

Institute of Actuaries of India

Subject SA6 – Investment

May 2009 Examination

INDICATIVE SOLUTION

Introduction

The indicative solution has been written by the Examiners with the aim of helping candidates. The solutions given are only indicative. It is realized that there could be other points as valid answers and examiner have given credit for any alternative approach or interpretation which they consider to be reasonable

Question 1

A)

- General Elections occurred within last month so recent period of uncertainty as to who shall form government and what economic policy will be followed
- Large Government GSEC issuance as part of policy to stimulate the economy
- Whole Sale Inflation falling to 0.44% with concerns of deflation in the short term and some concerned about long term future inflation
- Consumer Price Index still high (7% levels) which will impact voters
- GSEC yields have fallen and remain very volatile
- Tight liquidity has been experienced with call rates seeing 16% in the relatively recent past, though RBI action has mitigated this situation
- Sensex has fallen significantly over the past 18 months
- Rupee has fallen in value significantly against the US dollar
- FII investors appear to be leaving the Indian equity market
- Corporate bond market still relatively immature
- After a period when banks were willing to invest surplus cash with the RBI via reverse repos and so reduced credit available, such rates have reduced and there is slowly more credit available for good credit ratings
- Alleged fraud at Satyam computers has created a significant dent in investor confidence
- Tax receivables may be less than budgeted
- GDP growth has fallen though still positive
- India seems to date insulated from most of the world's economic woes
- Companies and individuals are being careful about their expenditure plans
- Property prices in major metros have fallen
- Concerns over government budget and off balance sheet items such as oil bonds
- NRIs returning from UAE and H1-B issues in the US becoming more difficult to obtain may reduce NRI remittances to India
- Some private banks have had false rumours about their liquidity levels hence consumers may prefer public institutions
- Increasing issuance of government debt may crowd out private investment debt

B)

- US – Equity real returns very volatile being year on year change of -13.8% in 2000 and 29.2% in 2003 with an average over the period 2000-2007 of -0.4%. Short term Interest rates over the period 1998 to 2007 have averaged 3.7% but due to financial crises short term rates have fallen considerably in 2008 and 2009 e.g. 0.5% for 3 month treasury bills. Bond returns averages 7.1% in local terms over the ten years 2007-2008. US and UK economies suffered by the end of the technology bubbles post 1999, with effect exacerbated by 11th September 2001 terrorists attacks and subsequent corporate scandals reduced investor confidence. Subsequently markets boomed with labour shortages in the UK.
- UK – Inflation average 2.8 over period 1997-2007, equities nominal return 6.0, gilts nominal return 6.2%, index linked gilts 6.6%, cash 5.4%. Equity real returns very volatile being year on year change of -7.6% in 2000 and 11.5% in 2006 with an average over the period 2000-2007 of 0.5%. UK sterling exchange rate was for a period very strong against the US dollar but subsequently fell.
- Japan - Equity real returns very volatile being year on year change of -24.7% in 2000 and 45.4% in 2005 with an average over the period 2000-2007 of -0.7%. Japan's stock market has not recovered to the levels seen in 1989 due to severe problems in the banking system. Interest rates vary from

