Name:

NetEcon final exam

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Patrick Loiseau

For each question, check all boxes corresponding to correct answers. There may be zero, one or several.

Advice: Read the questions carefully!

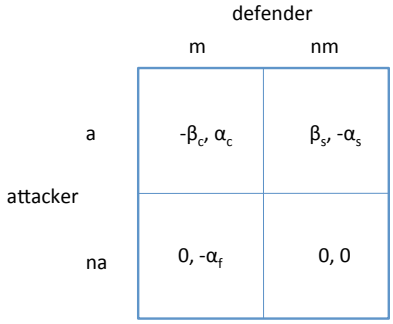
1. Consider a game with n users sharing the same communication link. Each user i chooses a non-negative consumption x_i and receives a utility $u_i(x_i, x_{-i}) = f(x_i)-(x_1+\dots+x_n)-p_i$ where f(.) is an increasing concave function and p_i is the price for user i.
   - ☐ The social welfare is $\Sigma_i f(x_i)$.
   - ☐ If $p_i=0$ for each user i, the price of Anarchy is one.
   - ☐ The price of anarchy is always larger or equal to one.
   - ☐ If $p_i=nx_i$, for all user i, at NE each user chooses a socially optimal level of consumption.

2. Consider the following two-players game:

		P2: A	P2: B
P1	A	5, 2	-1, -1
	B	-1, -1	2, 5

   - ☐ It is a potential game with potential f such that f(a, a)=5, f(a, b)=2, f(b, b)=5, f(b, a)=-1.
   - ☐ There exists an infinity of functions f such that it is a potential game with potential f.
   - ☐ Every finite potential game has a pure strategy Nash equilibrium.
   - ☐ Every finite potential game has a fully mixed Nash equilibrium.

3. Consider a 2-players attacker defender game. The attacker has 2 actions, attack (a) or not-attack (na) and the defender has 2 actions, monitor (m) or not monitor (nm). The payoffs are (with $\alpha_c>0$, $\alpha_f>0$, $\alpha_s>0$, $\beta_c>0$, $\beta_s>0$):



- ☐ Every finite game has a mixed strategy Nash equilibrium.
- ☐ The maxmin strategy (or safe strategy) and the Nash equilibrium always coincide.
- ☐ At the Nash equilibrium of this game, the attacker is choosing "a" with probability $1/(\alpha_c + \alpha_f + \alpha_s)$.
- ☐ At the Nash equilibrium of this game, the attacker's expected payoff is strictly positive.

4. Auctions. We consider auctions with a single item, where there is one seller and there are n>1 buyers with independent identically distributed private value.
   - ☐ A second-price auction is equivalent to an open descending auction.
   - ☐ Running an auction is always the optimal way of selling the good, regardless of the information of the seller about the buyers' values.
   - ☐ If a seller who wants to maximize his expected revenue through a second-price auction has value zero for the good, he should set a reserve price of zero.
   - ☐ In a first-price auction, at the symmetric increasing Nash equilibrium, every user bids less than his true value.