Model Documentation Analysis and Reporting

Q) Answer the following Question.

Q1)

1. Read the background document, which describes the scenarios that need to be modelled and documented for this project.
2. Construct a spreadsheet model that produces the following calculations and charts. You should ensure that your spreadsheet contains appropriate **self-checks** and that you have performed robust **reasonableness checks** at each stage of your calculations.

   a) Calculate the EMI for a 25-year loan under both the schemes. [6]

   b) Prepare the Home Loan Schedule that shows the repayment of principal and interest every month for the tenure of the loan and represent it by graph & **explain** [8]

   c) Calculate the total interest paid under both the schemes [2]

   d) Repeat last two steps under scenario 2 with repayments options available under both the schemes. Represent it by suitable graph showing cost analysis under both schemes & **explain** [8]

   e) Repeat for scenario 3 with repayments options available under both the schemes. Represent it by suitable graph to show the different interest charge under two scenarios for MyySmart Home saver scheme. [6]

Marks available for spreadsheet model and checks:

Accurate completion of above modelling steps [30]

Demonstration of good modelling technique and practice [5]

Other self and reasonableness checks [5]

[Sub-total 40]

Q2) Produce an audit trail for your spreadsheet model which includes the following:
- purpose of the model
- data and assumptions used.
- methodology, i.e., description of how each calculation stage in the model has been produced.
- explanation of any checks performed.

Both senior actuaries and your colleagues should be able to peer review your work in your absence or independently.

Marks available for audit trail:

Audit approach

a) Fellow student can review and check methods used in the model [10]

b) Senior actuary can scrutinise and understand what has been done [10]

c) Written in clear English [4]

d) Written in a logical order [4]

Audit content

a) All steps clearly explained [6]

b) Clear signposting included throughout [6]

c) Statement of assumptions made [6]

d) All model steps accurately covered [14]

[Sub-total 60]

Background

Your father is interested in purchasing a home for your family. Having spent a considerable amount of time looking he has recently been able to finalize a house. To finance the purchase, he wants to take a home loan of amount Rs. 150 lacs for a tenure of 25 years. The Bank (MyyBank) he approached specialises in two kinds of loan:

1. MyyBasic Loan Scheme

2. MyySmart Home Saver Scheme, which only allows part payment once a year.

There is a part payment charge equivalent to 1% of the loan outstanding at the time of the part payment subject to a minimum of Rs 10,000 and a maximum of Rs 25,000 on both schemes.

Under MyySmart Home Saver Scheme, you can park idle money in home Saver account anytime which will earn the same interest rate as the borrowing rate. The interest on the Outstanding Principal loan will be reduced to the extent of the interest earned on the cumulative deposits. You also have an option to withdraw money to the extent you have deposited voluntarily. The information received by you from the Bank manager is as follows:

- Under MyyBasic Scheme, the interest charged is 9% p.a. payable monthly.
- Under Home Saver Scheme, the interest charged is 10% p.a. payable monthly.
- The interest is calculated on the principal outstanding as at the end of the month after considering any part-payment made.
- There will be no interest payable on the amount parked for that month.
- The anniversary of receiving bonus is the same as the home loan anniversary.

You are asked to prepare the Home Loan Schedule for your father stating any assumptions you make and answer the question based on the same.

Scenario 2

Your father has reviewed your quotation and wants to run scenarios to compare both the schemes and asked for your help as he has two options with the following expected cash flows:

- To pay his bonus of Rs. 24,00,000 (or the final capital outstanding if less) that he receives at the end of every year as part payment along with the repayment fee under MyyBasic scheme.
- Instead, park Rs 2,00,000 per month (or the final capital outstanding if less) under the MyySmart Home Saver Scheme rather than waiting for the year-end bonus to partly repay his loan and keep his savings in home Saver account to reduce the interest paid to that extent and use the bonus for his own expenses rather than repayment of loan.

Scenario 3

Your father has now referred several of his colleagues who have similar payment capacity for the MyySmart loan.

You decide to get yourself a job by writing to MyyBank to remove this arbitrage opportunity under Scenario 2 with immediate effect and ask them to increase the interest rate.

They want your help in calculating the revised interest rate such that both the schemes are neutral under Scenario 2.

END OF PAPER