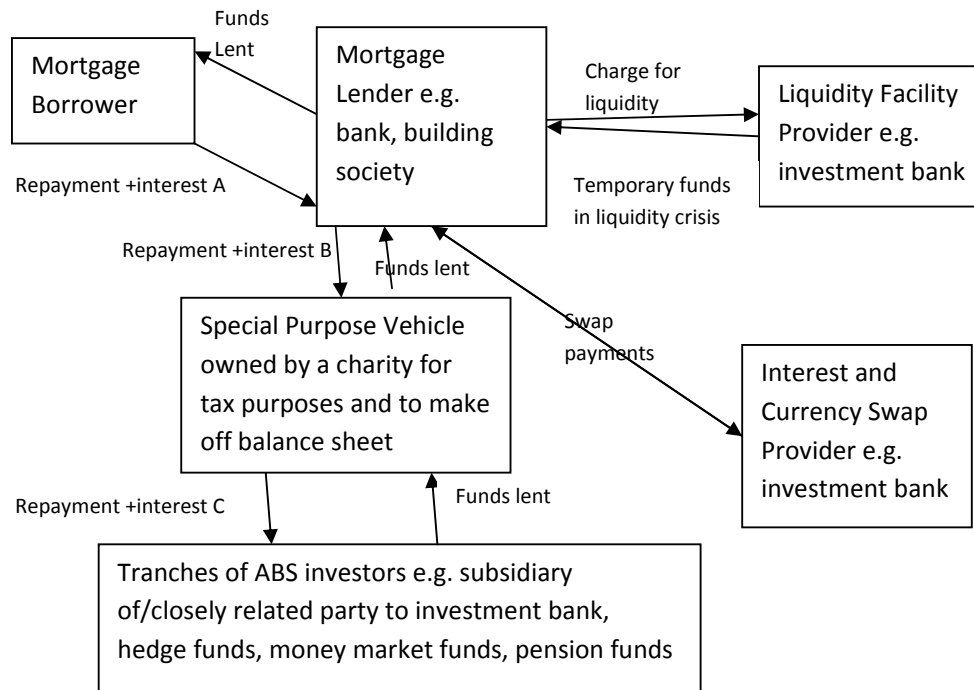
0.1% in 1998 to 1.8% in 2007 with an average of 0.3%, but have fallen subsequently. On occasion interest rates have been negative (i.e. effectively “taxed” to encourage spending.) Deflation has been a constant concern over the period. Bond returns averages 7.8% in local terms over the ten years 2007-2008.

- Significant tightening of liquidity and LIBOR rates increasing significantly in 2008 as banks were unwilling to lend to one another with knock on impact of availability of credit for general consumer
- Asset backed security market in disarray
- US Investment banks and commercial banks defaulting with bail outs by US Government
- Significant collapse of two alleged pyramid schemes in US of A.
- Similar bail outs in UK and Europe so that many leading retail banks are effectively owned by the taxpayer
- Major economic stimulus packages issued by developed nations
- Significant over haul of financial regulation expected
- Surprising flight to safety of US dollar
- Commodity prices have fallen considerable having previously peaked
- Gold price increased significantly
- Many developed economies have entered recession with increased unemployment
- Increasing signs of protectionism in world trade
- Treasury Bill returns fall to very low levels (0.5%)
- Deflation a concern
- Concerns over sovereign defaults in Europe and impact on Euro – Ireland, Italy etc
- Property prices fallen considerably
- Equity markets have fallen
- For a period severe restrictions on short selling was imposed on US and UK markets
- Long term swap yields exhibiting unusual behaviour relative to long term government bonds in UK
- Comparison with 1930’s depression

C)

1) Asset backed securities result from the securitization of a revenue generating asset held by the borrower. The income from the asset, or more typically, pool of assets is repackaged as the repayments on an issue of bonds which are then sold in the market or placed in a private placement to a specific investor e.g. a conduit

Cashflow diagram with SPV, as structured by an investment bank.



Different rates of interest (A, B, C) are charged to different entities in order to make a profit.

The provision of a mortgage to a customer is a long term (e.g. 20 years) loan and can be at floating or fixed interest rates. However, the ABS investors will loan for a shorter period e.g. 7-10 years (expected maturity as opposed to legal maturity). Hence there may be a need for a liquidity facility provider to cover the period when initial ABS investors bonds are redeemed and second set of ABS investors provide capital.

Also the ABS investors may expect a floating rate return e.g. LIBOR + 200bp whilst the mortgage borrower pays say 8% flat. Hence there is a mismatch and an interest swap might be entered into with the investment bank.

Often different tranches can be denominated in different currencies and so a currency-interest swap (bespoke) swap is required to match the expected repayments of capital and interest.

Examples of ABS – mortgages, credit cards, life insurance VIF, car loans, student loans

Statement that secured assets are ringfenced so other assets are not used to benefit debt holders (except perhaps covered bonds)

Securitisation gave banks capital relief under Basel 11 (except if it was a covered bond)

Tranching based on various models of default of underlying assets so AAA most likely to pay off and BBB or equity tranches least likely. Many deterministic scenarios considered based on historical asset defaults to meet rating agency criteria for rating of a particular tranche i.e. would cashflows with a certain default rate ultimately repay interest and capital of a particular tranche given the cashflows that were required to support a more senior tranche?

