Solutions: Case 1 (Roger)

Q1 B) professional requirement under Practice Guidelines of FPSB India

Q2 D) Identify other issues that may potentially impact Roger's ability to achieve financial goals

Q3 C) Rs.54 lakh (approx.)

(Solution given below)

Current value of the desired house	10,000,000	Rs.	
Expected value of new house after 5 years considering 6.5% appreciation	13,700,867	Rs.	10000000*(1+6.5%)^5
Existing market value of the occupied house	7,500,000	years	
Expected market value in five years considering 6.5% appreciation	10,275,650	p.a.	7500000*(1+6.5%)^5
Loan outstanding on existing home to be settled			
Principal value of 15-year loan (availed in April 2011)	2,400,000	Rs.	
EMI considering 10% p.a. interest for first three years	25,791	Rs. p.m.	PMT(10%/12,15*12,-2400000,0,0)
Loan outstanding as at end March, 2014	2,158,061	Rs.	PV(10%/12,(15-3)*12,-25791,0,0)
The average rate on loan 1.5% above the Repo rate of 6.5%	8.00%	% p.a.	
Revised EMI (average) over the next 8 years (3 years till Mar'17 + 5 years until sold)	23,360	Rs. p.m.	PMT(8%/12,(15-3)*12,-2158061,0,0)
Loan outstanding as at end March, 2022 (five years from today)	956,870	Rs.	PV(8%/12,(15-3-3-5)*12,-23360,0,0)
Amount to be set aside for tax liability, duties and furnishing	1,000,000	Rs.	
Amount that can be utilized from sale proceeds to buy new house	8,318,780	Rs.	10275650-956870-1000000
Amount to be financed for new house	5,382,087	Rs.	13700867-8318780

Q4 A) They must take Mortgage Redemption Insurance or an equivalent term insurance to cover outstanding loans

Q5 D) Rs. 105 lakh (approx.)

(Solution given below)

Current household expenses	40,000	Rs. p.m.	
Annual expenses in current terms	480,000	Rs. p.a.	
Inflation rate	5.00%	p.a.	
Return on Debt MF schemes	7.50%	p.a.	
Current age of Angela	31	years	
PV of 80% of current expenses required till Angela's age of 55 years	7,124,721	Rs.	PV((1+7.5%)/(1+5%)-1,55-31,-480000*80%,0,1)
Household expenses (80% of current) in the 55th year of Angela	1,238,438	Rs.	480000*80%*(1+5%)^(55-31)
PV at Angela's age of 55, of 80% of then living expenses for remaining 25 years	18,945,605	Rs.	PV((1+7.5%)/(1+5%)-1,80-55,-1238438*80%,0,1)
PV of post-55 years expenses today (income stream drawn from Debt funds)	3,339,684	Rs.	18945605/(1+7.5%)^(55-31)
Life cover required to the extent of covering living expenses as proposed	10,464,405	Rs.	7124721+3339684
(Approximate)	Rs. 105 lakh		

Q6 A) Rs. 147 lakh

(Solution given below)

Current expenses	480,000	Rs. p.a.	
Rate of return to invest claim proceeds and other assets	7.50%	p.a.	
Inflation	5.00%	p.a.	
Living Expenses			
80% of present expenses for the next 50 years	11,420,551	Rs. (PV):1	PV((1+7.5%)/(1+5%)-1,50,-480000*80%,0,1)
Higher Education Expenses			
Mark: Rs. 4 lakh p.a. for 4 years required after 14 years at 8% escalation	1,719,344	Rs. (PV):2	PV((1+7.5%)/(1+8%)-1,4, -400000*(1+8%)^14,0,1)/(1+7.5%)^14
Stephanie: Rs. 4 lakh p.a. for 4 years required after 17 years at 8% escalation	1,743,447	Rs. (PV):3	PV((1+7.5%)/(1+8%)-1,4, -400000*(1+8%)^17,0,1)/(1+7.5%)^17
Loans outstanding			
Housing loan	1,785,000	Rs. (PV):4	
Car loan	305,000	Rs. (PV):5	
Total corpus required to meet the living and HE expenses and loans (PV:1 to 6)	16,973,342	Rs. (PV): 1 to 5	PV1+PV2+PV3+PV4+PV5
Financial Assets:			
Cash in bank accounts and FDs	570,000	Rs.	
Equity shares and Equity MF scheme investments	1,180,000	Rs.	
PPF A/c balance	490,000	Rs.	
Total of Financial Assets	2,240,000	Rs.	
Therfore, Life cover needed at this stage for Roger	14,733,342	Rs.	16973342-2090000
(Approximate)	Rs. 147 lakh		

