Answer Key: 2048 Find Exam. W17 B E €BR (=> p(-20)+(1-p)30 > 0 ⇒ 30 ≥ 50p <⇒ p ≤ 3/5.
</p> F/KG (\$) FX (G (100) C) First step in BI shown, Remaining NFG 17 (35) (23) (24) (40) (20) (30) PF, GN 35, -20 85, Q NEG 49, 30 100,0 SO SPNE is (NEGN, E) with p=0. That is, it is a (weakly) dominant strategy, and SGP, for I to Not prepare, to Fisht if prepared (not on eg. path) and to Go easy in not prepare and entrants BR is to Enter. (2) Simple BI gives (Outpect) Outpect, Inputer, Inputer) for outrant, thus (PHCH, Pela), with payoffs (1,1) EH (2) + (3,1) (8) = (2,6). B) Try (PHICH, PLICE), 180, w(CHIPH)=1=4 (CLIPE). Then (4) [BR, (PH) = In, BR, (PL) = Out] But BRy to (x) includes PLICH, breaking this ex Try (P, 1CH, P, 1CL) so u (C+1PL)= 1=u (C, 1PH). Then (\*x)(BR,(PH) = Owt, BR, (R) = In). But BR, to (xx) includes PHICH, breaking the eg Thus neither possible pooling stractegy is part of a PBE. c) Try (PHICH, CL). SO M (CHIPH) = .2 (the prior) and M (CHIPL) = Q & [O,1] and white ary. BR2 (PH) = Out, BR2 (PL) = In iff 825. Then BR1(CH)=PHV, BR1(CL)=PH if 97.5 V So a Footing PRE) is Mf P+ 1C4, C1) u(1P+)= prier, 4 (C41P1)= 930.5. Try (Pelcyce). So u (Chlpe)=prior, u (Chlpu)=g [[0,1] arbitrary BR, (PL) = Out, BR, (PH) = In if 970.5. Then BR, (CL) = P, Y, BR, (CH) = P, iff 920,5 . So lagar we have a powhy PBF M=(P4 | CH, CL); M(·IPL) = prior, M(CHIPH) 20,5; A=(PL) = Out; O\*(PH) = In))

3 w(1)=1, w(2)=2, w(3)=3, w(12)=6, w(13)=8, w(23)=10, w(123)=18,		
	BVB) MC, MC, MC,	
	123   5   12	
(Core, e.g. (6,6,6) + Core.	132 1 10 7	
	213 4 2 12	
Z X, \( \begin{align*}  \chi_1 \\  \chi_2 \\ \end{align*}   \chi_2 \\ \end{align*}  \chi_2 \\  \chi_2 \\ \qu	231 8 2 8	
c. Yes, since wis convex (supermodular),	312 5 10 3	
d(w) e Gre (w)	321 8 7 3	
	27 36 45	
d. NBS: max (x,-1)(x,-2)(x,-3) s.t x+x+x=18		
	normalized 1/4 1/3 2/12	
$\Rightarrow y_{i} = 4 \Rightarrow [x_{1} = 4 + 1 = 5, x_{2} = 4 + 2 = 6]$		
X3 = 4+3 = 7		
A)W= CE = M;+0.2 Var; = 5 1+(0.2) 12 1.2; i=L		
$(2+(0.2)2^2=2.8, i=4)$		
6) Eloss = (4) 2 + (.6) 1 = [1.4 K/yr = P]	•	
At P=1.4, low risk people refuse (1.2<1.4), so only H-types accept		
Eprofit = 4000 (P-Eloss H) = 4000 (1.4	The state of the s	
d) Assuming a uniform price, Insurors will sorve only Htypes (as just seen), at P=2 +.4 = 2.4 K/yr.		
e) With free entry, P gets bid fown to 0 -11		
f) Use screening model, find IC's +PC to separate contracts aimed at H, L types.		
PC's imply that an upper bound in profit for H customer is (0.2) 22 = 0.8		
and is (0,2) 12 = 0,2 for each 1- customer or (0,2) 6000 + (0,8) 4000 = 44,000 K =		
a) Vis not equivalent to Eu as evaluated in the Notest of 24+1.		
His equivalent up to second order. Over a limited range, the function U(x)=x-cx2		
See also PS 1 problem#2.	works.	

