

INSTITUTE OF ACTUARIES OF INDIA

EXAMINATIONS

19th December 2018

**Subject CA1 – Actuarial Risk Management
(Paper I)**

Time allowed: Three Hours (10.15* – 13.30 Hours)

Total Marks: 100

INSTRUCTIONS TO THE CANDIDATES

- 1. Please read the instructions inside the cover page of answer booklet and instructions to examinees sent along with hall ticket carefully and follow without exception.*
- 2. Mark allocations are shown in brackets.*
- 3. Attempt all questions, beginning your answer to each question on a separate sheet.*
- 4. Please check if you have received complete Question Paper and no page is missing. If so, kindly get new set of Question Paper from the Invigilator.*

AT THE END OF THE EXAMINATION

Please return your answer book and this question paper to the supervisor separately. You are not allowed to carry the question paper in any form with you.

- Q. 1) i)** What does the yield curve represent? (2)
- ii)** How do you think the yields of different bonds, viz., Central Government, State Government and Corporate bonds would compare against each other? (4)
[6]
- Q. 2)** In a developing country, the National Pension Scheme (NPS) is a defined contribution scheme and offers freedom to its subscribers in choice of fund/s in which they can invest their contributions. The fund choice varies from Money market fund (which keep funds in cash or liquid instruments), debt fund (which invest in Government bonds, Corporate Bonds), Equity fund (investing primarily in equities) to Property fund (primarily investing in properties). Switch option between funds is allowed. Contributions are locked in until a subscriber attains age 60 after which the proceeds can be used to buy an annuity from a life insurance company. Discuss a suitable investment strategy for a subscriber currently aged 40 till he attains age 60. [6]
- Q. 3)** The Trustees of a well-funded benefit schemes wants to maximise the return on their benefit scheme which has liabilities related to inflation. They are exploring the possibility of providing loan to a manufacturing company. Interest will be paid on the loan at a fixed rate over ten years (higher than the interest on the Government bonds due to the higher credit risks associated with it), with full repayment at the end of the term. Outline the factors that the scheme should take into consideration when determining whether to make this loan. [9]
- Q. 4)** A wind farm consists of several hundreds of wind turbines covering hundreds of squares of kilometres but the land between the turbines can be used for agriculture. A group of entrepreneur visionary farmers, having seen the power problem in their state, are considering installing a wind farm in their lands to generate power. The Government also provides tax benefits on these kinds of renewable energy projects by way of reduced tax rate.
- i)** Outline the information that will be needed in order to calculate the internal rate of return on this project. (5)
- ii)** Describe two other cash flow projection methods which can be used to assess the viability of this project. (4)
- The results of the cash flow projections show that the project is financially viable.
- iii)** Discuss the other factors which should be considered before deciding on whether to go ahead with this project. (5)
[14]
- Q. 5) i)** State the principles that an insurer should follow when determining an appropriate investment strategy. (2)

A small insurer selling only annuity products currently sells two types of products-

- Both annuity products provide a guaranteed level of income while the annuitant is alive.

- Half the portfolio is of policies providing a fixed level of income and the other half provide income that increases yearly, where this increase is linked to the change in a price inflation index for that country.
- In the event of death, all policies pay a return of premium less the amount of annuity payments already made (if this value is positive).

ii) The Company is currently facing financial difficulties and wants to optimise its capital usage. Recommend, with reasons, an appropriate investment strategy for this insurer. (12)
[14]

Q. 6) i) Describe the general and simplified discounted dividend model of valuing equity shares. (4)

ii) What are the issues to consider when using the simplified model? (5)

iii) Discuss a method of valuing equity shares of a young “on-line” grocery retailer who is neither making profits nor declared dividends till date. (6)
[15]

Q. 7) i) In the context of collective investment vehicle, define an open-ended and closed-ended fund? (2)

ii) What factors would influence the decision of investing in an open-ended fund compared to a closed-ended fund? (5)

iii) What does the term ‘Emerging market’ refers to? (2)

A large mutual fund in a developed country plans to launch an “Emerging markets fund”. It is considering 2 options.

- a) Launch a fund that will track return of the “DSS Emerging Markets Share Index”.
- b) Offer a fund with active fund management.

iv) Discuss the factors the mutual fund needs to consider while making a decision. (7)
[16]

Q. 8) A health Insurance company is planning to set up a risk department within the organisation.

i) What is likely to be the aim of risk management process within the health insurance company. (3)

ii) List key risk management tools available to a health insurance company. (5)

iii) Following internal risk assessment, the insurance company has identified its top 3 risks as-

- a) Regulator does not approve actuarially justified increases in premium rate
- b) Unexpected customer behaviour leading to pricing assumptions not being realized.
- c) Under estimation of medical inflation leading to mis-pricing

Key risk indicators (KRIs) are metrics (both qualitative and quantitative) used by organizations to provide an early signal of increasing risk exposures in various areas of the organisation. The management of the company has asked the newly setup risk management department to develop KRIs (both market related and internal) that it needs to track on regular basis so that it (management) has adequate time to pro-actively take action to respond to risks. Discuss the KRIs that could be developed for the risks mentioned above.

(12)
[20]
