

Suggested solutions to 3-mark and 4-mark problems contained in the Sample Paper - Exam 1: Risk Analysis & Insurance Planning

Setion II Question 6

A training institute bought 50 computers at a total cost installed for Rs. 25 lakh. The set up came into operation on 1st April, 2012. The cost of a similar new computer in due course declined to Rs. 42,000. The industry norm of the depreciation charged on the computers is 30% on written down value basis. At what appropriate value he should insure the set up on next due date 1st April, 2013?

Solution:

Cost of acquisition of computers- 1st April, 2012	2,500,000	Rs.	
Depreciation cahrged	30%	p.a.	
Current replacement cost	2,100,000	Rs.	42000*50
Appropriate value to be insured	1,470,000	Rs.	2100000*(1-30%)

Setion II Question 7

A With Profit life insurance policy with a track record of offering bonuses at Rs. 50 per thousand sum assured (SA) has a premium differential of Rs. 30 per thousand SA from the similar pure term policy. The corresponding pure term cover of 20 years and SA Rs. 12 lakh is available at Rs. 7,860 p.a. Your client has recently paid 16th premium in the With Profit policy. You evaluate the differential returns from With Profit policy in case of mortality today from the perspective of 8% p.a. return. You find that ____.

Solution:

Price differential in premium per thousand	30	Rs.	
Price differential in premium for a Rs. 12 lakh policy	36,000	Rs.	30*1200000/1000
Estimated bonuses on maturity of with profit policy	960,000	Rs.	50*16*1200000/1000
Rate expected on maturity proceeds	5.78%	p.a.	RATE(16,-36000,0,960000,1)
Return differential from 8% p.a.	-2.22%	p.a.	5.78% - 8%

Setion II Question 8

Mr. A has a gross annual salary of Rs. 10 lakh of which he saves 25% including mandatory savings and voluntary systematic investments. Another 35% goes towards servicing of housing and car loans and taxes. His Financial Planner advises him to accumulate 8 months' household expenses in liquid funds. He changes job and expects an immediate rise of 30% in his gross income. The incremental effect in his mandatory savings and taxes would respectively be 1.5% and 3% of his revised gross income. You estimate that other heads would not change materially except his household expenses which would rise by 8% due to child education. How many months will it take to accumulate liquid reserves?

Solution:

Gross present salary	1,000,000	Rs. p.a.	
EMI and Taxes	350,000	Rs. p.a.	1000000*35%
Statutory and long term investments	250,000	Rs. p.a.	1000000*25%
Household expenses	400,000	Rs. p.a.	1000000-350000-250000
Increased Gross Salary	1,300,000		
Revised Household expenses	432,000		400000*(1+8%)
Revised out go towards EMI and Taxes	389,000		350000+1300000*3%
Statutory and long term investments	269,500		250000+1300000*1.5%
Amount available for investments in liquid fund	209,500		1300000-432000-389000-269500
Required liquid fund reserve	288,000		432000*8/12
Time required for building required reserve	1.3747	years	288000/209500
Months required	16.50	months	1.3747*12

Setion II
Question 9

A businessman bought a piece of land in March, 2002 for Rs. 80 lakh. He got a factory built on the land at a cost of Rs. 90 lakh, the factory became operational on 1st September, 2005. The land prices have appreciated at 15% per annum in the period and the construction cost has escalated at 12% per annum since 2005. At what value the factory should be insured in April, 2013 on Market Value basis if the depreciation on factory premises is charged at 6% per annum on straight line method?

Solution:

Cost of land in 2002	8,000,000	Rs.	
Cost of construction in 2005	9,000,000	Rs.	
Cost escalation	12%	p.a.	
Cost of construction in 2013	22,283,669		$9000000*(1+12\%)^8$
Depreciation rate (on SLM method)- 8 years	6%	p.a.	
Therefore, sum insured on market value basis	11,587,508	Rs.	$22283669*(1-8*6\%)$

Setion III
Question 4

An executive purchased an annuity for a lump sum Rs. 85 lakh when he was of 53 years and had in dependents a non-working spouse of age 48 and a son of age 25. On reaching age 60, he expects at least one, himself or his spouse, to survive till 85 years and contracts an immediate life annuity with return of purchase price at Rs. 10.15 lakh p.a. vested against the purchase price of Rs. 1.61 crore. What return is expected from the vesting date?

