HUL311 - APPLIED GAME THEORY

MINOR 1 EXAMINATION (**Aug 28, 2016**), IITD SEM-I, AY 2016-17.

Time Allowed: 1 Hour. (ANSWER ALL, Max marks=20)

Q1: Basic Concepts [$3 \times 4 = 12$ **marks**].

Define, using as best you can the notation introduced in class, and briefly explain, using examples, the following terms (3 marks each):

(a) Best response,

(b) Nash Equilibrium.

U (4,8) (3,7) (5,6)

(~~6~~2,3) (5,5) (4,2)

(8,4) (2,3) (3,5)

For each of the following statements, provide a proof if it is true or a counter-example if it is not (3 marks each):

(c) In a two-player matrix game, the process of iterated elimination of strictly dominated strategies will always lead to a pure-strategy Nash equilibrium.

(d) Every Strict Dominant Strategy Equilibrium is a Nash equilibrium.

Q2 [8 **marks**].

You often go to Delhi Race Course where betting on horse racing takes place. You can:

- Decline to place any bets at all.
- Bet on Belle. It costs \$1 to place a bet; you will be paid \$2 if she wins (for a net profit of \$1).
- Bet on Jeb. It costs \$1 to place a bet; you will be paid \$11 if he wins (for a net profit of \$10).

You believe that Belle has probability 0.7 of winning and that Jeb has probability 0.1 of winning.

1. Your goal is to maximize the expected value of your actions. What, if any, bet should you place, and what is your expected value? Draw the decision tree that supports your conclusion. Assume that you are risk-neutral. (1+1+2 marks)

2. Someone comes and offers you an insurance against gambling. If you agree to it,

- they pay you \$2 up front
- you agree to pay them 50% of any winnings (that is, \$0.50 if Belle wins, and \$5 if Jeb wins).

How would it affect the expected value of each of your courses of action? What would be the best action to take now, again assuming risk-neutrality? Draw the new decision tree. (1+1+2 marks)

THE END