Problem 9:
Suppose 1 plays H with probability p.

$$\pi_2(H) = (1)(p) + (4)(1-p)$$
$$= 4 - 3p$$

$$\pi_2(T) = (2)(p) + (5)(1-p)$$
$$= 5 + p$$

Indifferent when

$$4 - 3p = 5 + p$$
$$-2p = 1$$
$$p = -\frac{1}{2}$$

A probability cannot be negative of course, so at this point I hope you pause and recognize that something unusual is going on. In this case, for player 2, T strictly dominates H. It can never be an equilibrium for her to play H with any probability, so there is no mixed strategy equilibrium. The only Nash equilibrium is (T, T).

Problem 10:
We do not typically do mixed strategies with more than two strategies. When you see a game like this

1 \ 2	L	R
T	1,1	3,3
M	2,4	5,5
B	3,2	1,1

you should look for a strategy you can eliminate. In this case M strictly dominates T, so we can eliminate T (Player 1 never plays T in any equilibrium). Now the game looks like:

1 \ 2	L	R
M	2,4	5,5
B	3,2	1,1

Now this is a standard game. If 2 plays L with prob p, then 1's payoffs are:

$$\pi_1(M) = 2p + 5(1-p)$$
$$\pi_1(B) = 3p + 1(1-p)$$

1 is indifferent when $p = \frac{1}{5}$. If 1 plays M with prob p, then 2's payoffs are:

$$\pi_2(L) = 4q + 2(1-q)$$
$$\pi_2(R) = 5q + 1(1-q)$$

2 is indifferent when $q = \frac{1}{2}$. Therefore, the mixed strategy NE is 1 plays M with prob $\frac{1}{2}$ and 2 plays L with probability $\frac{1}{5}$.

Problem 11

Suppose two of the players play the following mixed strategy: I will attend with probability p. We find when the third player is indifferent between attending and not.

$$\begin{aligned} \pi(Attend) &= 5 \\ \pi_2(Not) &= 10 * (\text{the probability someone else attends}) + \\ &= 0 * (\text{the probability no one else attends}) \end{aligned}$$

There are several ways someone else can attend but only one way no one else attends, so we calculate the latter. The probability no one else attends is $(1-p)^2$. Therefore, the probability someone else attends is $1-(1-p)^2$. The player is indifferent where

$$5 = 10 * (1 - (1-p)^2)$$
$$(1-p)^2 = \frac{1}{2}$$
$$p = 1 - \sqrt{\frac{1}{2}}$$

So the mixed strategy is each person attends the meeting with the probability found above.