Step 1 : Initial Outflow :-

Cost of new machine	1000000
(+) Add ⁿ w.c. (200000-100000)	100000
(-) Sales proceed of existing m/c	(300000)
Initial Investment	<u>800000</u>

(Block concept me starting me Capital Gain/Loss nahi aa sakta hai bcoz wi block me new machine add hui hai block khtm nahi hua)

Step 2: Incremental Deprⁿ & Terminal Flow :-

Particulars	w/o replacement	with replacement
a) Op. Book Value [600000 × (0.8) ²]	384000	384000
b) Cost of new m/c	-	1000000
c) S.P. of existing m/c	-	(300000)
$z = a + b - c$	384000	1084000
d) B.V. after 4 years [(0.8) ⁴ × z]	157286	444006
e) S.V. after 4 years	-	-
f) Capital Loss (d-e)	157286	444006
g) Tax shield @ 30% = Post Tax S.V.	47186	133202

$$\therefore \text{Terminal Flow} = 133202 - 47186 + 100000 \quad \text{recovery of w.c.}$$

$$= 186016$$

Incremental Deprⁿ @ 20% WDV on 1084000 - 384000
i.e. on 700000

Step 3: Incremental EBDIT :-

Particulars	Existing m/c	New m/c
a) Quantity	36000 (300 × 6 × 20)	72000 (300 × 6 × 40)
b) Selling Price	10	10
c) Material Cost	2	2
d) Labour Cost	1 (20/20)	0.75 (30/40)
e) Cont ⁿ p.u.	7	7.25
f) Contribution (a × e)	252000 (8 × 0000)	522000 (8 × 0000)
g) Cash F. Cost	100000	60000
h) EBDIT (f-g)	152000	462000

∴ Incremental EBDIT = 462000 - 152000 = 310000 p.a.

Step 4: Incremental CFAT :-

= EBDIT (1-t) + DTS
 = 310000 × 0.7 + Deprⁿ × 0.3

Years	1	2	3	4
EBDIT (1-t)	217000	217000	217000	217000
DTS (20% of 71 × 0.3)	42000	33600	26880	21504
CFAT	259000	250600	243880	238504
Df @ 10%	0.909	0.826	0.751	0.683
Present Value	235431	206995	183154	162898

∴ P.V. of Operating Flow = 788479

Step 5 : NPV :-

P.V. of operating flow	788479
(+) P.V. of Terminal Flow (186016×0.683)	127049
(-) Initial Investment	(1800000)
	<u>115528</u>

Q.2

Step 1: CFAT from each machine:-

Particulars	Z	X	Y
a) Output (qty.)	16000 (2000 × 8)	16000 (2000 × 8)	24000 (2000 × 12)
b) Contribution p.u.	7 (20 - 10 - 3)	8.5 (20 - 10 - 1.5)	7.5 (20 - 10 - 2.5)
c) Contribution (a × b)	112000	136000	180000
d) Fixed cost (incl. depreciation)	92000	108000	140000* (132000 + 8000)
e) EBIT (c - d)	20000	28000	40000
f) NOPAT @ 50%	10000	14000	20000
g) Depreciation	18000 $[(11L - 10k)/5]$	33000 $[(1.8L - 15000)/5]$	36400 $[(2L - 18000)/5]$
h) CFAT (f + g)	28000	47000	56400
i) Incremental CFAT			
Z to X		19000	
Z to Y			28400

Step 2: Initial Investment :-

Z to X	→	$180000 - 110000 = 70000$
Z to Y	→	$200000 - 110000 = 90000$

Step 3: Terminal Flow :-

$$Z \text{ to } X \rightarrow 15000 - 10000 = 5000$$

$$Z \text{ to } Y \rightarrow 18000 - 10000 = 8000$$

→ Case 1: No Capital Rationing -

Criteria - NPV -

Z to X ↓

$$\text{NPV} = 19000 \times \text{PVAF}(10\%, 5) + 5000 \times \text{PVIF}(10\%, 5) - 70000$$

$$\text{NPV} = 19000 \times 3.79 + 5000 \times 0.621 - 70000$$

$$\therefore \text{NPV} = 75115 - 70000$$

$$\therefore \text{NPV} = 5115$$

Z to Y ↓

$$\text{NPV} = 28400 \times 3.79 + 8000 \times 0.621 - 90000$$

$$= 112604 - 90000$$

$$= 22604$$

Shift from Z to Y → High NPV.

→ Case 2: Capital Rationing (Scarcity of funds) -

Criteria - Profitability Index

Z to X ↓

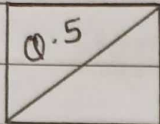
$$\text{PI} = \frac{\text{NPV}}{I} + 1 = \frac{5115}{70000} + 1 = 1.07$$

Z to Y ↓

$$\text{PI} = \frac{22604}{90000} + 1 = 1.25$$

Shift from Z to Y → High Profitability Index.

v.v.v. Imp.....



(Equivalent Annual Cost)

Step 1 : Calculation of EAC of the new machine -
 Replace now.

Cost of replacement	95000
(+) P.V. of 8 years maintenance $[10000 \times PVAF (15\%, 8)]$ i.e. $[10000 \times 4.487]$	44870
(-) S.V. $[25000 \times PVIF (15\%, 8)]$ i.e. (25000×0.327)	(8175)
	<u>131695</u>
Annuity factor	4.487
EAC $(131695 / 4.487)$	29350

→ Replace after one year -

S.V. today forgone (opp. cost)	40000
(+) P.V. of maintenance cost $(10000 \div 1.15)$	8696
	<u>48696</u>
(-) P.V. of S.V. $(25000 \div 1.15)$	(21739)
	<u>26957</u>
Annuity factor for 1 year	0.870
∴ EAC $(26957 / 0.870)$	30985

→ Replace after 2 years -

S.V. today forgone (opp. cost)	40000
(+) P.V. of maintenance cost -	
Year 1 (10000×0.870)	8700
Year 2 (20000×0.756)	<u>15120</u>
	<u>23820</u>
	<u>63820</u>
(-) P.V. of S.V. (15000×0.756)	(11340)
	<u>52480</u>
Annuity factor for 2 years	1.626
EAC $(52480 / 1.626)$	32276

⇒ Computation of EAC of existing machine - (as per Icai)

Particulars	CF	Df @ 15%	Disc. CF	P.V. of CF : Replace after			
				1 yr	2 yrs	3 yrs	4 yrs
S.V. forgone (opp. cost)	40000	1	40000	40000	40000	40000	40000
Maintenance Cost-							
Year 1	10000	0.87	8700	8700	8700	8700	8700
Year 2	20000	0.756	15120		15120	15120	15120
Year 3	30000	0.658	19740			19740	19740
Year 4	40000	0.572	22880				22880
				48700	63820	83560	106440
Salvage Value							
Year 1	25000	0.87	21750	(21750)			
Year 2	15000	0.756	11340		(11340)		
Year 3	10000	0.658	6580			(6580)	
Year 4	-	0.572	-				(0)
				26950	52480	76980	106440
Annuity Factor				0.87 (Yr.1)	1.626 (Yr.2)	2.283 (Yr.3)	2.855 (Yr.4)
EAC				30977	32276	33719	37282

∴ Replace the machine now, since EAC is less.