

(iii) **Yield to Maturity (Y.T.M)**

This is an annualized internal IRR rate of return based on bonds price & its promised cash flow. It is a rate of return that investor will earn when they purchase the bond and hold it until maturity period.

$$\text{Y.T.M} = \left[\frac{C + \frac{Pv - mv}{n}}{(Pv + mv)/2}\right][1 - T] \times 100$$

Where

$C = \frac{\text{Coupon rate}}{100} \times \text{Par value}$

CHAPTER FOUR

FIXED INCOME RISK AND RETURN

Bond Valuation

In order to estimate the value of the bond, the following variables should be established
(i) Coupon Rate:- Is the interest rate that the issuer of the bond promises to pay the bond holder. It will determine the cash flow of an investor.

Cash flow (c) = $\frac{\text{Coupon rate}}{100}$ X par value

(ii) Interest rate / YTM: Is the prevailing interest rate in the market. This variable is used as a discounting rate.
(iii) Maturity (n)- Is the period it takes for the holder of the bond to receive the final cash flow & the principal amount.
(iv) The par value / face value- is the amount at which the bond was initially issued. Also known as face rate / redemption value etc.

General formula

$V_0 = C\ (PV1FA^r_n) + PV\ (PV1F^r_n)$
Where r = YTM, n = Maturity Pv = Par Value Vo = Price of the bond

Other factors that might influence the bond value include

(v) Credit Rating- Is the opinion given by rating agencies. It indicates the risk that the investors are exposed to when they invest in a fixed income instrument. The higher the credit rating the lower the risk and vice versa.

(vi) Embedded Options: - Are provisions in the bond contract that may benefit the issuer or holder of a fixed income instrument. They are called embedded because they are part & parcel of the bond hence cannot be separated from the bond.

Example
A 10% bond has a par value of 1000 & YTM of 12% given that this is an annual pay bond with a maturity of 5yrs, determine its price

Solution

$Vo = C\ (PV1FA^{r=12}_{n=5}) + PV\ (PV1F^{r=12}_{n=5})$

$C = \frac{10}{100}\ X\ 1000 = 100$

$Vo = 100x3.6048 + 1000\ x\ 0.5674 = 927.907 = 908$

CHAPTER FIVE

CREDIT RISK MANAGEMENT

Credit Risk is the risk associated with losses from the failure of the borrower to make timely & full payment of the interest & principal
Credit risk has 2 components;

- ✓ Default risk
- ✓ Loss severity

Default risk: probability that a borrower fails to pay interest or repayment when due.
Loss Serenity or Loss given default-Refers to the value of the bond investor will lose if the issuer defaults

There are four main approaches of gauging the credit risk.
(a) Credit rating
(b) Traditional credit analysis
(c) Credit scoring models
(d) Credit risk model

a) Credit rating

Is an opinion given by rating agencies about the risk of default in a particular issue of debt security.

Rating process, surveillance & preview

The rating process begins when a rating agency receives a formal request from an entity planning to issue a bond in which it seeks a rating for the bond issue.
Once credit rating has been assigned to a corporate debt, the rating agency monitors the credit quality of the issue & reassigns a different rating
Typically before an issue rating is changed, the rating agency will announce in advance that it is reviewing the issue with the potential for upgrade or downgrade.
In this case, the issue is said to be on a credit watch or rating watch. In addition, rating agencies will issue a rating outlook.

A rating outlook is a projection of whether an issue in the long – run is likely to be upgraded, downgraded or maintains its current rating.

Dec 2012 Q3b

Risks in relying on ratings from credit rating agencies

Relying on rating from credit rating agencies has some risks.
The 4 specific risks are:-
(i) Credit ratings are dynamic: - Credit rating change over time. Rating agencies may update their default risk assessment during the life of a bond. Higher credit rating tends to be more stable than lower credit rating.
(ii) Rating agencies are not perfect
Rating mistakes occur from time to time hence there is no exact accuracy on rating.
(iii) Event risk is difficult to access
Risks that are specific to a company or industry are difficult to predict & incorporate into credit rating

(iv) Market prices of credit spread change much than credit rating
Additionally two bonds with the same rating can trade at different yield
Market prices reflect expected losses while credit rating only access default risk

May 2015 5a

CHAPTER SIX

THE TERM STRUCTURE AND INTEREST RATE DYNAMICS

YIELD CURVE SHIFTS

A shift in the yield curve refers to the relative change in the yield for each treasury maturity.
A parallel shift in the yield curve refers to a shift in which the change in yield for all maturities is the same.
A non – parallel shift in the yield curve means that the yield for different maturities does not change by the same number of b.ps
Historically two types of non – parallel shifts have been observed
(a) A twist in the shape of the yield curve
(b) A change in the humpedness / curvature of the yield curve

A twist in the shape of the yield curve refers to a flattening or steepening of the yield curve
A flattening curve – shape of yield curve has decreased whereas steepening of yield curve – slope of yield curve has increased.

