ANSWER KEY - LABORATORY EXERCISE 11
IMPROVING "AS FOUND" TUNING

2. LOOP TUNING

Does the loop need to be retuned? YES

Trial No.	Gain	TI	Period	Decay Ratio	Period/TI	Rule Used
As Found	1.5	2.5	16.2	0.66	6.48	Set 1/2P < TI < 2/3P
1	1.5	9.0	17.5	0.01	1.94	Multiply Gain by 1.4
2	2.1	9.0	14.0	0.12	1.55	Multiply Gain by 1.1
3	2.31	9.0	13.4	0.16	1.49	Set 1/2P < TI < 2/3P
4	2.31	7.5	13.5	0.20	1.80	Multiply Gain by 1.05
5	2.43	7.5	13.3	0.22	1.77	Stop. Close enough.

NOTE: We could probably have stopped after Trial No. 2, since the Period/ResetTime criterion was met and, although the decay ratio was not 0.25, there was a reasonable response.

3.0 A COMPARISON

10 % Load Change:

Gain:	0.7
Reset:	2.5 min/rpt
Maximum Deviation from Set Point:	11.6 minutes
How long before loop settles to within +/- 2.5 DegC (+/- 1/2 %) of Set Point?	35.0 minutes
Gain:	2.43
Reset:	7.5
Maximum Deviation from Set Point:	7.5
How long before loop settles to within +/1 2.5 DegC (+/- 1/2 %) of Set Point?	13.0 minutes

The controller tuning of Section 3.2 has better response than that of Section 3.1 (lower maximum deviation from set point and faster return to an acceptable deviation from Set Point. See note at bottom of page 4 of Laboratory Exercise 11.