ADVANCED CAPITAL BUDGETING DECISIONS

CLASS 2-HW-Q4

Topic Decision Tree

Question 4:

Janata Pharmaceuticals is planning to invest Rs.18 lakhs during April 2003 in "Bison" Project. Director (R&D) called a meeting on 15th November 2002. In that meeting, along with senior members of the project team, some external management consultants were also invited. In the meeting it is found that there is a 60% chance of the project being successfully completed by the end of first year. If the project is not completed by March 2004, the company may either choose to abandon the project for Rs.5 lakhs or incur an additional cost of Rs.8 lakhs to complete the project by next year. The chance of successful completion in the second year is 30%. In case the project is not completed by the end of second year, the project will be abandoned for Rs.7 lakhs.

On successful completion, annual cash inflows until the end of the life of project are expected to be as follows:

Cash inflow (Rs. in lakhs)	Probability
08	20%
10	40%
12	30%
14	10%

The life of the project, including the construction period, is 5 years. The opportunity cost of capital is 12%.

You are required to

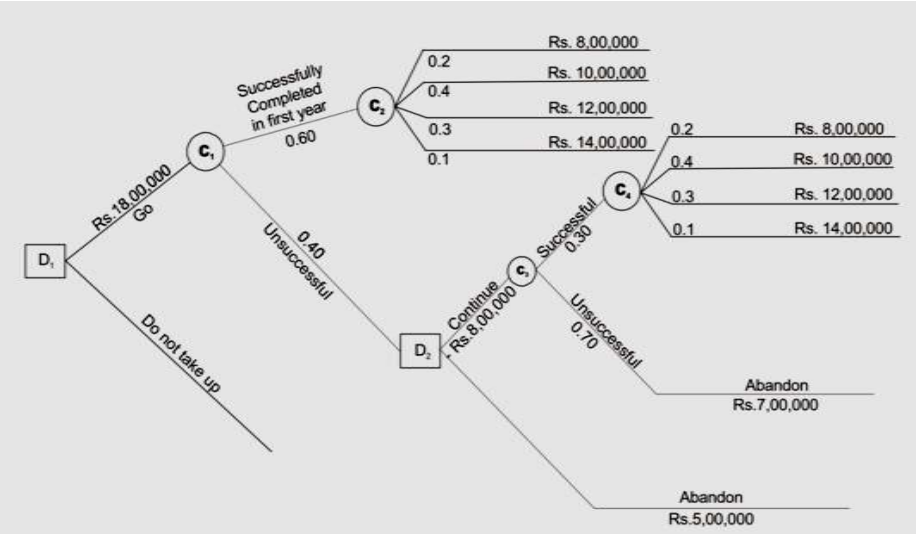
a. Construct a decision tree depicting the above situation.

b. Determine the optimal decision, considering the time value of money.

(Source: ICAI)

ANSWER:

a.



b. Value at C_4 = PV of annual cash inflows for 3 years as the end of second year.
= [0.2 x 8 + 0.4 x 10 + 0.3 x 12 + 0.1 x 14] x PVIFA (12,3)
= 10.6 x 2.402
= 25.46

Value at C_3 = 0.30 x 25.46 + 0.70 x 7.00
= 12.54

Value at D_2 = Maximum of [(PV of 12.54 – 8), 5]
= Maximum of [3.19,5]

Hence optimum value at D_2 is Rs. 5 Lakhs

Value at C_2 = PV of annual cash inflows for 4 years at the end of four years.
= 10.6 x 3.037
= 32.19

Value at C_1 = [Value at C_2 x 0.6 + Value at D_2 x 0.4]
= (32.19 x 0.6 + 5 x 0.4)
= 21.32

∴ Value at D_1 = Max [pv of 21.32 – 18.00), 0]
= 1.03

∴ Optimal decision is to take up the project and abandon the project if it is not successfully completed by the end of the first year.