However, use of AAA terminology suggested link with senior corporate debt but risk profile very different as at certain point of defaults AAA ABS hit a precipice in their risk return profile and not tapered as in senior debt.

Risks of MBS and CMO

- Default risk by mortgage borrower not paying mortgage payments (interest or capital)
- Default risk of mortgage lender receiving payments from borrower but not paying them to investors in the securitised bonds
- Comingling risk of money due to ABS investor being mixed with other bank funds and in the event of insolvency, the liquidator/receiver not recognising them as assets with a higher priority charge on them
- Prepayment risk – mortgage borrowers may repay their mortgage early and the economic structure of the ABS is premised on mortgagee paying high interest rates for a long time not cash earning floating rates.
- Liquidity risk if a mortgage is foreclosed and although market value of property is high it takes time to convert it into liquid cash (property is not fungible) to pay ABS investors and so a liquidity back up provider may be needed.
- Mortgage borrower may not have been fully truthful in his mortgage application and so the actual risk of the portfolio may not be understood.
- Due diligence by mortgage lender of mortgage applications may not be so thorough as they are transferring risk to a third party (though retention of first loss 'equity' tranche can serve to align interests)
- Properties may be geographically or socially concentrated and so benefits of a diversified portfolio are less than expected and this may not be captured in the credit rating agency, investment bank, and ABS investors' asset models.
- Economic scenarios which form base of modelling returns may not capture all reasonably possible scenarios that may occur during lifetime of the ABS.

2)

- Individuals giving false information on mortgage applications (NINJA loans – No Income No Job Also loans) – subprime mortgages
- (Passive) Encouragement of mortgage advisors to mortgage applicants for less than complete disclosure on assets and income exacerbated in certain circumstances due to commission payments
- Massive speculation by individual consumers that house properties could only increase
- Householders borrowing against the value of property i.e. further gearing for the purchase of consumables
- Government policy to encourage house ownership
- Legal structure of mortgages in US whereby defaulting on mortgage means property is claimed by the mortgage lender but the mortgage lender cannot recover losses from mortgagees' other assets
- Failure of mortgage lenders to underwrite loans appropriately perhaps influenced by the fact that they would be transferred via a securitisation to other investors and off balance sheet to the bank
- Over reliance on rating agency credit rating models to ascertain risk and allegations that rating agencies and investment bank finance structurers worked together to assign ratings rather than a more arms length transaction
- Many investors e.g. money market funds did not conduct their own due diligence and invested in these assets based solely on credit rating agencies' rating
- Often investors in these securitisations were conduits (set up by investment banks) which to fund these long term commitments issued short term commercial paper to money market funds
- Investment banks provided liquidity support to their conduits so that in the event that money market funds would not buy the conduits commercial paper, the investment banks would purchase it (hence in that event bringing the asset risk back on balance sheet)

- Investment banks asset management teams were (independently from the investment banks capital finance structuring teams) assessing the risk return profile of ABS and purchasing it especially the lower tranches with greater expected return (and risk)
- Over reliance on models which did not allow for significant increase in correlations between asset classes in the event of extreme market scenarios (e.g. one in million year events occurring several times in a week)
- Low returns on other asset classes driving investors to invest in increasingly risky assets
- Eventually the sub-prime householder with a mortgage could not pay his mortgage and the pyramid of risk toppled
- As a result of the liquidity support arrangements that banks had arranged with conduits and others they were keen to retain liquidity and did not trust the liabilities of other banks and so the London Inter Bank Offer Rate for lending between AA rated banks soared.
- Many ABS arrangements required revolving i.e. the assets were 30 year mortgages but the funding achieved by the ABS was only say 7-10 years and after the 7-10 year period a second ABS had to be issued so as to repay the principal to the first ABS investors. This wholesale market closed with the sub-prime crisis impacting some retail banks
- LIBOR soaring had a knock on effect on floating rate bonds and interest rate swaps that were based on LIBOR. This made bank lending (when banks were not hoarding capital to meet expected liquidity needs) more expensive and eventually caused the crisis among banks to spread to non-financial corporates and the wider economy due to the lack of credit available to non-financial corporates
- For certain retail banks, their other source of funding individual customers started to demand their money – causing a run on the bank. The first run on a bank in the UK in 150 years led to the nationalisation of the particular bank
- With globalisation the tranches had been sold to investors throughout the world and as such it was unclear who held the risky assets
- Further these risky assets were often further repackaged in ABS e.g. to form CDO squared and sold to investors
- Often these risky tranches were supported by AAA rated monoline insurers who agreed to wrap say an A rated tranche so that it received an AAA rating. Essentially these monoline insurers carried out more due diligence and so provided a guarantee that in the event of the tranche failing they would guarantee to make the subsequent outstanding payments.
- Monoline insurers were effectively writing credit default swaps.
- Occasionally investment banks (and one known US Insurer) would write credit default swaps on the lower rated tranches that the Monoline insurers would not wrap since they believed the ABS story.
- With corporates not being able to obtain credit and individuals fearing that their savings in banks would not be safe, consumer spending fell with a knock on impact on employment.
- A significant spike in oil prices during this time also added to the issues.

