

	A	B	C	D	E	F	G	H	I
1	Your name		Date						
2	Partner's name								
3									
4	Phys 1101/1120 - Surrey campus				<b>DISCLAIMER: These example data are purposefully inaccurate. You may test your spreadsheet equations for correctness using these values, but your real experimental values will be very different.</b>				
5	Expt. 7: Inelastic Collisions								
6									
7	<b>DATA - Part A</b>								
8									
9	Edge-to-edge distance on picket fence:				Velocity of red glider:		Velocity of red glider:		
10	d (cm)	$\delta d$ (cm)	$\delta d/d$		Before Collision:		After Collision:		
11	1.5	0.1	6.67%		vred_i (m/s)		vred_f (m/s)		
12					2.4		1.6		
13	Glider masses:				Velocity of gold glider:		Velocity of gold glider:		
14	mred (g)	dmred (g)	(dm/m)_red		Before Collision:		After Collision:		
15	800	0.05	0.01%		vgold_i (m/s)		vgold_f (m/s)		
16					0		1.6		
17	mgold (g)	dmgold (g)	(dm/m)_gold						
18	400	0.05	0.01%						
19					Momentum of red glider:		Momentum of red glider:		
20	Fractional uncertainty of photogate:				Before Collision:		After Collision:		
21	0.01				pred_i (kgm/s)		p_f (kgm/s)		
22					1.92		1.28		
23									
24					Momentum of gold glider:		Momentum of gold glider:		
25					Before Collision:		After Collision:		
26					pgold_i (kgm/s)		pgold_f (kgm/s)		
27					0		0.64		
28									
29	<b>CALCULATIONS - Part A</b>								
30									
31	Edge-to-edge distance on picket fence:				Vel. uncty of red glider:		Vel. uncty of red glider:		
32	d (m)	$\delta d$ (m)	$\delta d/d$		Before Collision:		After Collision:		
33	0.015	0.001	6.67%		dvred_i (m/s)		dv_f (m/s)		
34					0.161789987		0.10786		
35									
36	Glider masses:				Vel. uncty of gold glider:		Vel. uncty of gold glider:		
37	mred (kg)	dmred (kg)	(dm/m)_red		Before Collision:		After Collision:		
38	0.8	0.00005	0.01%		dvgold_i (m/s)		dvgold_f (m/s)		
39					0		0.10786		
40	mgold (kg)	dmgold (kg)	(dm/m)_gold						
41	0.4	0.00005	0.01%						
42					Mom. uncty of red glider:		Mom. uncty of red glider:		
43					Before Collision:		After Collision:		
44					dpred_i (kgm/s)		dp_f (kgm/s)		
45					0.129432045		0.086288		
46									
47					Mom. uncty of gold glider:		Mom. uncty of gold glider:		
48					Before Collision:		After Collision:		
49					dpgold_i (kgm/s)		dpgold_f (kgm/s)		
50					0		0.043144		
51	Impulse of red glider, (pf - pi):								
52	ired (kgm/s)	dlred (kgm/s)	(dl/l)_red						
53	-0.64	0.155557959	-24.31%						
54									
55	Impulse of gold glider, (pf - pi):								
56	lgold (kgm/s)	dlgold (kgm/s)	(dl/l)_gold						
57	0.64	0.043144071	6.74%						
58									
59	Total momentum of system:								
60	Before collision:								
61	p_tot_i (kgm/s)	dp_tot_i (kgm/s)	(dp/p)_tot_i						
62	1.92	0.129432045	6.74%						
63									
64	After collision:								
65	p_tot_f (kgm/s)	dp_tot_f (kgm/s)	(dp/p)_tot_f						
66	1.92	0.096472976	5.02%						

	J	K	L	M	N	O	P	Q
1								
2								
3								
4								
5								
6								
7	<b>DATA - Part B</b>							
8								
