

ADVANCE ECONOMIC THEORY (203) PRELIM June 2002
ANSWERS to questions 1 and 2

1. (i)

Time:	AFTER EXPERIMENT					
A's partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	1	2	4	3	5
1	2	4	3	5		
B's partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">5</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">4</td> </tr> </table>	1	3	5	2	4
1	3	5	2	4		
C's partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	2	3	4	1	5
2	3	4	1	5		
Common knowledge partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	1	2	3	4	5
1	2	3	4	5		

Scientist → State ↓	A	B	C	Average
1	2/3	2/3	1/2	11/18
2	2/3	1/2	2/3	11/18
3	1/2	2/3	2/3	11/18
4	2/3	1/2	2/3	11/18
5	1/2	2/3	1/2	5/9

Time:	AFTER FIRST ANNOUNCEMENT					
A's partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	1	2	4	3	5
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B's partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	1	3	2	4	5
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Common knowledge partition	<table border="1" style="display: inline-table; border-collapse: collapse;"> <tr> <td style="padding: 2px 10px;">1</td> <td style="padding: 2px 10px;">2</td> <td style="padding: 2px 10px;">3</td> <td style="padding: 2px 10px;">4</td> <td style="padding: 2px 10px;">5</td> </tr> </table>	1	2	3	4	5
1	2	3	4	5		

Scientist → State ↓	A	B	C	Average
1	2/3	1	1	8/9
2	2/3	1/2	2/3	11/18
3	1	1	2/3	8/9
4	2/3	1/2	2/3	11/18
5	0	0	0	0

Time:

AFTER SECOND ANNOUNCEMENT

A's partition	1	2 4	3	5
B's partition	1 3	2 4	5	
C's partition	1	2 4	3	5
Common knowledge partition	1 3	2 4	5	

Scientist → State ↓	A	B	C	Average
1	1	1	1	1
2	1/2	1/2	1/2	1/2
3	1	1	1	1
4	1/2	1/2	1/2	1/2
5	0	0	0	0

- (ii) Only A and C will, B won't (according to B's information, state 3 is a possibility)
 (iii) No. However, it will be common knowledge that the state is either 2 or 4.

2.

(a) Given the rules, since there were two highest bids. The first object went to Ann (even though she bid less than the others). Thus the normal form of this second-round game is:

	Bob			A	Bob			A	Bob		
	\$0	\$10	\$20		\$0	\$10	\$20		\$0	\$10	\$20
A \$0	100,0,0	0,-10,0	0,-20,0	\$0	0,0,-10	100,-10,-10	0,-20,-10	\$0	0,0,-20	0,-10,-20	100,-20,-20
\$10	90,0,0	90,-10,0	-10,-20,0	N \$10	90,0,-10	90,-10,-10	-10,-20,-10	N \$10	-10,0,-20	-10,-10,-20	90,-20,-20
N	80,0,0	80,-10,0	80,-20,0	N \$20	80,0,-10	80,-10,-10	80,-20,-10	N \$20	80,0,-20	80,-10,-20	80,-20,-20
N											

Carla: \$0

Carla: \$10

Carla: \$20

For both Bob and Carla, bidding \$0 is a strictly dominant strategy. Eliminating \$10 and \$20 for both Bob and Carla gives us a reduced game where bidding \$0 is a strictly dominant strategy for Ann. Thus, since common belief in rationality yields iterative elimination of strictly dominated strategies, the profile played is (\$0, \$0, \$0).

- (b) For every player it is a dominant choice to bid 0 in round 2 if he/she did not win object 1 in round 1. There is no dominant choice for any player if he/she won the first round (e.g. for Ann bidding 0 is worse than bidding 20 if only one other person bids 20).
- (c) The iterated dominant-strategy equilibrium in the second round is as follows: (1) if Amy won the first round, everybody bids 0; (2) if Bob won the first round, Bob bids 10 and the others 0; (3) if Carla won the first round, Carla bids 10 and the others 0.
- (d) The normal form for the reduced first-round game is as follows. First figure out who wins the first object:

		Bob \$10	\$0	\$20
A \$0	Ann	Bob	Bob	Bob
\$10	Ann	Ann	Bob	Bob
N	Ann	Ann	Ann	Ann
\$20	Ann	Ann	Ann	Ann
N				

		Bob \$10	\$0	\$20
A \$0	Carla	Ann	Bob	Bob
N \$10	Ann	Ann	Bob	Bob
N \$20	Ann	Ann	Ann	Ann

		Bob \$10	\$0	\$20
A \$0	Carla	Carla	Ann	Ann
N \$10	Carla	Carla	Ann	Ann
N \$20	Ann	Ann	Ann	Ann

Carla: \$0

Carla: \$10

Carla: \$20

Recalling the conclusions from part (b) we get the following normal-form:

		Bob \$10	\$0	\$20
A \$0	100,0,0	0, 80,0	0,70,0	
\$10	90,0,0	90,-10,0	-10, 70,0	
N	80,0,0	80,-10,0	80,-20,0	
N				

		Bob \$10	\$0	\$20
A \$0	0,0,90	100,-10,-10	0,70,-10	
N \$10	90,0,-10	90,-10,-10	-10,70,-10	
N \$20	80,0,-10	80,-10,-10	80,-20,-10	
N				

		Bob \$10	\$0	\$20
A \$0	0,0,70	0,-10,70	100,-20,-20	
N \$10	-10,0,70	-10,-10,70	90,-20,-20	
N \$20	80,0,-20	80,-10,-20	80,-20,-20	
N				

Carla: \$0

Carla: \$10

Carla: \$20

(e) There are no pure-strategy Nash equilibria (e.g. everybody bidding 0 is not a Nash equilibrium: Bob can do better by increasing his bid to 10, etc.).