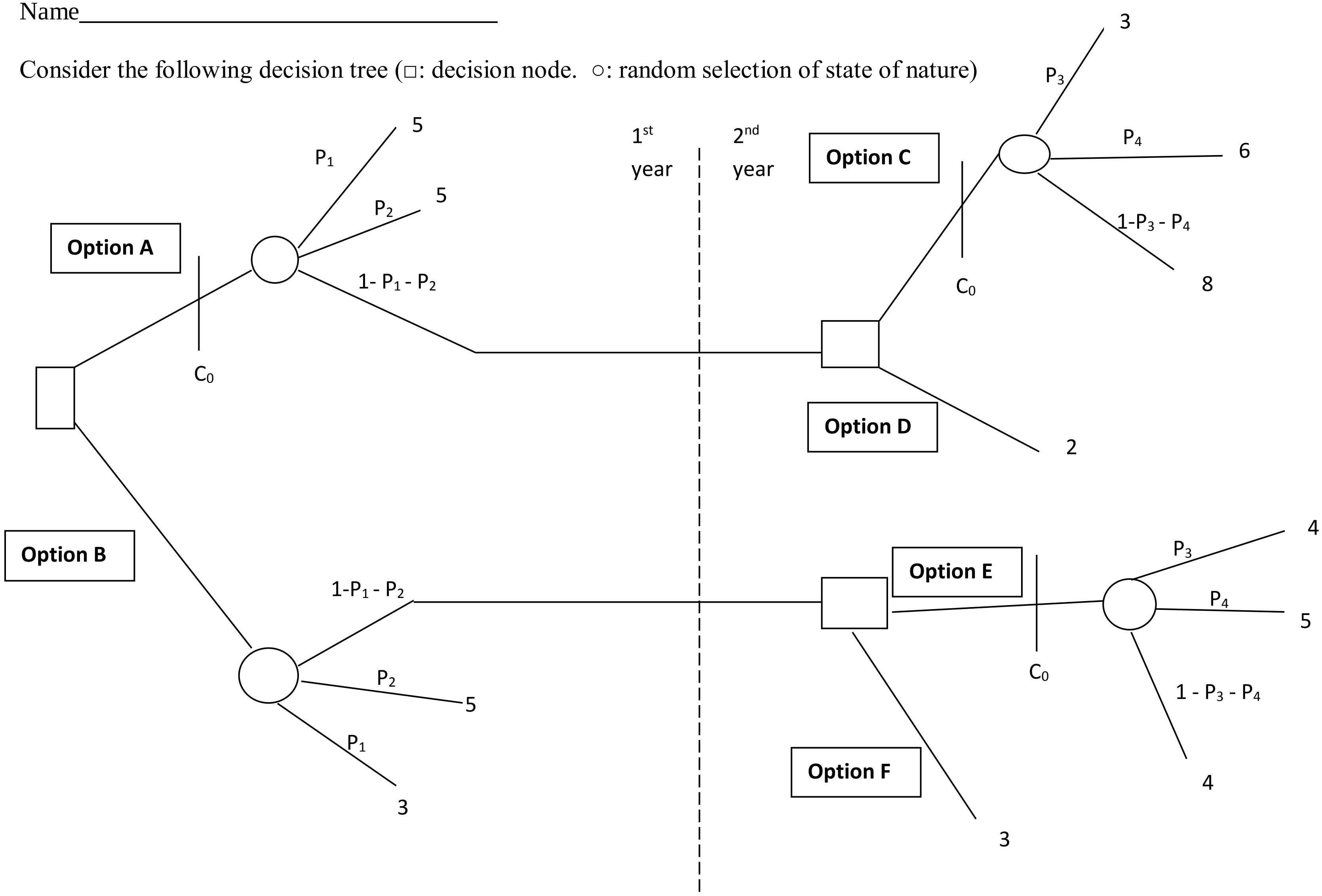
Quiz #7 (answer key)
ECNS 432
Fall 2017
Name________________________________

Consider the following decision tree (□: decision node. ○: 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 vs. 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 vs. 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 and E[(B, F)] = 3.95.

Policy (B, F) should be chosen.