Question: 03

ABC Chemicals is evaluating two alternative systems for waste disposal, System A and System B, which have lives of 6 years and 4 years respectively. The initial investment outlay and annual operating costs for the two systems are expected to be as follows:

	System A	System B
Initial Investment Outlay	₹ 5 million	₹ 4 million
Annual Operating Costs	₹ 1.5 million	₹ 1.6 million
Salvage value	₹ 1 million	₹ 0.5 million

If the hurdle rate is 15%, which system should ABC Chemicals choose?

The PVIF @ 15% for the six years are as below:

Year	1	2	3	4	5	6
PVIF	0.8696	0.7561	0.6575	0.5718	0.4972	0.4323

Replacement decision

Whenever old machine is in working condition. but new machine with better technology is available in market.

In this situation, decision is taken whether old machine should be replaced or not? Such decision is taken on the basis of Incremental cash flows.

TYK 26

Question: 09

A machine used on a production line must be replaced at least every four years. Costs incurred to run the machine according to its age are:

Age of the Machine (years)					
	0	1	2	3	4
Purchase price (in ₹)	60,000				
Maintenance (in ₹)		16,000	18,000	20,000	20,000
Repair (in ₹)		0	4,000	8,000	16,000
Scrap Value (in ₹)		32,000	24,000	16,000	8,000

Future replacement will be with identical machine with same cost. Revenue is unaffected by the age of the machine. Ignoring inflation and tax, determine the optimum replacement cycle. PV factors of the cost of capital of 15% for the respective four years are 0.8696, 0.7561, 0.6575 and 0.5718.

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Statement Showing PVCO

	YEAR	PVF.	EVERY YEAR		2 YEARS		3 YEARS		4 YEARS	
			Amt	P.V.	Amt	P.V.	Amt	P.V.	Amt	P.V.
Cost	0	1.000	60000	60000	60000	60000	60000	60000	60000	60000
Maintenance & Repair	1	0.8696	16000	13914	16000	13914	16000	13914	16000	13914
	2	0.7561	-	-	22000	16634	22000	16634	22000	16634
	3	0.6575	-	-	-	-	28000	18410	28000	18410
	4	0.5718	-	-	-	-	-	-	36000	20585
Salvage	1	0.8696	(32000)	(27827)	-	-	-	-	-	-
	2	0.7561	-	-	(24000)	(18146)	-	-	-	-
	3	0.6571	-	-	-	-	(16000)	(10520)	-	-
	4	0.5718	-	-	-	-	-	-	(8000)	(4574)
PVCO				46087		72402		98438		124969
÷ PVAF				0.8696		1.6257		2.2832		2.858
EAPVCO				₹52998		₹44536		43114		43772

Optimal Replacement cycle is 3 YEARS due to Lower PVCO

Question: 12

X Ltd. is a taxi operator. Each taxi cost to company ₹4,00,000 and has a useful life of 3 years. The taxi's operating cost for each of 3 years and salvage value at the end of year is as follows:

	Year 1	Year 2	Year 3
Operating Cost	₹ 1,80,000	₹ 2,10,000	₹ 2,38,000
Resale Value	₹ 2,80,000	₹ 2,30,000	₹ 1,68,000

You are required to determine the optimal replacement period of taxi if cost of capital of X Ltd. is 10%.

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Statement showing Calculation of PVCO

	YEAR	PVf (10%)	Replace Every year		2 YEARS		3 YEARS	
			Amt	P.V.	Amt	P.V.	Amt	P.V.
Cost	0	1.000	400000	400000	400000	400000	400000	400000
operating cost	1	0.909	180000	163620	180000	163620	180000	163620
	2	0.826	—	—	210000	173460	210000	173460
	3	0.751	—	—	—	—	238000	178738
Salvage	1	0.909	(280000)	(254520)	—	—	—	—
	2	0.826	—	—	(230000)	(189980)	—	—
	3	0.751	—	—	—	—	(168000)	(126168)
PVCO				309100		547100		789650
÷ PVAF				0.909		1.735		2.486
EAPVCO				340044		315331		317639