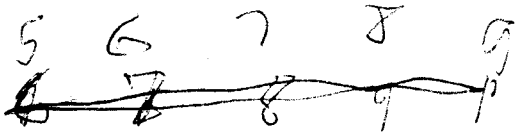
YEAR 150 FINAL SOLNS SP02

(1.)



	1	2	3	4	5	6	7	8	9
	40	80	100	110	150	190	200	210	210
	100	110	130	150	170	200	220	230	240
Δ	60	30	30	40	20	10	20	20	30
ATP	10	10	10	10	10	10	20	20	30
REG		10	20	30					
CUM QUOTE		10	10	10	10	10	20	20	30
QUOTE		10	0	0	0	0	10	0	10

(6)

	40	80	95	105	145	185	195	200	200
	100	110	130	150	170	200	220	230	260
	60	30	45	45	25	15	25	30	60
ATP	15	15	15	15	15	15	25	30	60
REG		10	20	30					
CUM QUOTE		10	15	15	15	15	25	30	30
QUOTE		10	5	0	0	0	10	5	0

(2)

1	0	1/60
5	1	1/50
9	2	1/45

CEE = .85

3

(a) $\frac{1}{60}X_t + \frac{1}{50}X_{t-1} + \frac{1}{45}X_{t-2} \leq 3(.85)(168)$

~~428~~

378

4680

.0167 + .02 + .022

(b) 6426

(c) 4680

(3.) $TPW = XT + NT + \frac{NC * EE}{LI} + (NE-1)*NT$

$= 13 + 27.5 + 29.5 + \frac{60(1000)}{1000(.9994)^n}$

$= 70 + 60\left(\frac{1}{.9994}\right)^n$

OUTPUT RATE

$= \frac{n}{14,400 + \sum_{i=1}^{n}\left[70 + 60\left(\frac{1}{.9994}\right)^n\right]}$

$= \frac{n}{14,400 + 70n + 60\left[\frac{1}{.9994}\ \frac{1-\left(\frac{1}{.9994}\right)^n}{1-.9994}\right]}$

$= \frac{n}{14,400 + 70n + 60\left[1.0006\ \frac{1-(1.0006)^n}{-.0006}\right]}$

$= \frac{n}{14,400 + 70n + 60\left[1667.67\left[(1.0006)^n - 1\right]\right]}$

$n = 100$	.0036
$n = 1000$	.0060
~~$n = 10000$~~	~~.0002~~
$n = 5000$	0.0022

(7.) (a)

STEP	FAT DEF Δ	FATAL DEF Δ / ET
(3) 1	.05	.05/16 = .0031
(5) 2	.04	.04/15 = .00267
(4) 3	.06	.06/18 = .003
(6) 4	.04	.04/16 = .0025
(1) 5	.06	.06/10 = .006
(2) 6	.06	.06/15 = .004

(b) Need $e^{A\Delta D} = \frac{.80}{.72} = 1.11$

OR $\Delta D = .211$

$$\frac{.06}{10} + \frac{.06}{15} + \frac{.05}{15} + \frac{.06}{18}$$

58 DAYS

(5.) (a) $\mu = \frac{UCL + LCL}{2} = 5800$

$USL = 7000$
$LSL = 4500$

$\frac{6\sigma}{\sqrt{n}} = UCL - LCL = 1600$

$C_{pk} = \frac{USL - \mu}{3\sigma} \Rightarrow \sigma = \frac{USL - \mu}{3C_{pk}} = \frac{7000 - 5800}{3(1.077)}$

$= 372.787$

$n = \left(\frac{6\sigma}{1600}\right)^2 = 5$

(b) $\bar{R} = 2.326(372.787) = 867.1$

$UCL = 2.11\bar{R} = 1829.6$

$LCL = 0$

(61)

(a) $AVAIL_A = 1 - \frac{16}{168} - \frac{8}{208} = 1 - .0952 - .0385$
$= 0.866$

$AVAIL_B = 1 - \frac{18}{168} - \frac{6}{104} = 1 - .1071 - .0577$
$= 0.834$

(b) THROUGHPUT = AVAIL * (1 - SCRAP RATE) * $\frac{1}{\text{PROCESS TIME}}$

$T_A = .866\left(1 - \frac{.001}{\text{[illegible]}}\right)\frac{1}{.55(.99) + 1.1(.01)} = 1.55$[illegible]

$T_B = .834\left(1 - \frac{.006}{\text{[illegible]}}\right)\frac{1}{.5(.98) + 1.0(.02)} = 1.629$

(c) OEE = A * PE * QE

$OEE_A = .866 * \frac{.5}{\text{[illegible]}}$

(a) TCT = 40 PR = 10
TW = 400

(c) AW = 60 + 75 + 95 + 55 + 15 = 300 ⇒ SCT = 30

⇒ BT = 10

$\sum_{i=1}^{4} \sigma_i = 1 + 1.5 + 1.5 + 1.0 = 5 \Rightarrow K = 2$

LAYER	$TCT_i = \frac{AW}{PR} + K\sigma_i$
1	6 + 2(1.0) = 8
2	7.5 + 2(1.5) = 10.5
3	9.5 + 2(1.5) = 12.5
4	5.5 + 2(1.0) = 7.5
5	1.5 + 0 = 1.5

(b)

LAYER	AW	TW	IPR
1	80	80	15 + 105 − 120 = 0
2	120	105	−2 + 125 − 108 = 15
3	108	125	10 + 75 − 87 = −2
4	87	75	10
5	15	15	—

(c)

LAYER	IPA	PHOTO WEP	PHOTO PT	QUAL M/C
1	0	10	0.4	A, B, C
2	15	20	0.5	B, C
3	−2	5	0.6	A, B
4	10	8	0.8	C
5	—			

7. (c)

PASS 1 - COMPLETE JOBS

1. ASSIGN 15 LOTS LAYER 2 TO M/C B (5 LOTS L2, 0.5 HRS B)
2. ASSIGN 8 LOTS LAYER 4 TO M/C C (L4 GONE, 1.6 HRS C)

PASS 2 - ASSIGN REST OF WIP

1. ASSIGN 4 LOT LAYER 2 TO M/C B (4 LOTS L2, B GONE)
2. ASSIGN 10 LOTS LAYER 1 TO M/C A (L1 GONE, A 4 HRS)
3. ASSIGN 4 LOTS LAYER 2 TO M/C C (~~L2~~ L2 GONE, C GONE (OVER .4 HRS))
4. ASSIGN 5 LOTS LAYER 3 TO M/C A (L3 GONE, A HAS 1 HR)

RECAP:

B: 16 LOTS LAYER 2
C: 12 LOTS (8 LOTS LAYER 4, 4 LOTS LAYER 3)
A: 15 LOTS (10 LOTS LAYER 1, 5 LOTS LAYER 3)