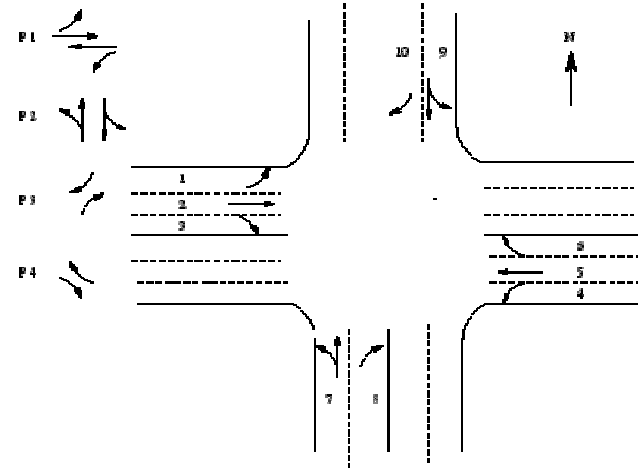


Traffic flow and phase plan for a four-arm intersection is shown in figure. The E-W flow is 1420, W-E flow is 1150, N-S flow is 640, and S-N flow is 580 vehicles per hour. Assume for all the phases the yellow time is 3 seconds, the lost time is 4 seconds, saturation headway is 1.2 seconds, and degree of saturation is 0.9. Assume left turn adjustment factor 1.2 and right turn adjustment factor 1.3. Assume left turn and right turn traffic proportions of 20% and 30% respectively. Assuming no pedestrian traffic, compute signal timing and illustrate with a sketch.



1	Input Data		
	No of phases	N	4
	Yellow time in sec	Y	3
	Lost time in sec	L	4
	Saturation head way in sec	h	1.20
	Degree of saturation	X	0.90
	Left turn adj factor	fLT	1.20
	Through turn traffic	fT	1.00
	Right turn adj factor	fRT	1.30

2	Signal time computaion											
	Movement	Lane	Lane flows	Adj Factor	Adj Flow	Phase	Phase movement details	Phase flows	Vc_i	g_i	G_i	
	E-W Left	4	284	1.2	340.80	1	E-W Left	340.8	710	15.93	17	
	E-W Through	5	710	1.0	710.00		E-W Through	710				
	E-W Right	6	426	1.3	553.80		W-E Left	276				
	W-E Left	1	230	1.2	276.00	2	W-E Through	575	473.6	10.63	12	
	W-E Through	2	575	1.0	575.00		N-S Left & N-S Through	473.6				
	W-E Right	3	345	1.3	448.50	3	S-N Left & S-N Through	429.2	249.6	5.60	7	
	N-S Left	9	128	1.2	153.60		N-S Right	249.6				
	N-S Through	9	320	1.0	320.00		S-N Right	226.2				
	N-S Right	10	192	1.3	249.60	4	E-W Right	553.8	553.8	12.43	14	
	S-N Left	7	116	1.2	139.20		W-E Right	448.5				
	S-N Through	7	290	1.0	290.00		Nil					
	S-N Right	8	174	1.3	226.20		Nil					
	Total Critical flow Vc								1987			62
	Saturation flow s								3000			
	Available green tg								44.59			
	Cycle time C								60.59			

For the above problem, if the actual green time allotted is 30, 28, 18 and 22 respectively for phase 1, 2, 3 and 4, compute the delay for each lane and total intersection delay.

3 Delay computation						
Input Data						
Phases	G1	g1				
1	30	29				
2	28	27				
3	18	17				
4	22	21				
Saturation flow s		3000				
Cycle time C		110				
Movement	Lane	Flow (fi)	Phase	gi	di	di x fi
E-W Left	4	284	1	29	32.94	9355.29
E-W Through	5	710	1	29	39.07	27739.04
E-W Right	6	426	4	21	41.96	17876.38
W-E Left	1	230	1	29	32.30	7428.77
W-E Through	2	575	1	29	36.89	21214.10
W-E Right	3	345	4	21	40.68	14035.67
N-S Left	9					
N-S Through	9	448	2	27	36.81	16491.19
N-S Right	10	192	3	17	42.00	8064.34
S-N Left	7					
S-N Through	7	406	2	27	36.21	14703.16
S-N Right	8	174	3	17	41.73	7261.75
Average Intersection delay (sec/vehicle)					38.04	(cum di fi) / (cum fi)

Note: For delay calculation, adjustment factors should not be used since adjustment factors are actually for the saturation flow.

Note: N-S Left and N-S Right are part of the respective through movement.