9	<b>Edge-to-edge angle on picket disk:</b>				<b>Angular velocity of apparatus:</b>			
10	$\theta$ (degs)	$\delta\theta$ (degs)	$\delta\theta/\theta$		Before Collision:		After Collision:	
11	12	0.5	4.17%		$\omega_{app\_i}$ (rads/s)		$\omega_{app\_f}$ (rads/s)	
12					2.4		1.37	
13	<b>Moment of Inertia of apparatus:</b>				<b>Angular velocity of object:</b>			
14	$I_{app}$ (kgm <sup>2</sup> )	$dI_{app}$ (kgm <sup>2</sup> )	$(dI/I)_{app}$		Before Collision:		After Collision:	
15	0.004201	0.000085	2.02%		$\omega_{bar\_i}$ (rads/s)		$\omega_{bar\_f}$ (rads/s)	
16								
17	<b>Moment of Inertia of object:</b>				<b>Angular velocity of object:</b>			
18	$I_{bar}$ (kgm <sup>2</sup> )	$dI_{bar}$ (kgm <sup>2</sup> )	$(dI/I)_{bar}$		Before Collision:		After Collision:	
19	0.00318	0.00017	5.35%		0		1.37	
20								
21	<b>Fractional uncertainty of photogate:</b>							
22	0.01							
23								
24								
25	<b>CALCULATIONS - Part B</b>							
26								
27	<b>Edge-to-edge angle on picket disk:</b>				<b>Angular momentum of apparatus:</b>			
28	$\theta$ (radians)	$\delta\theta$ (radians)	$\delta\theta/\theta$		Before Collision:		After Collision:	
29	0.20943951	0.008726646	4.17%		$L_{app\_i}$ (kgm <sup>2</sup> /s)		$L_{app\_f}$ (kgm <sup>2</sup> /s)	
30					0.0100824		0.005755	
31								
32	<b>Angular momentum of object:</b>				<b>Angular momentum of object:</b>			
33					Before Collision:		After Collision:	
34					$L_{bar\_i}$ (kgm <sup>2</sup> /s)		$L_{bar\_f}$ (kgm <sup>2</sup> /s)	
35					0		0.004357	
36								
37								
38								
39	<b>Uncertainty of angular velocity of apparatus:</b>				<b>Uncertainty of angular velocity of apparatus:</b>			
40					Before Collision:		After Collision:	
41					$d\omega_{app\_i}$ (rads/s)		$d\omega_{app\_f}$ (rads/s)	
42					0.102839681		0.058704	
43								
44	<b>Uncertainty of angular velocity of object:</b>				<b>Uncertainty of angular velocity of object:</b>			
45					Before Collision:		After Collision:	
46					$d\omega_{bar\_i}$ (rads/s)		$d\omega_{bar\_f}$ (rads/s)	
47					0		0.058704	
48								
49	<b>Uncertainty of angular momentum of apparatus:</b>				<b>Uncertainty of angular momentum of apparatus:</b>			
50					Before Collision:		After Collision:	
51					$dL_{app\_i}$ (kgm <sup>2</sup> /s)		$dL_{app\_f}$ (kgm <sup>2</sup> /s)	
52					0.000477771		0.000273	
53								
54	<b>Uncertainty of angular momentum of object:</b>				<b>Uncertainty of angular momentum of object:</b>			
55					Before Collision:		After Collision:	
56					$dL_{bar\_i}$ (kgm <sup>2</sup> /s)		$dL_{bar\_f}$ (kgm <sup>2</sup> /s)	
57					0		0.000298	
58								
59	<b>Total ang. momentum of system:</b>							
60	<b>Before collision:</b>							
61	$L_{tot\_i}$ (kgm <sup>2</sup> /s)	$dL_{tot\_i}$ (kgm <sup>2</sup> /s)	$(dL/L)_{tot\_i}$					
62	0.0100824	0.000477771	4.74%					
63								
64	<b>After collision:</b>							
65	$L_{tot\_f}$ (kgm <sup>2</sup> /s)	$dL_{tot\_f}$ (kgm <sup>2</sup> /s)	$(dL/L)_{tot\_f}$					
66	0.01011197	0.000404317	4.00%					