3)

- Detailed understanding of the original assets and how they were sourced
- Appropriate due diligence
- Not over rely on credit rating agency models
- Develop own internal models
- Ensure default and prepayment risk were understood
- Consider worst case scenarios and impact on organisation if they occurred
- Understanding correlation with existing assets

- Concentration Limits for exposure to certain assets
- For MBS consider geographical concentration limits
- Have a sufficient number of suitably skilled staff
- Ensure there is an appropriate review process of trades and audit trails
- Ensure compliance system means that trades cannot be executed above thresholds without senior manager authority
- Consider how to hedge risks beyond your risk budget
- Consider how to mitigate the risk exposure to the counterparty you have hedged the risk above your risk budget (e.g. margins, collateral etc)
- Ensure assets bought are actively monitored so timely information on defaults are obtained
- Where trading occurs at a significant distance from the main group, there is a need for stronger risk controls and more oversight e.g. Barings in Singapore, AIG in London, Allied Irish Bank in USA.

D)

- 1) A foreign currency convertible bond is where an issuer issues a bond (which in due course there is an option to convert into equity) in a foreign currency – in this case US \$. The debt is issued and US \$ are received and coupon payments are paid in US\$. If there is no conversion to equity the redemption payments is also in US \$
- 2) The bank could have bought a Rs/\$ currency swap - probably OTC given the possible need to consider timings of payments and the need not to exercise if the bond is converted.
 Currency swap involves exchanging principal and interest payments in one currency for principal and interest payments in another currency. The principal should be specified in both currencies and the principal amounts are usually exchanged at the beginning and end of the life of a swap to reduce risk. Margin calls should occur on regular basis to protect against default by one party or another.
 Bank consider its holistic position with regard to its international subsidiary and this may mitigate some of its need for a currency swap as presumably the international subsidiary ABC USA Ltd may have made US \$ profits which need to be converted into Rs when it pays dividends to the Bank

E)

- 1)
 - Bank invests in an equity put option to hedge risk.
 - Put option is the right but not the obligation to sell an asset at a certain price at some point in the future
 - Statement of basis risk issues.
 - Mention should be made of the risks associated with rolling over options since they are of a short duration in India though off-shore market may be available in certain circumstances
 - Alternative equity futures could be used but then upside of rise in equity markets would be lost.
- 2)
 - Shareholders' fund is to meet new business strain, dividends and solvency requirements.
 - New business strain involves paying commission and initial expenses and so cash/liquidity required
 - Payment of dividends requires cash/liquidity
 - Solvency margin is the capital required to maintain the solvency of the company in extreme scenarios. As such it should be diversified from the asset risk exposures that the company is exposed to e.g. equities in unit funds.
 - Need to consider duration and currency of outstanding liabilities
 - Need to ensure that solvency capital is available in extremis and so should be cash or liquid assets e.g. short to medium term GSECS, as long term GSECS may be volatile

- Need to consider liquidity aspects of the GSEC curve – certain terms are more liquid than others
- Invariably need to consider shareholders expected return needs

F) Given the Independent Director's comments you are now an Insider (if you were not previously due to your role) and legal and professional obligations mean that you could not carry out your purchase of shares until the information you have learnt has reached the public domain.

