

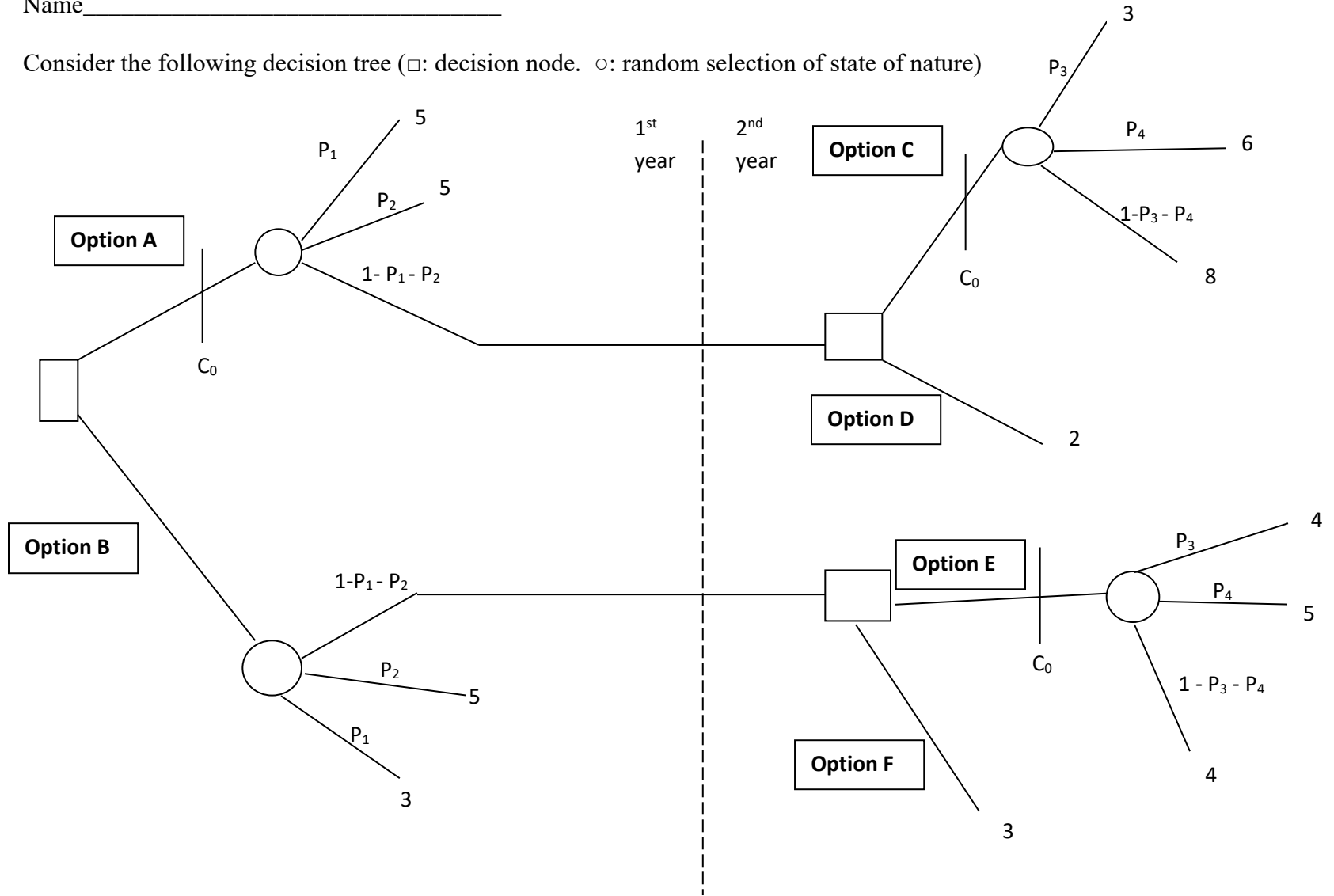
Quiz #6 (answer key)

ECNS 432

Spring 2020

Name _____

Consider the following decision tree (\square : decision node. \circ : random selection of state of nature)



The above decision tree represents a two period game where you (as a policy-maker) must decide between several combinations of policies. The values given represent **benefits**. So, for example, if you choose option A in the first period, then you stand to gain the following benefits: \$5 (with probability P_1), \$5 (with probability P_2), or you carry on to period 2 (with probability of $1 - P_1 - P_2$). There are four possible policy combinations you have to choose from: (A, C); (A, D); (B, E); (B, F). Given the following parameters, which option yields the greatest expected net benefits?

- $P_1 = 0.3$
- $P_2 = 0.5$
- $P_3 = 0.5$
- $P_4 = 0.4$
- $C_0 = 2$ (This represents a cost that you must incur if you choose options A, C, or E)
- Assume a discount rate of 0.10.

Solving via backwards induction:

$$E[C] = 2.7 \quad \text{vs.} \quad E[D] = 2$$

If we choose A in the first period, then we know we will choose C in the second period.

$$E[E] = 2.4 \quad \text{vs.} \quad E[F] = 3$$

If we choose B in the first period, then we know we will choose F in the second period.

So, our problem ultimately boils down to comparing policy (A, C) with policy (B, F). In calculating the expected benefits associated with each, we find that

$$E[(A, C)] = 2.49 \quad \text{and} \quad E[(B, F)] = 3.95.$$

Policy (B, F) should be chosen.