Q 2.19

Given the following, what are machine factor fractions for m/c A, B, C to produce Parts X & Y?

	M/c A	M/c B	M/c
Part X Std. time	0.15 hr	0.25 hr	0.1 hr
Part Y Std. time	0.10 hr	0.10 hr	0.15 hr
Part X defect estimate	5%	4%	5%
Part Y defect estimate	5%	4%	3%
Historical effeciency	85%	90%	95%
Reliability factor	95%	90%	85%
Equipment Avail.	1600 hr/yr	1600 hr/yr	1600 hr/yr

Part X [A] → [B] → [C] = 100,000 parts.

Part Y [B] → [A] → [C] = 200,000 parts

Setup time for X = 20 min ; Y = 40 min .

Solution :

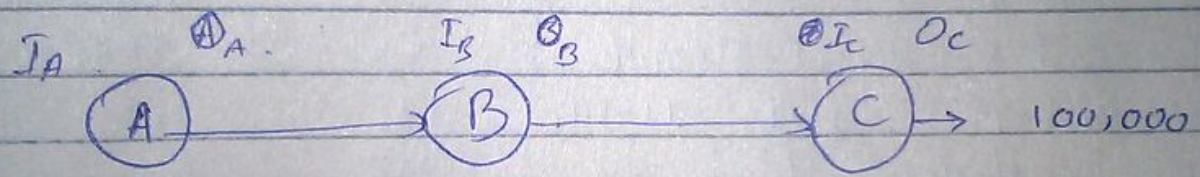
M/c Fraction = $\frac{SQ}{EHR}$.

We need 100,000 part/yr at Part X process at C, So we will calculate inputs to C, B & A and output of A & B using defect rate.

Process X

A → B → C

$I_K = \frac{O_K}{1-d_K}$



$I_B = \frac{O_B}{1-d_B}$

$= \frac{103092.783}{1-0.04}$

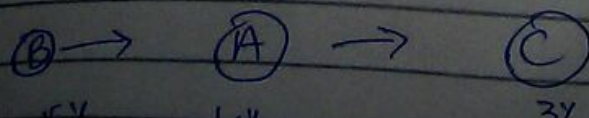
$O_A = I_B = 107388.22$ parts

$I_C = \frac{O_C}{1-d_C} = \frac{100,000}{1-0.03}$

$O_B = I_C = 103,092.783$ Parts

$I_A = \frac{O_A}{1-d_A} = \frac{107388.22}{1-0.05} = 113040.2$ parts.

Process Y



$I_A = \frac{O_A}{1-d_A}$

$= \frac{214776.56}{1-0.05}$

$= 226080.526$ parts

$I_B = \frac{O_B}{1-dB}$

$= \frac{206185.56}{1-0.04}$

$= 214776.56$ parts

$I_c = \frac{O_c}{1-d_c} = \frac{200,000}{1-0.03}$

$= 206185.567$ parts

Mc Fraction Part x

A	B	C
$F_A = \frac{SQ}{EHR}$	$F_B = \frac{SQ}{EHR}$	$F_c = \frac{SQ}{EHR}$
$= \frac{0.15 \times 113402}{(0.85)(1600)(0.95)}$	$= \frac{107388.2 \times 0.25}{(0.9)(1600)(0.9)}$	$= \frac{103092.783 \times 0.1}{(0.95)(1600)(0.85)}$
$F_A = 13.12$ m/c/shift	$= 20.71$ m/c/shift	$= 7.973$ m/c/shift

Mc Fraction Part y.

A	B	C
$F_A = \frac{SQ}{EHR}$	$F_B = \frac{SQ}{EHR}$	$F_c = \frac{SQ}{EHR}$
$\frac{0.10 \times 226080.526}{(0.85)(0.95)(1600)}$	$\frac{0.10 \times 214776.5}{(1600)(0.9)(0.9)}$	$\frac{0.15 \times 206185}{(1600) \times (0.85) \times (0.95)}$
$= 17.49$ m/c/shift	$= 16.57$ m/c/shift	$= 23.93$ m/c/shift