Solution:

Age of the lawyer on vesting date	60	years	
Age of spouse on vesting date	55	years	
Maximum annuity period expected	30	years	
Annual annuity amount	1,015,000	Rs.	
Purchase price of annuity on vesting date	16,100,000	Rs.	
Effective return expected from annuity	6.73%	p.a.	$\text{RATE}(30,1015000,-16100000,16100000,1)$

Setion III
Question 5

Mr. A has invested in an instrument for three years. The instrument has produced a return of 11%,15% and 12% in the three years. You as Mr. A's advisor have observed that the ruling inflation in these three years respectively was 4%,7% and 8%. You find the real rate of return which Mr. A has received as _____.

Solution:

If the amount invested is Rs. 100			
Real value of the investment at year end: 1	106.7307692		$100*(1+11\%)/(1+4\%)$
Real value of the investment at year end: 2	114.7106398		$106.73*(1+15\%)/(1+7\%)$
Real value of the investment at year end: 3	118.959182		$114.71*(1+12\%)/(1+8\%)$
CAGR of real return	5.96%		$(118.96/100)^{(1/3)}-1$

Setion III

Question 6

A family's monthly expenditure is Rs. 40,000. The earner accounts for 15% of the expense. He wants to cover his family's inflation-adjusted expenses for the next 40 years considering average inflation at 5.5% p.a. and the investment return at 7.5% p.a. The approximate life insurance needed is _____.

Solution:

Current household expenses	40,000	Rs.	
Self consumption	15.0%	p.a.	
Net Expenses	34,000	Rs.	$40000*(1-15\%)$
Family expenses period	40	years	
Rate of inflation	5.5%	p.a.	
Investment rate	7.5%	p.a.	
Monthly effective real rate of return	0.1566%	p.m.	$((1+7.5\%)/(1+5.5\%))^{(1/12)}-1$
Family expenses to be covered	11,484,273	Rs.	$PV(0.1566\%,40*12,-34000,0,1)$

Setion III

Question 7

A single mother, aged 33, earns Rs. 7.5 lakh p.a. out of which taxes and self-expenses account for Rs. 1.5 lakh p.a. Her salary is expected to rise 10% p.a. whereas taxes and personal expenses are likely to rise by 6% p.a. If she expects to work till 58 years, what economic value can you enumerate on her life, if she is confident of getting a return of 9% p.a. from investments?

Solution:

Current gross earnings	750,000	Rs.	
Rate of increment of gross earnings	10%	p.a.	
Current taxes and expenses	150,000	Rs.	
Rate of increment of taxes and espenses	6%	p.a.	
Rate of return from investing	9%	p.a.	
Current age	33	years	
Expected earnings potential upto	58	years	
PV of gross earnings, discounted at growth rate	20,967,027	Rs.	$PV((1+9\%)/(1+10\%)-1,58-33,-750000,0,1)$
PV of taxes/expenses, discounted at growth rate	2,737,432	Rs.	$PV((1+9\%)/(1+6\%)-1,58-33,-150000,0,1)$
PV of net earnings	18,229,596	Rs.	$20967027-2737432$

Setion III
Question 8

Mr. A had taken a loan of Rs. 40 lakh in July 2010 at a floating rate of interest of 10% p.a for tenure of 20 years from a housing finance company. The company sent a notice raising the interest rate to 10.75% p.a. effective January 2012 thereby increasing EMI. He decides to refinance the loan at 10.25% from a bank which charges a processing fee of 1% of loan sanctioned. What absolute amount he stands to save in the remaining tenure if the outstanding loan amount as at end of March 2012 is refinanced so that the new loan terminates as per original tenure?

Solution:

Tenure of loan	240 months		
Loan amount	4,000,000	Rs.	
Initial Rate of Interest	10.00%	p.a.	
EMI began in July 2010	38,601	Rs.	PMT(10%/12,240,-4000000,0,0)
EMI installments repaid till December 2011	18		
Loan outstanding as at December 2011	3,898,160	Rs.	PV(10%/12,240-18,-38601,0,0)
Revised Rate of Interest beginning January 2012	10.75%	p.a.	
New EMI effective January 2012	40,516	Rs.	PMT(10.75%/12,240-18,-3898160,0,0)
Loan outstanding to be repaid to Finance Co. in Mar 12	3,881,226	Rs.	PV(10.75%/12,240-18-3,-40516,0,0)
Processing fee @ 1% of outstanding loan taken fr. Bank	38,812	Rs.	3881226*1%
Rate of Interest charged by bank beginning April 2012	10.25%	p.a.	
Outstanding tenure being new tenure for bank loan	219 months		240-18-3
EMI to be charged by Bank	39,245	Rs.	PMT(10.25%/12,219,-3881226,0,0)
Amount to be incurred from Apr 2012 in earlier loan	8,872,908	Rs.	40516*219
Revised amount incurred towards EMIs	8,594,694	Rs.	39245*219
Processing fees included in revised amount incurred	8,633,507	Rs.	8594655+38812
Savings (absolute) in refinancing the loan	239,401	Rs.	8872908-8633507