Good practice would mean that you would obtain clearance from the compliance department prior to any purchase or sale of shares or derivatives on shares of the company, related entities or companies with whom your company was transacting business.

[48]

Question 2

A)

Let us denote MWRR(for bonds) as i_b .

Fund at beginning of year is Rs 100 crore split 85% bonds and 15% equities.

Thus for bonds we have $\dot{i}_b = 85(1+i_b) + 55(1+i_b)^{0.75} + 15(1+i_b)^{0.5} + 20(1+i_b)^{0.25} = 188$

and using the approximation $(1+i)^t = (1+it)$

we have $85(1+i_b)+55(1+0.75i_b)+15(1+0.5i_b)+20(1+0.25i_b)=188$

Thus $138.75 i_b = 13$ and thus $i_b = 9.4\%$

Similarly MWRR (for equities) is $i_e = -38.2\%$

and MWRR (for total funds)= $i_f = 3.2\%$

TWRR (for bonds) $\Rightarrow (1+ TWRRB) = (145-55) / 85 * (168-15) / 145 * (180-20) / 168 * (178+10)/180$

TWRRB = 11.13%

TWRR (for equities) $\Rightarrow (1+ TWRE) = 17/15 * 12/17 * (30-20)/12 * 27/30 \Rightarrow TWRE = -40\%$

TWRR (total funds) $\Rightarrow (1+TWRT) = (162-55)/100 * (180-15) / 162 * (210-40) / 180 * (205+10)/210$

TWRT = 5.38%

B)

The Provider's TWRR can be computed from the NAV movements as follows:

For bond fund the NAV of the bond fund at the end / The NAV of the bond fund at the beginning = $11.3 / 10.2 = 110.78\%$. Thus the TWRRB for PROVIDER = 10.78%.

If we allow for 1% fund management charge then the actual TWRRB for PROVIDER is 11.78% and it is higher than the TWRRB of 11.13% calculated for ACCESS. Thus ACCESS fund manager has underperformed in the stock selection as far as bonds are concerned.

Similarly for the equity fund TWRE = $(6.2 / 11 - 1) = -43.64\%$ and after providing for the fund management charge the returns are -42.64% which is worse than the ACCESS equity performance of -40% .

Thus in stock selection of equities the fund manager at ACCESS has done better.

For overall stock selection effect check the results in the answer to question number 4 below

C)

Cash flows				NAV		Notional-Notional			Actual-Notional		
	Bond	Equity	Total	Bond NAV	Equity NAV	Bond	Equity	Total	Bond	Equity	Total
Qtr 0	85	15	100	10.20	11.00	94.17	8.45		94.17	8.45	
Qtr 1	55		55	10.80	12.50	48.91	4.09		57.55	0.00	
Qtr 2	15		15	11.40	9.00	12.64	1.55		14.87	0.00	
Qtr 3	20	20	40	10.90	7.30	35.25	5.10		20.73	16.99	
Qtr 4	-10		-10	11.30	6.20	-8.50	-1.50		-10.00	0.00	
						182.47	17.69	200.16	177.32	25.44	202.76

The value of notional-notional for bonds is derived by taking notional allocation percentage of 85% for bonds (for all cash flows) and multiplied with the closing value of Index tracker Bond NAV / Index tracker Bond NAV at the time of the cashflow. Thus first row in notional-notional computation is 94.17 which is derived as $85\% * 100 * 11.30/10.2$ and the value in the second row = $48.91 = 85\% * 55 * 11.3/10.8$

Similarly for other rows of bonds and equities we perform the calculations to obtain the above values. Adding the bonds and equities notional-notional values gives the total fund notional-notional fund value.

or directly $85\% * 11.3 * (100/10.2 + 55/10.8 + 15/11.4 + 40/10.9 - 10) = 182.47$

Similarly for equities and then add up the two values to get the total notional-notional value.

The value of actual-notional is taken by taking the actual bond and equity cashflows and notionally investing them in the index tracker funds of the competitor (i.e. actual sector and notional stocks).