Scrimite (Nyoppile) a commitger y jeptórský skýtil mer a commitmed	
Signal and the second	20 Yes, it is symmetric in that Col's payoff within is the transpose of Row's.
ertinalii aabaaqqab qabaqaaq aaliibar abbaaliiqbaqtiisiisiig	b) For x & (-2,0), we have p* = 9, 19 = -2+x & (0,1), e.g., p* = 1/3 for x=-1.
n 15 pendin ga skiller (155 sie seel de skiller de skiller (155 sie skiller 155 sie skiller (155 sie skiller (	It is a downcrossing singe 0>a,=3-5, 0>a,=x-0, hence a unique NEAStable
5,525-patrol troussistivo vistenvosta rezistentos resistaças qui minercol	c) For x ∈ (0, 10), a2=x>0> a1=-z, hence S2 is a dominal strategy
g Section (1) z zavenezem et eszepéines készet elektrál es zett-ment el fel eszepement	the Pune NE Sz is i.globally Stable.
edinizidi seremmi silami e idan e tukan e idan e	d) Since a, = -2 < 0, the CO ease with 2 pure NE is not possible.
rationism of the state of the s	e) With x=1, (si, s,) is the stage gave NE. To sustain cooperation,
i dilikas visiona a jiheri savatno na his mello sastikisi.	consider tragger strategy: play So until someone first plays &, then so everaften
e entitudi sente entre en la constitución de la con	Playing S, (or trigger) against trigger yields stream 3,3,3, (x) 5,1,4,1, 6xx)
ninggan kagasa milangi kabapa kanang an ininggan k	5, 1, 4, 1. (sex)
	* is BR (homes (troger, trigger) ENE) iff PV(x) > PV(xx) \$ = 3 2 4+1-8
e sentie en try voeren ee op en terme op synthetie en een de de en en de see de een de een de een de een de ee	(=> 2 × 4(1-8) (=> 6 > 5 > 1/2 = 1/2
	If S= for, then the condition is g > \frac{1}{2} (140).
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१ साम चन्ना देनना चन्टा रचन्ने वस्तु सारासामा चनास्थित चन्ने साम	
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16

## **Final Examination**

**Instructions.** In class, closed book, three hours, only official double-sided page of notes allowed. When insufficient information is provided, please write down a plausible specific assumption and proceed to the solution. Partial credit will be awarded for partial solutions and for brief, relevant remarks, but not for rambling. Points (pts) are marked total is 100.

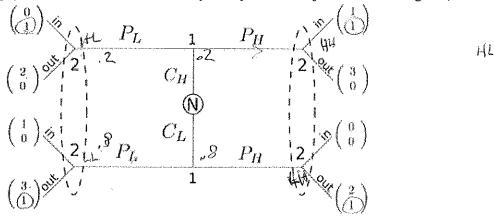
1. [Entry deterrence version 1] An incumbent firm can prepare to fight (P) at cost c = 15, or not prepare (N). In either case, a potential entrant firm then can enter (E) or not (D). If it enters the incumbent firm can fight (F) or go easy (G). Payoffs to (incumbent, entrant) are (50-c, -20) for (PEE) and (-20, 10) for (NF, E). The payoff vector is (100-c, 0) for (PF, D) or (PG, D), and is (40-c, 30) for (PE, G); the corresponding payoffs for (N\*, \*) are the same except that c=0 instead of c=15. The entrant assesses the probability that the incumbent is prepared as p. All this is common knowledge.

(a) Draw the extensive form game where the incumbent moves first. Be sure to label the nodes and branches with the notation and payoffs given above. (4 pts)

(b) For what values of p does the entrant want to enter? (4 pts) (p \le 3/5)

(c) Find all subgame perfect Nash equilibrium strategies and payoffs. Be sure to specify entire strategies for both players, not just strategy fragments. (8 pts)

2. [Entry deterrence version 2]A monopoly incumbent(player1) faces a potential entrant(player2). The monopoly has private information about its costs which may be either high  $(c_H)$  or low  $(c_L)$ . The monopoly chooses either a high price  $(P_H)$  or a low price  $(P_L)$ . The price is then observed by the potential entrant who then decides to enter (in) or to stay out of (out) the market. The potential entrant's prior belief is that there is an 80% chance that the monopoly is a low cost type  $(c_L)$ . The payoffs are as follows (don't worry if they seem odd, just take them as given).



(a) Find a subgame perfect Nash equilibrium if, contrary to the figure above, there were perfect information (so the potential entrant knew whether the monopoly had high or low cost). Be sure to clearly state the complete equilibrium strategies and expected payoffs. (6 pts)

(b) In the game shown, the monopolist's cost is private information. For this game, find a separating perfect Bayesian equilibrium (PBE) or show that none exists, completely specifying the equilibrium strategies and beliefs. (8 pts)

- (c) In the game shown, find a pooling PBE or show that none exists, completely specifying the equilibrium strategies and beliefs both on and off the equilibrium path. (8 pts)
- 3. A three-player game (players labelled i = 1,2,3) has ChF (or worth) w(S) = |S| ∑<sub>i∈S</sub> i, where |S| is the number of members of the coalition S. For example, if S = {1,3} then w(S) = 2(1+3) = 8.
  (a) Find the core and identify a point in the core. (5 pts)