Setion III
Question 9

A company has retirement age as 58 years. An employee at age 35 expected increments of 7% p.a. as per company policy when his annual net earnings were Rs. 6 lakh. After 5 years, he got next cadre and his annual net earnings became Rs. 9 lakh. The increments in the revised cadre are at 9% p.a. He had purchased a life cover by income replacement method at age 35. What additional cover is required if he expects his investments to yield 9.5% p.a.?

Solution:

Current net earnings	600,000	Rs.	
Rate of increment of net earnings	7.0%	p.a.	
Current age	35	years	
Retirement age	58	years	
Rate of return from investing	9.5%	p.a.	
Expected insurance by income replacement at age 35	10,830,035	Rs.	PV((1+9.5%)/(1+7%)-1,58-35,-600000,0,1)
Age when promoted to new cadre	40	years	
Revised net earnings at age 40	900,000	Rs.	
Revised Rate of increment of net earnings	9.0%	p.a.	
Revised insurance cover	15,586,286	Rs.	PV((1+9.5%)/(1+9%)-1,58-40,-900000,0,1)
Additional cover needed	4,756,252	Rs.	15586286-10830035

Setion IV
Question 6

A departmental store has rented a space in a Mall. The Store took insurance of goods housed in the shop for a value of Rs. 2.1 crore. The surveyor assessed the average value of goods stored at the facility at Rs. 2.5 crore. The Store in its quarterly stock taking on 31st December 2012 assessed value of the goods at landed cost of Rs. 1.8 crore. On 17th January 2013 the Store had a major fire destroying all goods stored therein. The Store as per sales records had sold goods for Rs. 35 lakh in the interim, making a profit of Rs.7.5 lakh. The admissible amount of claim should be _____.

Solution:

Insurance taken for value of goods	21,000,000	Rs.	
Assessed value of goods for which Insurer covered the risk	25,000,000	Rs.	
Value of goods at landed cost on 31st December 2012	18,000,000	Rs.	
Goods sold to customers till 17th January 2013	3,500,000	Rs.	
Profit made on selling goods after 31st December 2012	750,000	Rs.	
Landed cost of goods sold after 31st December 2012	2,750,000	Rs.	3500000-750000
Value of goods destroyed for which insurance was taken	15,250,000	Rs.	18000000-2750000
Admissible amount of insurance claim	12,810,000	Rs.	15250000*(21000000/25000000)

Setion IV
Question 7

An entrepreneur setting up a leather processing unit purchased a land in 2006 for Rs. 50 lakh and got specialized construction done in 2007 for Rs. 1.6 crore. In March, 2008 the processing plant was constructed at a cost of Rs. 2 crore. The cost of such construction and plant are escalating at 10% p.a. The corrosive nature of chemicals requires depreciation on plant as well as premises at 15% p.a. on written down value basis. As in 2013, what additional reserves should be created by the company apart from depreciation reserves and the residual insured value of plant and premises to reinstate the facility in case it is destroyed in a calamity?

Solution:

Cost of land	5,000,000	Rs.	
Construction cost of premises	16,000,000	Rs.	
Construction done in	2007		
Cost of plant & machinery	20,000,000	Rs.	
Plant installed in	2008		
Depreciation rate on w-d-v method	15%	p.a.	
Escalation cost	10%	p.a.	
Year of reinstatement considered	2013		
Current cost of reinstatement or premises	28,344,976	Rs.	16000000*(1+10%)^(2013-2007)
Current cost of reinstatement of plant	32,210,200	Rs.	20000000*(1+10%)^(2013-2008)
Total cost of reinstatement of the facility	60,555,176	Rs.	28344976+32210200
Depreciation reserves charged on premises in the B/S	9,965,608	Rs.	16000000-(16000000*(1-15%)^(2013-2007))
Depreciation reserves charged on plant in the B/S	11,125,894	Rs.	20000000-(20000000*(1-15%)^(2013-2008))
Total reserves on premises and plant	21,091,502	Rs.	9965608+11125894
Residual Insured value of the plant	14,908,499	Rs.	(16000000+20000000)-21091502
Therefore, additional reserves to be created	24,555,176	Rs.	60555176-21091502-14908498