Q7 B) Rs. 3.20 crore (approx.)

(Solution given below)

Monthly household expenses	40,000	Rs. p.m.	
Required Annual expenses in the first year after retirement (age 58 of Roger)	1,383,022	Rs.	12*40000*70%*(1+5%)^(58-29)
Rate at which corpus is invested	6.5%	p.a.	
Inflation	5.0%	p.a.	
PV of expenses required from Roger's age of 58 to 70	15,369,121	Rs. (corpus:1)	PV((1+6.5%)/(1+5%)-1,12,-1383022,0,1)
PV (on retirement) of Provision of Gifts and Charity at age 70	5,871,036	Rs. (corpus:2)	12500000/(1+6.5%)^12
Additional Rs. 10,000 p.m. (current cost) at Roger's age of 70	73,920	Rs. p.m.	10000*(1+5%)^(70-29)
Additional Annual expenses to be provided for medical care at Roger's age of 70	887,039	Rs.	73920*12
Basic Household expenses at Roger's age of 70	2,483,708	Rs.	1383022*(1+5%)^(70-58)
Total Annual expenses required at Roger's age of 70	3,370,747	Rs.	887039+2483708
Corpus (at 70 of Roger) for expenses required from age 70 to 75 of Roger	16,385,620	Rs.	PV((1+6.5%)/(1+5%)-1,5,-3370747,0,1)
PV of this sum (computed at Roger's age of 70) on Roger's retirement (at age 58)	7,696,045	Rs. (corpus:3)	16385620/(1+6.5%)^(70-58)
Expenses further curtailed to 70% for Angela (Roger dies at 75, Angela survives at 77)	3,011,415	Rs.	3370747*(1+5%)^5*70%
Corpus at Roger's age of 75 (death) for next three years of Angela's survival#	8,907,600	Rs.	PV((1+6.5%)/(1+5%)-1,3,-3011415,0,1)
Corpus (at 58) for expenses required at Roger's age 75 for Angela's survival	3,053,637	Rs. (corpus:4)	8907600/(1+6.5%)^(75-58)
Total Corpus required at age 58 of Roger	31,989,838	Rs. (corp 1 to 4)	#Angela (life exp. 80) survives Roger by 3 years

Q8 A) Rs. 57 lakh; 44% curtailment

(Solution given below)