CHAPTER SEVEN

THE ARBITRAGE-FREE VALUATION FRAMEWORK

This approach argues that the value of the bond using the traditional rate should be equivalent to the value of the bond using the traditional valuation method basically YTM:

$V_0 = C\ (PV1FA^{r=}_{n=}) + PV\ (PV1Fra^{=}_{n=})$

With the arbitrage free valuation approach, we discount each cash flow using a discount rate that is specific to the maturity of each C.F

The discount rates are called spot rates & can be thought of as the required rates of returns on zero coupon bonds, maturing at various times in future.
The arbitrage free valuation approach simply says that the value of a T-bond based on spot rates must be equal to the value of the parts .i.e. the sum of the pv of all expected CFs. If this isn't the case, there must be an arbitrage opportunity.
If the bond is selling for more than the sum of present value of its expected CFs an arbitrage will buy the bond and sell the pieces.
If the bond is selling for more than the sum of the PV of the pieces i.e. individual CFs one would buy the pieces packages them to make a bond & sell the bond percentage to earn an arbitrage profit.

The 1st Step: In checking for arbitrage free valuation is to value a coupon bond using the appropriate spot rates.

2nd Step: Compare this value to the market price of the bond.
If the market value isn't given, determine the theoretical value of the bond using the YTM. If the computed value isn't equal to the market price, there is an arbitrage profit to be earned by buying the lower price alternative & selling the higher price alternative.

Example
Consider a 6% T. note with 1.5 years to maturity. Spot rates expressed as semiannual YTM or bond equivalent yield curve as follows

6 months	5%
1 yr	6%
1.5 yrs	7%

If the rate is selling for 992, compute the arbitrage profit & explain a dealer could perform the arbitrage

Solution

Semiannual spot rates		S_1
6 month	5%	2.5
1 Yr	6%	3
1.5 yr	7%	3.5

$$V_O = \frac{CF1}{(1+5)\text{^}1} + \frac{CF2}{(1+S2)\text{^}2} + \frac{(CF3+Pv)}{(1+S3)\text{^}3}$$

$$C.F = {}^{6}/_{200} \text{ X } 1000 = 30$$

$$V_O = \frac{30}{(1.025)\text{^}1} + \frac{30}{(1.03)\text{^}2} + \frac{(1030)}{(1.035)\text{^}3} = 986.55$$

The investor will buy the STRIPS in the open of Shs. 986.55 then reconstitute the STRIPS or combine the STRIPS to form a treasury note. Ignore the cost of performing the transformation
The sell the note in the open market at 992/=
The arbitrage profit = 992 – 986.55 = Shs. 5.45

How a dealer can generate an Arbitrage Profit.

- The treasury STRIPS programme allows dealers to divide T-bonds into their coupon payments by date & their maturity payment in order to create zero coupon securities.
- The programme also allows re – constitution of T. bonds or notes by putting the individual C.Fs back together to create treasury securities.
- Ignoring any cost of performing these transformations, the ability to separate and reconstitute treasury securities will ensure that the arbitrage free valuation condition is met.

The arbitrage free valuation approach is based on the law of one price .i.e. A security cannot sell at different prices.

Dec. 2012 Q4b

Assume par value of Shs. 1000

C.F = $\frac{5}{200}$ X 1000 = 25

$$V_O = \frac{CF1}{(1+S1)1} + \frac{CF2}{(1+S2)2} + \frac{CF3}{(1+S3)3} + \frac{CF4+Pv}{(1+S4)4}$$

$$= \frac{25}{(1.015)^1} + \frac{25}{(1.0165)^2} + \frac{25}{(1.017526)^3} + \frac{1025}{(1.019584)^4} = 1021.051$$

Using YTM = V_0 = 3.717 x 25 + 1000 x 0.8888 = 981.4

981.4 = mkt value

Buy bond at Shs. 981.4 & sell at 1021.051

Arbitrage profit = 1021.051 – 981.4 = 39.651

CHAPTER EIGHT

VALUATION AND ANALYSIS OF BONDS WITH EMBEDDED OPTIONS

Valuing a bond with embedded option using Binomial model
A binomial model is a relatively simple single factor interest rate model that given an assumed level of volatility suggest than interest rates have an equal probability of taking on one of the two possible values in the next period.

An interest rate models assumptions about interest rate volatility along with a set of path with interest rate may follow. This set of possible interest rates path is referred to as interest rate tree.

Binomial Interest rate trees
The set of possible interest rate paths that are used to value bonds with a binomial model is called a binomial interest rate tree.

