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 $7q-(1-q)=-q+(1-q)$. Thus, $q=0.2$. Thus,

$\boxed{\textbf{Player } A\textbf{'s expected payoff is 0.6}}$

Question 2

(a) Then pure strategy Nash equilibria $\boxed{\textbf{exist}}$

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

$\boxed{\textbf{Stag, Stag}}$ $\boxed{\textbf{Rabbit, Rabbit}}$

(b) Let p be the probability that B chooses Stag. In equilibrium A must be indifferent, i.e., $6p+0(1-p)=5p+3(1-p)$. Solving this equation for p yields $p=3/4$

In the mixed strategy equilibrium player A will hunt the stag with probability $\boxed{3/4}$

Since the game is symmetric, PIayer B will hunt the stag with probability $\boxed{3/4}$

Question 3

		Joe	
		l	h
Rita	l	$\boxed{10}$, $\boxed{10}$	$\boxed{25}$, $\boxed{5}$
	h	$\boxed{20}$, $\boxed{10}$	$\boxed{20}$, $\boxed{20}$

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., $10q+25(1-q)=20q+20(1-q)=20$. Thus, $q=1/3$.

If p is the probability that Rita chooses l then Joe must be indifferent, i.e., $10p + 10(1-p) = 5p + 20(1-p)$, i.e., $p = 2/3$.

$\boxed{\text{Rita chooses low effort with probability } 2/3}$

$\boxed{\text{Joe chooses low effort with probability } 1/3}$

Rita gets an A with probability $\boxed{7/9}$ and a B with probability $\boxed{2/9}$.

Joe gets an A with probability $\boxed{2/9}$ and a B with probability $\boxed{7/9}$.

Question 4

(a) Let p be the cost of insurance. The expected utility from being insured is $\ln(120{,}000-p)$. For a low-risk person the expected utility from being uninsured is $0.98\ln(120{,}000)+0.02\ln(20{,}000)$. Thus, $\ln(120{,}000-p) = 0.98\ln(120{,}000) + 0.02\ln(20{,}000)$.

Then a low-risk consumer's maximum willingness to pay for insurance is $\boxed{\mathbf{4{,}224.09}}$

For a high-risk person the expected utility from being uninsured is $0.6\ln(120{,}000)+0.4\ln(20{,}000)$. Thus, $\ln(250{,}000-p) = 0.6\ln(120{,}000)+0.4\ln(20{,}000)$.

A high-risk consumer's maximum willingness to pay for insurance is $\boxed{\mathbf{61{,}396.88}}$

The expected payment is $0.95 * 0.02 * 100{,}000 + 0.05 * 0.4 * 100{,}000$.

The price at which the insurance company would break even if they insure both high and low risk consumers is $\boxed{\mathbf{3{,}900}}$

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 40,000. Otherwise, the expected insurance payment is $0.99 * 2{,}000 + 0.01 * 40{,}000 = 2{,}380$. Then the premium charged to a person with a pre-existing condition is $\boxed{\mathbf{40{,}000}}$

Then the premium charged to a person without a pre-existing condition is $\boxed{\mathbf{2{,}380}}$

Question 5 MC = 10. Thus,

$$10 = p\left(1 - \frac{2}{3}\right) = p/3.$$

$\boxed{\textbf{the firm charges a price } \boldsymbol{p = 30}}$

$\boxed{\textbf{the firm's profit/unit is 20}}$

Now

$$10 = p\left(1 - \frac{1}{3}\right) = 2p/3.$$

$\boxed{\textbf{the firm charges a price } \boldsymbol{p = 15}}$

$\boxed{\textbf{the firm's profit/unit is 5}}$

Question 6 The manager maximizes $0.05(100e - e^2) - 2e$. This expression is maximized when the derivative is 0, i.e., $5 - 0.1e - 2 = 0$, which implies $e = 30$. The owner's profit is therefore $0.95(100e - e^2)$. Therefore,

$\boxed{\textbf{If } \boldsymbol{s = 0.05}\textbf{, the owner's payoff is 1,995}}$

If $s = 0.1$ then the manager maximizes $0.1(100e - e^2) - 2e$. Again, this expression is maximized when the derivative is 0, i.e., $10 - 0.2e - 2 = 0$, which implies $e = 40$.

$\boxed{\textbf{If } \boldsymbol{s = 0.1}\textbf{, the owner's payoff is 2,160}}$

Question 7 The price elasticity of demand is $\epsilon = -0.1p/(10 - 0.1p) = p/(p - 100)$. Thus,

$$20 = p\left(1 + \frac{p - 100}{p}\right) = p - 100 + p = -100 + 2p.$$

Thus, $\boxed{\textbf{The profit maximizing price is 60}}$

$\boxed{\textbf{The firm sells 4 units}}$

Revenue is 240. Cost are $c(4) = 180$. Thus,

$\boxed{\textbf{The firm's profit is 60}}$

Question 8

(a) The price elasticity of demand is $\epsilon_P = \frac{10p}{10p-1000} = \frac{p}{p-100}$. Marginal costs are 20. Thus, $20 = p\left(1 + \frac{p-100}{p}\right) = p + p - 100$. Thus,

$$\boxed{\textbf{The firm will charge a price } p = 60}$$

Demand is $D(60) = 400$. Thus, revenue is $24,000$. Costs are $c(400) = 13,000$. Thus,

$$\boxed{\textbf{The firm's profit is 11,000}}$$

Individual demand is $Q = y/100 = 400/100 = 4$. Thus, an individual consumer spends 240 Dollars, which implies that $m = 10,000 - 240 = 9,760$. Thus, utility is $u(4, 9760) = 10,080$.

$$\boxed{\textbf{A consumer's utility is 10,080}}$$

(b) Now marginal costs are 30. Thus, $30 = p\left(1 + \frac{p-100}{p}\right) = p + p - 100$.

$$\boxed{\textbf{The firm will charge a price } p = 65}$$

Demand is $D(65) = 350$. Thus, revenue is $22,750$. Costs are $c(350) = 15,500$. Thus,

$$\boxed{\textbf{The firm's profit is now 7,250}}$$

$$\boxed{\textbf{The government's total tax revenue is 3,500}}$$

Individual demand is $Q = y/100 = 350/100 = 3.5$. Thus, an individual consumer spends 227.50 Dollars, which implies that $m = 10,000 - 227.50 = 9,772.50$. Thus, utility is $u(4, 9760) = 10,080$.

$$\boxed{\textbf{A consumer's utility is 10,061.25}}$$

Thus, each consumer's utility loss is 18.75. Given that there 100 consumers, total loss is 1,875. The firm loses 3,750. The tax gain is 3,500. Thus,

$$\boxed{\textbf{The dead weight loss generated by the tax is 2,125}}$$

$$\boxed{\textbf{Thus, for each Dollar of taxes raised, the loss is 60.7 cents}}$$