Thus for bonds we have

$$11.3 * (85 / 10.2 + 55/10.8 + 15 / 11.4 + 20 / 10.9 - 10 / 11.3) = 177.32$$

For equities it is $6.2 * (15/11 + 20/7.3) = 25.44$

Adding the bonds and equities value gives the total value.

The actual-actual fund value is 205 (the actual final fund value of the portfolio at the end of the year) less 1.75 (for fund management charges , since it is given that this charge is 1% of the fund value and average fund over the year is given to be 175). Thus the actual-actual fund value is 203.25.

Effect of Stock selection = Actual-Actual less Actual-Notional = $203.25 - 202.76 = 0.49$ crores.

Effect of Sectoral allocation = Actual-Notional less Notional-Notional = $202.76 - 200.16 = 2.6$ cr.

D) While declaring returns on traditional endowment and gratuity portfolios the company would be attempting to give smoothed returns. If the assets are recorded at market values then in some years if the market (equity and bonds) falls there might be a big loss in the revenue accounts (since everything is marked to market) whereas in some other years there would be abnormal profits if interest rates are low and equity and bond prices go up substantially. Thus the revenue accounts would reflect unstable profits and could require capital infusion in bad years.

To avoid such volatility the company may have to create a smoothening fund account to stabilise the portfolio performance results. Such smoothening account may require funding from shareholders in the beginning when there is no balance in the account and may not be allowed from a tax perspective. Such a smoothening fund may be part of the shareholders retained profits /P&L account.

Valuing bonds at market value would add to transparency and comparability between funds. Losses on impaired bonds would be more quickly recognised and so customers would have a better understanding of the actual solvency of the company. It would tend to prevent with profit funds being managed as giant pyramid schemes which are not solvent on a realistic basis, but meet a regulatory basis and maintain liquidity by paying exiting customers from new customers' premiums.

Throughout the world recently a similar lack of marking to market has caused money market funds which used amortised cost values to become insolvent when a run on the fund occurred.

E) Factors to be considered for Strategic Asset Allocation:

Nature - The gratuity portfolio in India is an example of typical defined benefit scheme wherein the lump sum payouts are linked to salary and are thus real in nature increasing with wage inflation. Since the population is young in this case the liabilities will be more linked to wage inflation. In ageing population (specially with higher salaries) the cap of Rs 3.5 lacs will mean that the liabilities will become more of a fixed nature rather than linked to wage inflation since the benefit payout would have reached the cap . Special arrangements for special categories of staff e.g. senior management or those in hazardous roles may have an impact on the nature of benefits and their timing.

Term- It depends on the age of the employees. In case the population is young the liabilities are of long term in nature. For public sector companies with higher average age the liability profile may be short term. Staff retention will impact the term of the policies. For example, traditionally IT companies had a relatively high turn-over of staff –many not reaching five years. Hence the term could be very long. However, the economic climate at the current time may mean that past experience may be less of a guide to future experience e.g. many staff finding it difficult to obtain new jobs. Similarly future recruitment plans will have an impact on the term.

Liquidity – The contribution to schemes is more than the benefit outgo if the members are young. For certain ageing groups (as mentioned above in case of public sector companies) the scheme needs to maintain some liquid assets but average age in Indian population being young the contributions from other companies with younger employees should provide natural liquidity. Some liquidity requirements may arise for younger population too when they change jobs after completing 5 years of service thereby eligible for gratuity payouts.

Currency- The liabilities would be in Indian Rupees since the gratuity payments are statutory for companies in India and the schemes being registered in India the payments need to be in Indian Rupees.

Certainty – The outgo is uncertain to the extent that employees may leave and join some other company. If that happens after 5 years then it may lead to a gratuity benefit payout. Though the death probabilities might be more certain and retirement ages known in advance the withdrawals due to change in jobs might be uncertain in nature.

An asset liability matching exercise could occur to ensure that liabilities can be met when they fall due.

The fund will want to invest in sufficient liquid assets such as cash and short term GSECs/money market funds to pay near future benefits though the future contributions may meet that cash outflow. The fund will also wish to meet its longer term liabilities by investing in longer dated GSECs and depending on the risk budget of the company it may be willing to invest in equity if it believes in the long term (and more importantly when it has cash needs) that equity will outperform bonds. (1mark)

The fund may also invest in a group term life insurance policy to cover any additional death benefits to avoid unexpected cashflows e.g. in the event of a serious industrial accident.

