MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

1) A company sponsoring a new Internet search engine wants to collect data on the ease of using it. Which is the best way to collect the data?
   A) sample survey
   B) simulation
   C) observational study
   D) census
   E) experiment

2) The January 2005 Gallup Youth Survey telephoned a random sample of 1028 U.S. teens and asked these teens to name their favorite movie from 2004. *Napoleon Dynamite* had the highest percentage with 8% of teens ranking it as their favorite movie. Which is true?
   I. The population of interest is all U.S. teens
   II. 8% is a statistic and not the actual percentage of all U.S. teens who would rank this movie as their favorite.
   III. This sampling design should provide a reasonably accurate estimate of the actual percentage of all U.S. teens who would rank this movie as their favorite.
   A) I, II, and III
   B) I and II
   C) I only
   D) II only
   E) III only

3) Suppose your local school district decides to randomly test high school students for attention deficit disorder (ADD). There are three high schools in the district, each with grades 9-12. The school board pools all of the students together and randomly samples 250 students. Is this a simple random sample?
   A) Yes, because they could have chosen any 250 students from throughout the district.
   B) Yes, because each student is equally likely to be chosen.
   C) No, because we can't guarantee that there are students from each grade in the sample.
   D) No, because we can't guarantee that there are students from each school in the sample.
   E) Yes, because the students were chosen at random.

4) A basketball player has a 70% free throw percentage. Which plan could be used to simulate the number of free throws she will make in her next five free throw attempts?
   I. Let 0, 1 represent making the first shot, 2, 3 represent making the second shot, ..., 8, 9 represent making the fifth shot. Generate five random numbers 0-9, ignoring repeats.
   II. Let 0, 1, 2 represent missing a shot and 3, 4, ..., 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9.
   III. Let 0, 1, 2 represent missing a shot and 3, 4, ..., 9 represent making a shot. Generate five random numbers 0-9 and count how many numbers are in 3-9, ignoring repeats.
   A) II and III
   B) I only
   C) I, II, and III
   D) II only
   E) III only

5) More dogs are being diagnosed with thyroid problems than have been diagnosed in the past. A researcher identified 50 puppies without thyroid problems and kept records of their diets for several years to see if any developed thyroid problems. This is a(n)
   A) survey
   B) retrospective study
   C) randomized experiment
   D) blocked experiment
   E) prospective study
6) A chemistry professor who teaches a large lecture class surveys his students who attend his class about how he can make the class more interesting, hoping he can get more students to attend. This survey method suffers from
   A) voluntary response bias
   B) none of these
   C) response bias
   D) undercoverage
   E) nonresponse bias

7) Placebos are a tool for
   A) blocking
   B) blinding
   C) control
   D) sampling
   E) randomization

8) Double-blinding in experiments is important so that
   I. The evaluators do not know which treatment group the participants are in.
   II. The participants do not know which treatment group they are in.
   III. No one knows which treatment any of the participants are getting.
   A) I, II, and III
   B) III only
   C) II only
   D) I and II
   E) I only

9) Which of the following is not required in an experimental design?
   A) control
   B) blocking
   C) randomization
   D) All are required in an experimental design.
   E) replication

10) A researcher wants to compare the effect of a new type of shampoo on hair condition. The researcher believes that men and women may react to the shampoo differently. Additionally, the researcher believes that the shampoo will react differently on hair that is dyed. The subjects are split into four groups: men who dye their hair; men who do not dye their hair; women who dye their hair; women who do not dye their hair. Subjects in each group are randomly assigned to the new shampoo and the old shampoo. This experiment
    A) has two factors (gender and whether hair is dyed) blocked by shampoo type.
    B) has one factor (shampoo type), blocked by gender and whether hair is dyed.
    C) has three factors (shampoo type, gender, whether hair is dyed).
    D) is completely randomized.
    E) has two factors (shampoo type and whether hair is dyed) blocked by gender.

**SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.**

11) Video games A headline in a local newspaper announced “Video game playing can lead to better spatial reasoning abilities.” The article reported that a study found “statistically significant differences” between teens who play video games and teens who do not, with teens who play video games testing better in spatial reasoning. Do you think the headline was appropriate? Explain.
12) **College students' spending** A consumer group wants to see if a new education program will improve the spending habits of college students. Students in an economics class are randomly assigned to three different courses on spending habits.

a. What are the experimental units?

b. How many factors are there?

c. How many treatments are there?

d. What is the response variable?

13) **Good CDs** Brian is a systems manager for a large company. In his work, he has found that about 5% of all CDs he orders are bad. He needs to give one of the executives at his company five good CDs. Conduct a simulation to estimate how many CDs Brian will have to check to get five good CDs for the executive.

a. Describe how you will use a random number table to conduct this simulation.

b. Show three trials by clearly labeling the random number table given below. Specify the outcome for each trial.

<table>
<thead>
<tr>
<th>Trial</th>
<th>Simulation</th>
<th>Outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>#1</td>
<td>03242 50692 18977 28370</td>
<td></td>
</tr>
<tr>
<td>#2</td>
<td>78695 21402 85525 81183</td>
<td></td>
</tr>
<tr>
<td>#3</td>
<td>60809 06765 39996 81915</td>
<td></td>
</tr>
</tbody>
</table>

c. State your conclusion.
14) **Bone Builder** Researchers believe that a new drug called Bone Builder will help bones heal after children have broken or fractured a bone. The researchers believe that Bone Builder will work differently on bone breaks than on bone fractures, because of differences in initial bone condition. Bone Builder will be used in conjunction with traditional casts. To test the impact of Bone Builder on bone healing, the researchers recruit 18 children with bone breaks and 30 children with bone fractures. Design an appropriate experiment to determine if Bone Builder will help bones heal.

15) **Military funding** A college group is investigating student opinions about funding of the military. They phone a random sample of students at the college, asking each person one of these questions (randomly chosen):

A: “Do you think that funding of the military should be increased so that the United States can better protect its citizens?”

B: “Do you think that funding of the military should be increased?”

Which question do you expect will elicit greater support for increased military funding? Explain. What kind of bias is this?