1) Initial outlay ÷ A.Factor (cost)
2) P.V. of salavage value ÷ A.F. (Benefit)
3) Cum. P.V. of Operating & m^c. cost (1-t) ÷ A.F. (cost)
4) Cum. P.V. of DTS ÷ A.F. (Benefit)

TOTAL COST = (1)-(2)+(3)-(4)

∴ Uniform Annual Equivalent (Total cost) → UAE(TC) OR Annual Capital Charge (ACC).

Cumulative P.V. of [OM^c. cost x (1-t) - DTS] → Cost....

Optimum Replacement Cycle / Economic Life....

Eg: 5 year machine → Initial outlay = 10 lakhs

Years	1	2	3	4	5
Op. & m^c. cost	80000	85000	92000	110000	150000
S.V.	690000	410000	400000	110000	50000

t = 30%, kc = 18%

Deprn = 25% WDV

Optimum Replacement cycle?

Soln:- Optimum Replacement cycle / Economic life is that life for which UAE (TC) is the least.

	1	2	3	4	5
a) Post tax Op. M^c cost	56000 (80k x 0.7)	59500 (85k x 0.7)	64400 (92k x 0.7)	77000	105000
b) DTS @ 25% WDV & t = 30%	75000 (10L x 25% x 0.3)	56250 (75k x 0.75)	42188 (56250 x 0.75)	31641 (42188 x 0.75)	23730 (31641 x 0.75)
c) After tax OM net of DTS (a-b)	(19000)	3250	22212	45359	81270
d) Df @ 18%	0.847	0.718	0.609	0.516	0.437
e) PV of (c) (c x d)	(16093)	2334	13527	23405	35515

f) Cum. PV	(16093)	(13759)	(232)	23173	58688
g) Salvage Value	690000	410000	400000	110000	50000
h) PV of SV (d x g)	495030	294380	243600	56760	21850
i) Initial outlay	1000000	1000000	1000000	1000000	1000000
j) PV of Total Cost (i+f-h)	568877	691861	756168	966413	1036858
k) Annuity Factor	0.847	1.565	2.174	2.690	3.127
l) UAE (TC) i.e. ACC (j ÷ k)	671638	442084	347823	359261	331576

∴ Optimum Replacement Cycle = 5 years.

Q.2 Optimum Replacement Cycle / Economic Life :-

	1	2	3
a) Operating & mc. cost	33000	38000	46000
b) Df. @ 10%.	0.909	0.826	0.751
c) PV of cost (a x b)	29997	31388	34546
d) Cum. PV of cost	29997	61385	95931
e) salvage value	30000	21000	9000
f) P.V. of S.V. (e x b)	31815	17346	6759
g) Initial outlay	55000	55000	55000
h) PV of Total Cost (d + g - f)	53182	99039	144172
i) Annuity factor	0.909	1.735	2.486
j) UAE (TC) = (h/i)	58506	57083	57994

∴ Replace after 2 years.

- Recurring process & life disparity → UAE = Cost / NPV / A.F.
- Not a repetitive process & life disparity → Decision : NPV.

Q.1 pg

① If machine is replaced now :-

Cash inflow of 80000 p.a. for 3 years

Initial outflow = Purchase cost of new m/c - S.V. of old m/c

= 150000 - 80000

= 70000

∴ NPV = 80000 × PVAF (10%, 3) - 70000

= 80000 × 2.486 - 70000

= 198880 - 70000

= 128880

ICAI But icai has not considered the amount foregone.

NPV = 198880 - 150000 = 48880 ← NPV of new m/c.

② Replace after 1 year :-

Cash inflow of 40000 in year 1 & 80000 p.a. for next 3 years.

Initial outflow = Purchase price of new m/c - S.V. of old m/c

= 150000 × PVIF(10%, 1) - 70000 × PVIF(10%, 1)

= 80000 × 0.909 = 72720

~~∴ NPV = 40000 + 80000 × PVAF (10%, 3) - 80000~~

Calculation of NPV :-

Years	Cash Flow	PV factor @ 10%	Present Value
0	(72720)	1	(72720)
1	40000	0.909	36360
2-4	80000	2.260	180800
			NPV = 144440

∴ We should replace machine after 1 year, since the NPV is higher in that case.