PROBABILITY CONCEPTS

1. An experiment consists of rolling a single die and observing the up face.

a) List a sample space S
b) List the event E "the die has 5 on its up face".
c) List the event F "the die has a number greater than four on its up face".
d) List the event G "the die does NOT have a number greater than four on its up face".
e) Count to find n(S), n(E), n(F), n(G).

2. A basketball player takes three free shots from the foul line; the outcome is noted each time as a hit H or a miss M.

a) Use a tree diagram to list the sample space S for this experiment.
b) List the event E "three misses occur".
c) List the event F "two hits and a miss occur".
d) List the event G "there are more hits than misses".
e) Count to find n(S), n(E), n(F), n(G).

3. Four coins are tossed and the outcome noted in each case.

a) Use a tree diagram to list a sample space for this experiment.
b) List the event E "three tails and one head occur".
c) List the event F "two heads and two tails occur".
d) List the event G "there are more tails that heads".
e) Count to find n(S), n(E), n(F), n(G).

4. A coin is tossed and a die is rolled.

a) Draw a tree diagram and list a sample space S for the experiment.
b) List the event E consisting of all outcomes in which the coin is heads and the number on the die is even.
c) Count to find n(S) and n(E).

5. An experiment consists of testing a batch of calculators one after the other, without replacement, until either two defective calculators are found or three calculators have been tested.

a) Draw a tree diagram for this experiment indicating all possible outcomes in the sample space.
b) List the event E consisting of all outcomes where exactly one defective calculator is tested.
c) List the event F consisting of all outcomes where exactly two acceptable calculators are selected.

6. Automobile engines are to be tested for compression and timing. The compression can be too low L, too high H, or correct C. The result of the timing can be off O or accurate A.

a) Draw a tree diagram for this experiment indicating all possible outcomes in the sample space.
b) List the event E that the timing is accurate.

7. In an experiment a coin is tossed, a die is rolled and a card is selected from among the thirteen spades.

a) Describe in words an outcome from a sample space S for this experiment.
b) List four outcomes that belong to the sample space.
c) How many simple events are there in the sample space?

8. Five balls, numbered 1 to 5, are in a bag. One ball is drawn and not replaced. Then a second ball is drawn. The number on each ball is noted.

a) Use ordered pairs of numbers to list the sample space S for this experiment.
b) List the event E "the numbers on both balls are even".
c) List the event F "the product of the numbers on the balls is four".
d) List the event G "the numbers on the balls are both even and the product of the numbers is four".
e) Count to find n(S), n(E), n(F), n(G).