Corpus worked out in the Initial Scenario:			
Initial rate at which corpus is invested	6.5%	p.a.	
Initially assumed Inflation rate	5.0%	p.a.	
Current house hold expenses	480,000	Rs. p.a.	
Household expenses budgeted for retirement after 29 yrs (Rogers' age 58)	1,383,022	Rs. p.a.	480000*70%*(1+5%)^29
Age of Angela on Roger's retirement (Angela is senior by 2 years)	60	years	
Life expectancy of Angela	80	years	
Retirement corpus to last (out of which last 3 years further reduced to 70%)	20	years	
PV of expenses: Initial 17 years (till the survival of Roger up to age 75, Angela 77)	21,039,890	Rs.	PV((1+6.5%)/(1+5%)-1,17,-1383022,0,1)
PV of expenses:Balance 3 years (Angela's living expenses from age 77 to 80)	2,250,048	Rs.	PV((1+6.5%)/(1+5%)-1,3, -1383022*70%*1.05^17,0,1)/(1+6.5%)^17
Initially worked out corpus	23,289,939	Rs.	21039890+2250048
Stress test: lower yield, higher inflation, increased longevity			
Retirement corpus to last (Roger's 80 with now coincide with Angela's 82)	22	years	80-58
Revised Yield from investing corpus	6.00%	p.a.	
Revised Rate of inflation	5.50%	p.a.	
Retirement corpus required	28,965,848	Rs.	PV((1+6%)/(1+5.5%)-1,22,-1383022,0,1)
Cushion built in the corpus	5,675,909	Rs.	28965848-23289939
Alternately, the reduction sought in post-retire expenses (2nd Scenario)			
Required expenses to be withdrawn in the 1st year after retirement	1,112,016		1383022*(23289939/28965848)
Pre-retirement expenses (at the given rate of inflation up to retirement)	1,975,745		480000*(1+5%)^29
Curtailment in expenses	43.72%		1-(1112016/1975745)

Q9 A) The Capital Gains on redeeming these bonds on maturity are exempt from income tax

Q10 B)Mark Rs. 47.7 lakh, 22% shortfall; Stephanie Rs. 59.7 lakh, 24.5% shortfall

(Solution given below)

PPF account balance as on 31-March-2017	490,000	Rs.	
Account's initial maturity (opened in Dec-2011) is 1-April-2027			
Number of subscriptions from 31-Mar-2018 to 31-Mar-2027	10		
Number of subscriptions from 31-Mar-2028 to 31-Mar-2037 (2 extensions)	10		
Rate of interest assumed throughout	7.75%	p.a.	
Maximum subscription at the end of every financial year (for 20 years)	150,000	Rs.	
Accumulated balance on 31-March-2037 (Mark's age 24, Stephanie' age 21)	8,857,561	Rs.	FV(8%,20,-150000,-490000,0)
The account is maintained without subscription for 5 more years			
Accumulated balance on 31-Mar-2038 (Mark's age 25 years)	9,544,022	Rs.	8857561*(1+7.75%)
50% of accumulated amount withdrawn for Mark's marriage expenses	4,772,011	Rs.	9544022/2
Estimated expenses (current Rs. 10 lakh, escalating by 9% p.a.) for Mark	6,108,808	Rs.	1000000*(1+9%)^21
Shortfall in meeting Mark's marriage expenses	21.88%		1-(4772011/6108808)
Remaining amount in PPF accumulated till 31-Mar-2041: Stephanie's marriage	5,969,710	Rs.	(9544022/2)*(1+7.75%)^3
Estimated expenses (current Rs. 10 lakh, escalating by 9% p.a.) for Stephanie	7,911,083	Rs.	1000000*(1+9%)^24
Shortfall in meeting Stephanie's marriage expenses	24.54%		1-(5969710/7911083)

Q11 D) Rs. 115,300

(Solution given below)