F) The following factors may be considered to understand the security of coupon and principal repayments.

- Credit rating provides an indication but the investment department needs to study the financials of the company independently. It may not be clear that the Credit Rating Agency is truly objective.
- Income cover i.e. the number of times the interest payments can be made out of operating profits should be evaluated. Allowance needs to be made for prior and equal ranking debt.
- Asset Cover provides an insight into the saleable assets held which can be used to repay debt in case company was wound up.
- Terms and conditions of the issue including whether the bonds/debentures issue is secured or unsecured. Whether there is a fixed charge or floating charge on assets. What are the assets which can be claimed in case of defaults and what is there resale value
- Quality of company's profits, outlook for the future of the company and industry
- Nature of company and how its profits are impacted by the investment cycle e.g. volatile profits.
- Past track record of the issuer, the image and goodwill of the issuer.
- Quality of financial statements and auditor e.g. treatment of unfunded pension scheme liabilities should be considered debt, employee option treatment, foreign exchanges losses etc.
- Promoter's shareholdings, ethics and standing in the business world.
- Government regulation and taxes

The other factors to be evaluated are as follows:

- The term of the corporate bonds / debentures. The gratuity liability may be long term and not many corporate issuers have long term bonds issue.
- The marketability of the issue, whether there would be an active market for the issue.
- The yields offered by the corporate bonds / debentures
- The competition i.e. the yield offered by other corporate bonds of varying tenures and ratings and the yield offered by g-secs of varying maturities.

- G) At 9% the interest charge would be $9\% * 1500 = 135$ crores
- The income cover = operating profit / interest charge = $900 / 135 = 6.67$.
- The asset cover = Total assets after the new issue / Size of the new issue = $6500/1500= 4.33$
- The income cover and the asset coverage in excess of the minimum acceptable of 4 and 2.5 respectively. Hence the investment can be recommended.
- Of course, what the issuer intends to do with the monies raised is very pertinent.

[40]

QUESTION NO. (3)(A)

- Features of Liabilities
 - The premium income is split equally between the two types of business – motor insurance and employers’ liability insurance. Since employer’s liability claims take longer to settle, it is likely that the liabilities are predominantly in respect of this product category.
 - Nature
 - Employer Liability claims tend to be “real” in nature. However, there will not be a precise link to the general price inflation
 - The size of the employer liability claim payments will increase due to factors such as wage rises, generosity of awards made by courts and the cost of medical care. Therefore the rate of increase is difficult to predict, even in real terms.
 - The motor claims may also be “real”. However since motor claims tend to be short term, the inflation risk tends to be negligible.
 - Term

The majority of the liability claims (particularly in value terms) will take several years to settle. On the other hand, most of the vehicle repair claims will be settled very quickly.
 - Currency

Assuming that the company is based in India, most of the liabilities will be rupee denominated. However if there are liabilities arising from overseas business, there liabilities need to be identified and quantified by currency to achieve matching by currency.
 - Certainty

Claim outgo for general insurance companies tend to be highly uncertain

With motor insurance, a severe winter can result in substantially higher accidents than normal

In liability insurance, there is a possibility of a single large claim (e.g.: against an employer using a production technique that is found to cause an industrial disease)

QUESTION NO. (3)(B)

The switch to equities would achieve higher expected returns. We cannot be, however, sure that achieved returns will be higher over any given time horizon.

To the extent equity investments are long-term and real, they can provide a closer match to the outstanding liability claims than short term gilts and cash investments.

The equity investments will also help in maintaining the real value of the free reserves.

However the volatility associated with the equity investment returns must be carefully considered. Normally general insurance liabilities are not discounted. Hence they behave as if they have zero duration. This means that solvency can be endangered if excessive equity investments are made.

Increasing the range of investments will also provide a diversification benefit.

On balance, the CFO's recommendation to switch 10% of the funds into equity investments seems reasonable given the product mix of the company.

[12]

[Total 100 Marks]
