Question 1 Let q be the probability that B chooses H. Then in order for A to be indifferent between H and T we must have $5q - (1 - q) = -q + (1 - q)$. Thus, $q = 0.25$. Thus,

Player A's expected payoff is 0.5

Question 2

(a) Then pure strategy Nash equilibria **exist**

If pure strategy equilibria exist, then mark which ones are equilibria (the first strategy listed is that of player A.

Stag, Stag **Rabbit, Rabbit**

(b) Let p be the probability that B chooses Stag. In equilibrium A must be indifferent, i.e., $8p + 0(1 - p) = 5p + 2(1 - p)$. Solving this equation for p yields $p = 0.4$

In the mixed strategy equilibrium player A will hunt the stag with probability $\boxed{0.4}$

Since the game is symmetric, PIayer B will hunt the stag with probability $\boxed{0.4}$

Question 3

		Joe	
		l	h
Rita	l	$\boxed{12}$, $\boxed{12}$	$\boxed{20}$, $\boxed{6}$
	h	$\boxed{14}$, $\boxed{12}$	$\boxed{14}$, $\boxed{14}$

There is no pure strategy equilibrium. Let q be the probability that Joe chooses l. Then Rita must be indifferent between l and h, i.e., $12q + 20(1 - q) = 14q + 14(1 - q) = 14$. Thus, $q = 3/4$.

If p is the probability that Rita chooses l then $12p+12(1-p) = 6p+14(1-p)$, i.e., $p = 1/4$.

$\boxed{\text{Rita chooses low effort with probability } 1/4}$

$\boxed{\text{Joe chooses low effort with probability } 3/4}$

Rita gets an A with probability $\boxed{13/16 = 0.8125}$ and a B with probability $\boxed{3/16 = 0.1875}$.

Joe gets an A with probability $\boxed{3/16 = 0.1875}$ and a B with probability $\boxed{13/16 = 0.8125}$.

Question 4

(a) Let p be the cost of insurance. The expected utility from being insured is $\ln(250,000-p)$. For a low-risk person the expected utility from being uninsured is $0.98\ln(250,000)+0.02\ln(50,000)$. Thus, $\ln(250,000-p) = 0.98\ln(250,000) + 0.02\ln(50,000)$.

Then a low-risk consumer's maximum willingness to pay for insurance is $\boxed{\textbf{7,412.48}}$

For a high-risk person the expected utility from being uninsured is $0.75\ln(120,000)+0.25\ln(20,000)$. Thus, $\ln(250,000-p) = 0.75\ln(250,000)+ 0.25\ln(50,000)$.

A high-risk consumer's maximum willingness to pay for insurance is $\boxed{\textbf{77,855.98}}$

The expected payment is $0.95 * 0.02 * 200,000 + 0.05 * 0.25 * 200,000$. The price at which the insurance company would break even if they insure both high and low risk consumers is $\boxed{\textbf{6,300}}$

Thus, $\boxed{\textbf{both types}}$ will be insured).

(b) If a person has a pre-existing condition then this indicates that the person is a high-risk type. Thus, the expected cost is 50,000. Otherwise, the expected insurance payment is $0.99*4,000+0.01*50,000 = 2,380$. Then the premium charged to a person with a pre-existing condition is $\boxed{\textbf{50,000}}$

Then the premium charged to a person without a pre-existing condition is $\boxed{\textbf{4,460}}$

Question 5 MC = 30. Thus,

$$30 = p\left(1 - \frac{4}{5}\right) = p/5.$$

$\boxed{\textbf{the firm charges a price } \boldsymbol{p = 150}}$

$\boxed{\textbf{the firm's profit/unit is 120}}$

Now

$$30 = p\left(1 - \frac{1}{4}\right) = 3p/4.$$

$\boxed{\textbf{the firm charges a price } \boldsymbol{p = 40}}$

$\boxed{\textbf{the firm's profit/unit is 10}}$

Question 6 The manager maximizes $0.02(200e - 2e^2) - 2e$. This expression is maximized when the derivative is 0, i.e., $4 - 0.08e - 2 = 0$, which implies $e = 25$. The owner's profit is therefore $0.98(200e - 2e^2)$. Therefore,

$\boxed{\textbf{If } \boldsymbol{s = 0.02}\textbf{, the owner's payoff is 3,675}}$

If $s = 0.1$ then the manager maximizes $0.1(200e - 2e^2) - 2e$. Again, this expression is maximized when the derivative is 0, i.e., $20 - 0.4e - 2 = 0$, which implies $e = 45$.

$\boxed{\textbf{If } \boldsymbol{s = 0.1}\textbf{, the owner's payoff is 4,455}}$

Question 7 The price elasticity of demand is $\epsilon = -0.1p/(20-0.1p) = p/(p-200)$. Thus,

$$40 = p\left(1 + \frac{p - 100}{p}\right) = p - 200 + p = -200 + 2p.$$

Thus, $\boxed{\textbf{The profit maximizing price is 120}}$

$\boxed{\textbf{The firm sells 8 units}}$

Revenue is 960. Cost are $c(8) = 420$. Thus,

$\boxed{\textbf{The firm's profit is 540}}$

Question 8

(a) The price elasticity of demand is $\epsilon_P = \frac{10p}{10p-1000} = \frac{p}{p-100}$. Marginal costs are 40. Thus, $40 = p\left(1 + \frac{p-100}{p}\right) = p + p - 100$. Thus,

$\boxed{\textbf{The firm will charge a price } p = 70}$

Demand is $D(70) = 300$. Thus, revenue is $21,000$. Costs are $c(300) = 13,000$. Thus,

$\boxed{\textbf{The firm's profit is 8,000}}$

Individual demand is $Q = y/100 = 300/100 = 3$. Thus, an individual consumer spends 210 Dollars, which implies that $m = 10,000 - 210 = 9,790$. Thus, utility is $u(3, 9790) = 10,045$.

$\boxed{\textbf{A consumer's utility is 10,045}}$

(b) Now marginal costs are 50. Thus, $50 = p\left(1 + \frac{p-100}{p}\right) = p + p - 100$.

$\boxed{\textbf{The firm will charge a price } p = 75}$

Demand is $D(75) = 250$. Thus, revenue is $18,750$. Costs are $c(250) = 13,500$. Thus,

$\boxed{\textbf{The firm's profit is now 5,250}}$

$\boxed{\textbf{The government's total tax revenue is 2,500}}$

Individual demand is $Q = y/100 = 250/100 = 2.5$. Thus, an individual consumer spends 187.50 Dollars, which implies that $m = 10,000 - 187.50 = 9,812.50$. Thus, utility is $u(4, 9812.5) = 10031.25$.

$\boxed{\textbf{A consumer's utility is 10031.25}}$

Thus, each consumer's utility loss is 13.75. Given that there 100 consumers, total loss is 1,375. The firm loses 2,750. The tax gain is 2,500. Thus,

$\boxed{\textbf{The dead weight loss generated by the tax is 1,625}}$

$\boxed{\textbf{Thus, for each Dollar of taxes raised, the loss is 65 cents}}$