Example
The following information relates to a 6.5% 100 par bond with maturity of 4 years

Year	Spot rates
1	3.5%
2	4.318%
3	4.17352%
4	5.2706%

Required
(a) Determine the value of the bond

Solution

$\frac{6.5}{100}$ X 100 = 6.5

$$\frac{6.5}{(1.035)^1} + \frac{6.5}{(1.042148)^2} + \frac{6.5}{(1.047352)^3} + \frac{106.5}{(1.052706)^4}$$

6.2802 + 5.9849 + 5.6576 + 86.7204 = 104.6431

Example 2
Given are the following forward rates
Current 1yr forward rate 3.1%
1 yr forward rate 1 yr from now is 4.939%
1 yr forward rate 2 yrs from now is 5.784%
1 yr forward rate 3 yrs from now is 6.893%

Required
(i) Determine the value of the bond using forward rates
(ii) Determine the value of the bond using a binomial tree based on the following information

Solution

$$\frac{6.5}{(1.031)1} + \frac{6.5}{(1.31)^1\,(1.04939)} \frac{6.5}{(1.031)(1.04939)(1.05784)} + \frac{106.5}{(1.031)\,(1.04939)(1.05784)(1.068)}$$

6.3046 + 6.0075 + 5.6793 + 86.8897 = 104.8814

CHAPTER NINE

CREDIT ANALYSIS MODELS

Cash flow measures

- The profitability ratios, turnover ratios & liquidity ratios show some downward trend but provide no definite clue to the Company's impeding bankruptcy.
- A study of cash flows from operations reveals that company operations were causing an increasing drain rather than providing cash flows.
- This led to an increased use of external financing which requires a firm to meet interest payment obligation which further drained the cash flows
- The firm's statement of cash flows lists separately cash flows from operating activities, investing & financing activities.
- Cash flow from operating activities is also known as cash flow from operation. By analyzing individual statement of cash flows creditors can examine specific aspects of business such a
  1) Source of financing for business operations whether through internal or external sources of funds.
  2) Ability of the firm to meet debt obligation i.e. interest & principal payment.
  3) Ability of the company to finance expansion through cash flow from operating activities.
  4) Ability of the company to pay dividends to shareholders.
  5) Flexibility a business has in financing its operations.

A firm that generates cash flows only by selling of its assets, obtaining cash flow from investing or by issuing more secure securities cannot keep that for very long.
The future prospect and the ability to meet such obligations, the firm must be able to generate cash flows from operations.

Analysts have reformatted the information from the firm's income statement and statement of cash flows to obtain what is believed as the best description of the company's activities.

These are referred to as funds from operation.
Funds from operations are defined as net income adjusted for depreciation and non-cash debt & credit.

That is funds from operations are net income from continuing operation plus depreciation, amortization, deferred taxes and non-cash items.

FFO is similar to cash flow from operation except that cash flows from operations exclude changes in working capital.

FORMAT

Funds from Operation (FFO)	xx
Decrease (increase) in non- cash current asset	xx (xx)
Increase (decrease) in non -cash current liabilities	xx (xx)
Operating cash flow	xx
Decrease by capital expenditure	(xx)
Free operating cash flow	xx
Decrease by cash dividend	(xx)
Discretionary cash flow	xx
Decrease by acquisition	(xx)
Increase by asset disposal	xx
Net other sources (uses of cash)	(xx)
Free financing cash flow (pre financing cash flow)	xx

NOTES

Operating cash flow is therefore funds from operation reduced by investment in working capital (CA – CL).
Subtracting capital expenditure from operating cash flow gives free operating cash flow.
It is this cash flow measure that can be used to pay dividend & make acquisition of other company's & assets.
Reducing free operating cash flow by cash dividend gives discretionary cash flows.
Adjusting discretionary cash flows for managerial discretionary positions / decisions for acquisition of other companies, disposal of assets & other cash sources gives free financing cash flows (pre financing cash flow)

JUNE 2011 Q3d

(i) Funds from operation / total debt
= Net income + Depreciation + Amortization + Deferred taxes + Non-cash items

FFO = 456 + 150 + 3 + 54 = 663

Total Debt = Long-term Liabilities = 2231
Current Liabilities = 3286
5517

663 : 5517 =8.3 $\frac{663}{5517}$ x 100 = 12%

(ii) Pre–tax return on capital= $\frac{\text{EBIT}}{\text{LT Debt+Short term Debt+Equity Capital+non Current difered taxes}}$

$\frac{533}{3286+2231+7644}$ x 100 = 4.05%s

(iii) Interest Expenses

EBITDA coverage ratio = 33
$\frac{\text{EBITDA}}{\text{Interest}}$

EBITDA = EBIT + Depreciation + Amortization
= 533 + 150 + 3 = 685

EBITDA Coverage ratio = $\frac{\text{ERITDA}}{\text{Interest}}$

$33 = \frac{686}{\text{Interest}}$

33x = 686
X = 20.79
Interest Expense = 20.79