The current cost of annual vacation (1-April-2017); Roger's age 29	150,000	Rs.	
Cost escalation provisioned in the vacation expenses	7.00%	p.a.	
Lump sum invested on 1-April-2017 in the fund (Roger's age 29)	1,000,000	Rs.	
Total annual investments from 1-April-2018 to 1-April-2043 (till Roger is 55)	26	years	
Total withdrawals from 1-April-2022 to 1-April-2046 (till Roger is 58)	25	years	
Total investment peiod (1-April-2017 to 1-April-2046)	29	years	
Return expected from Asset allocation in the first 15 years (Initial + 14 installments)	11.00%	p.a.	
Return expected from Asset allocation in the remaining period	9.50%	p.a.	
Vacation Expenses enumerated			
Vacation expenses to be first drawn after 5 years, i.e. in April-2022	210,383	Rs.	
PV of expenses (first 11 withdrawals, 1-Apr-2022 to 1-Apr-2032) drawn from 11% return	1,939,223	Rs.	PV((1+11%)/(1+7%)-1,11,-210383,0,1)
PV as on 1-April-2018	1,277,426	Rs. (PV:1)	1939223/(1+11%)^4
Likely vacation expenses on 1-April-2033	442,825	Rs.	150000*(1+7%)^16
PV of expenses (next 14 withdrawals, 1-Apr-2033 to 1-Apr-2046) drawn from 9.5% return	5,358,498	Rs.	PV((1+9.5%)/(1+7%)-1,14, -442825,0,1)
PV as on 1-April-2018	1,135,291	Rs. (PV:2)	5358498/((1+11%)^14*(1+9.5%))
Total PV of all vacations provisioned (Pv:1 + 2) as on 1-April-2018	2,412,718	Rs.	1277426+1135291
Accumulation:			
Initial sum invested (1-April-2017) in the needed fund for vacation	1,000,000	Rs.	
Accumulation of initial sum as on 1-April-2018	1,110,000	Rs.	1000000*(1+11%)
Remaining amount to be provisioned by way of annual investments	1,302,718	Rs.	2412718-1110000
Let us assume that former annual investment (first 14) be	100	Rs.	
PV of first 14 investments of Rs. 100 from 1-Apr-2018 to 1-Apr-2031	774.99	Rs.	PV(11%,14,-100,0,1)
Investments in the latter part, 12 annual investments(from 1-Apr-2032 to 1-Apr-2043)	200	Rs.	
PV of next 12 investments of Rs. 200 from 1-Apr-2032 to 1-Apr-2043	354.83	Rs.	PV(9.5%,12,-200,0,1)/(1+11%)^14
PV of all 26 Annual Investments as provisioned	1,129.81	Rs.	774.99+354.83
Amount of Annual Investment equivalent to the assumption of Rs. 100	115,304	Rs.	(1302718/1129.81)*100

Q12 B) Shortfall of Rs. 10.12 lakh

(Solution given below)

Higher Edu. expenses, in current terms, of Mark (age 4) at his age 18, 19,20 & 21	400,000	Rs. p.a.	
Higher Edu. expenses, in current terms, of Stephanie (age 1) at her age 18,19,20,21	400,000	Rs. p.a.	
Cost escalation for higher education expenses	8.00%	p.a.	
Expenses drawn from a fund invested in Debt instruments at	7.50%	p.a.	
Total accumulation period through monthly investments in Asset Allocation Fund	12	years	
Present Value of Higher Education Expenses after 12 years			
PV of Higher Edu. Expenses of Mark at his age of 18 (after 14 years) in Debt instruments	4,732,399	Rs.	PV((1+7.5%)/(1+8%)-1,4,-400000*(1+8%)^14,0,1)
PV of such expenses after 12 years when drawn from Debt instruments	4,095,099	Rs. PV:1	4732399/(1+7.5%)^2
PV of Higher Edu. Exp. Of Stephanie at her age of 18 (after 17 years) in Debt instruments	5,961,460	Rs.	PV((1+7.5%)/(1+8%)-1,4,-400000*(1+8%)^17,0,1)
PV of such expenses after 12 years when drawn from Debt instruments	4,152,506	Rs. PV:2	5961460/(1+7.5%)^5
Total PV of Higher Edu. Exp. After 12 years in Debt instruments	8,247,605	Rs. PV:(1+2)	4095099+4152506
Accumulation			
Aggressive Asset Allocation (year 1 to 7)	7	years	
Return expectation (aggressive)	12.00%	p.a.	
Monthly investment	20,000	Rs.	
Accumulation in 7 years	2,576,027	Rs.	FV((1+12%)^(1/12)-1,12*7,-20000,0,1)
Moderate Asset Allocation (year 8 to 12)	5	years	
Return expectation (moderate)	10.00%	p.a.	
Monthly investment	40,000	Rs.	
Accumulation in 12 years	7,235,587	Rs.	FV((1+10%)^(1/12)-1,12*5,-40000,-2576027,1)
Excess/(Shortfall) expected after 12 years	(1,012,018)	Rs.	7235587-8247605

