Name:

NetEcon final exam

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

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 $u_i(x_i, x_{-i}) = f(x_i)-(x_1+...+x_n)-p_i$ where f(.) is an increasing concave function and p_i is the price for user i.
   - ☐ The social welfare is the sum of utilities of all users.
   - ☐ If $p_i=0$ for each user i, the consumptions chosen by users at Nash equilibrium maximize the social welfare.
   - ☐ Social welfare is always maximal at Nash equilibrium.
   - ☐ Social welfare is maximized at Nash equilibrium if the price imposed to each user equals the externality that he imposed on the society.

2. An expert has a belief q about the weather: she believes it will be sunny with probability q and rain with probability 1-q on the next day. She reports a prediction p (i.e., she announces "it will be sunny with probability p tomorrow") and she is rewarded according to a scoring rule called S(.).
   - ☐ For any scoring rule, the expert has an incentive to report truthfully her belief.
   - ☐ If S(.) is the Brier or the logarithmic scoring rule, then it is strictly dominant for the expert to report her true belief.
   - ☐ If S(.) is any proper scoring rule, then it is strictly dominant for the expert to report her true belief.
   - ☐ The logarithmic scoring rule is strictly proper.

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 $\alpha_c>0$, $\alpha_f>0$, $\alpha_s>0$, $\beta_c>0$, $\beta_s>0$):

		defender: m	defender: nm
attacker	a	$-\beta_c, \alpha_c$	$\beta_s, -\alpha_s$
	na	$0, -\alpha_f$	0, 0

- [ ] There is no pure strategy Nash equilibrium.
- [ ] All Nash equilibria are in pure strategy.
- [ ] This is a zero-sum game.
- [ ] At the Nash equilibrium, the probability that the attacker attacks depends only on the payoff parameters of the defender α_c, α_f, α_s.

4. Auctions. We consider auctions with a single item, where there is one seller and there are n buyers with independent identically distributed private value.
    - [ ] In a first-price auction, bidding truthfully is weakly dominant.
    - [ ] In a second-price auction, bidding truthfully is weakly dominated.
    - [ ] The expected revenue for the seller is strictly higher in a first-price auction than in a second price auction.
    - [ ] The expected revenue for the seller is strictly smaller in a first-price auction than in a second price auction.