A. Consider a modified version of the Bayesian Battle of Sexes, with the Boy i.e. Player 1 or the row player of two types Interested (I), Uninterested (U) and the girl i.e. Player 2 or the column player of a single type. Further, $P(I) = \frac{3}{4}$ and $P(U) = \frac{1}{4}$. The game tables for both types of the Boy player are shown below.

Game Table for Boy of type Interested (I)

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>10,5</td>
<td>0,0</td>
</tr>
<tr>
<td>H</td>
<td>0,0</td>
<td>5,10</td>
</tr>
</tbody>
</table>

Game Table for Boy of type Uninterested (U)

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>0,5</td>
<td>10,0</td>
</tr>
<tr>
<td>H</td>
<td>5,0</td>
<td>0,10</td>
</tr>
</tbody>
</table>

Answer the questions below.

1. What are the respective payoffs to the Girl for choosing the pure strategies C, H when the Boy is choosing (C, C) i.e. Boy of type I is choosing C and Boy of type U is also choosing C.
   a) 0,0
   b) 5,5
   c) 5,0
   d) 0,5
   Ans (c)

2. What are the respective payoffs to the Girl for choosing the pure strategies C, H when the Boy is choosing (C, H) i.e. Boy of type I is choosing C and Boy of type U is choosing H.
   a) $\frac{15}{4}, \frac{5}{2}$
   b) $\frac{15}{2}, \frac{5}{4}$
   c) $\frac{15}{2}, \frac{5}{2}$
   d) $\frac{15}{4}, \frac{5}{4}$
   Ans a)
3. What are the respective payoffs to the Girl for choosing the pure strategies C,H when the Boy is choosing (H,C) i.e. Boy of type I is choosing H and Boy of type U is choosing C.
   a) 5/4, 15/2
   b) 5/2, 15/2
   c) 5/4, 15/4
   d) 5/2, 15/4
   **Ans a)**

4. What are the respective payoffs to the Girl for choosing the pure strategies C,H when the Boy is choosing (H,H) i.e. Boy of type I is choosing H and Boy of type U is also choosing H.
   a) 0,5
   b) 0,10
   c) 5,5
   d) 10,10
   **Ans b)**

5. Which of the following are the best responses of the Girl to the strategies (C,C), (C,H) respectively of the Boy
   a) C, C
   b) C, C
   c) H, C
   d) H, H
   **Ans a)**

6. Which of the following are the best responses of the Girl to the strategies (H,C), (H,H) respectively of the Boy
   a) C,C
   b) C,H
   c) H,C
   d) H,H
   **Ans d)**

7. Which of the following is a Bayesian Nash equilibrium of the above game
   a) ((C,C),H)
   b) ((C,C), C)
   c) ((C,H), C)
   d) ((C,H), H)
   **Ans (c)**

8. Which of the following is a Bayesian Nash equilibrium of the above game
   a) ((H,O), C)
   b) ((H,O),H)
   c) ((H,H), C)
B. Consider a modified version of the two player confrontation i.e. Yield (Y) vs. Fight (F) game described in the lectures, where each person can either choose Y or F. Similar to the lectures, let there be a single type of Player 1 i.e. the row player, while there are two types of player 2 i.e. the column player, strong (S) and weak (W). Let \( P(S) = \frac{3}{4} \) and \( P(W) = \frac{1}{4} \). The game tables are similar to the lecture and are reproduced below for the sake of convenience.

<table>
<thead>
<tr>
<th></th>
<th>Y</th>
<th>F</th>
</tr>
</thead>
<tbody>
<tr>
<td>Y</td>
<td>0,0</td>
<td>0,1</td>
</tr>
<tr>
<td>F</td>
<td>1,0</td>
<td>-1,1</td>
</tr>
</tbody>
</table>

Strong (S) and \( P(S) = \frac{3}{4} \)

<table>
<thead>
<tr>
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<th>F</th>
</tr>
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<tr>
<td>Y</td>
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</tr>
<tr>
<td>F</td>
<td>1,0</td>
<td>-1,1</td>
</tr>
</tbody>
</table>

Strong (W) and \( P(W) = \frac{1}{4} \)

Answer the questions below

9. What is the payoff to the row player i.e. player 1 for the pure strategies Y, F respectively for the strategy (F,Y) of player 2 i.e. player 2 of type S is choosing F and of type W is choosing Y

a) 0, 0  
b) -1/2, 0  
c) -1/2,-1/2  
d) 0,-1/2  
Ans d)

10. What is the payoff to the row player i.e. player 1 for the pure strategies Y, F respectively for the strategy (F,F) of player 2 i.e. player 2 of type S is choosing F and of type W is also choosing Y

a) 0,0  
b) -1/2,0  
c) -1/2,-1/2  
d) 0,-1/2  
Ans d)

11. Is there any Bayesian Nash equilibrium in which player 2 of type S is choosing Y?

a) Yes  
b) No  
c) Sometimes
d) Cannot Say  
   Ans b) 

12. What is the Bayesian Nash equilibrium of this game  
   a) (Y,(F,F))  
   b) (Y,(F,Y))  
   c) Both of the above  
   d) None of the above  
   Ans a) 

Consider a modified version of the Bayesian Cournot game described in the lectures, where Firm 1 has a production cost of C while types Low (L) and High (H) of Firm 2 have production costs \( \frac{1}{2} C \) and \( 2C \) respectively. The price \( p \) per unit is given by the inverse demand function \( p = (a - (q_1 + q_2)) \). Answer the questions that follow. 

13. What is the optimal quantity \( q_1^* \) produced by Firm 1 at Nash equilibrium  
   a) \( \frac{1}{3}*(a-5c/4) \)  
   b) \( \frac{1}{3}*(a-3c/4) \)  
   c) \( \frac{1}{3}*(a-4c/4) \)  
   d) \( \frac{1}{3}*(a-6c/4) \)  
   Ans b) 

14. What is the optimal quantity \( q_2^{L}^* \) produced by Firm 2 of type L at Nash equilibrium  
   a) \( a/3-c/24 \)  
   b) \( a/3-c/16 \)  
   c) \( a/3-c/12 \)  
   d) \( a/3-c/8 \)  
   Ans d) 

15. What is the optimal quantity \( q_2^{H}^* \) produced by Firm 2 of type H at Nash equilibrium  
   a) \( a/3 - 7c/24 \)  
   b) \( a/3 - 7c/16 \)  
   c) \( a/3-7c/8 \)  
   d) \( a/3-7c/12 \)  
   Ans c)