Q13 C) future capital gains tax on assets transferred to trust could be lower

Q14 A) Rs. 12,818 short term capital loss to be set off against capital gains in AY 2018-19 or carried in 8 subsequent years (Solution given below)

Investment amount on 20-Sep-2016	400,000	Rs.	
Investment made at a price	28.273	Rs.	
Units allotted	14,147.773	units	400000/28.273
Dividend received Rs. 5 per unit (RD 4-Dec-2016 is within 3 months of purchase date)	70,739	Rs.	14147.773*5
Price prevailing today (1-Apr-2017)	22.367	Rs.	
Redemption proceeds (within 9 months of dividend)	316,443	Rs.	14147.773*22.367
Short term Loss in the transaction	(83,557)	Rs.	316443-400000
Under Section 94(7) dividend stripping applies in this case			
Hence, short term capital loss allowable in AY 2018-19	(12,818)	Rs.	-83557+70739

Note: As per Section 94(7), dividend stripping is applicable only if:

1) Shares or MF units are bought within 3 months of dividend record date
2) Shares are sold within 3 months of dividend record date/MF units are sold within 9 months of dividend record date
3) There is short term capital loss (STCL) on such sale
4) Dividend received is less than the STCL on sale

If it is applicable, the amount of dividend received is deducted from the total STCL figure for shares/MF units sold. Balance will be either set-off against capital gains, if any, or carried forward to next assessment year.

Q15 C) Rs. 24,745 "Income from Other Sources" in AY2018-19; Capital gains on maturity shall be tax-exempt
(Solution given below)

As on 31-Mar-2017			
Amount cumulated in Rs. 2 lakh, 3-year fixed deposit made on 1-Jul-2014 @9.75% p.a.	260,663	Rs.	200000*(1+9.75%/4)^11
Amount cumulated in Rs. 1 lakh, 2-year fixed deposit made on 1-Jul-2015 @9.25% p.a.	117,355	Rs.	100000*(1+9.25%/4)^7
Amount cumulated in Rs. 1 lakh, 1-year fixed deposit made on 1-Jul-2016 @8.75% p.a.	106,707	Rs.	100000*(1+8.75%/4)^3
Maturity proceeds to be received as on 1-Jul-2017			
Amount cumulated in Rs. 2 lakh, 3-year fixed deposit made on 1-Jul-2014 @9.75% p.a.	267,016	Rs.	200000*(1+9.75%/4)^12
Amount cumulated in Rs. 1 lakh, 2-year fixed deposit made on 1-Jul-2015 @9.25% p.a.	120,069	Rs.	100000*(1+9.25%/4)^8
Amount cumulated in Rs. 1 lakh, 1-year fixed deposit made on 1-Jul-2016 @8.75% p.a.	109,041	Rs.	100000*(1+8.75%/4)^4
Total maturity procceds of Fixed Deposits	496,126	Rs.	267016+240137+109041
Interest accrued and receivable in the FY2017-18	11,402	Rs.	496126-(260663+117355+106707)
Current Quoted price of SGB (issue date: 18-July-2016)	2,660	Rs.	
Number of SGBs to be bought at the quoted price	186.51	bonds	186.5135338
	186	rounded-off	
Coupon to be received on bonds (half-yearly on 18-Jul'17 and 18-Jan'18)	2.50%	p.a.	
Discount to issue price	7.30%		
Face value per unit of SGB	2,869	Rs.	2660/(1-7.3%)
Face value of SGBs to be purchased	533,722	Rs.	2869*186
interest to be received on bonds in the FY2017-18	13,343	Rs.	533722*2.5%
Total interest due to these transactions under 'Income from Other Sources'	24,745	Rs.	11402+13343

Capital Gains on maturity of the SGBs in July 2024 shall be exempt from income tax