Exam

Name_____

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

1) The scientific method: 1) _____
A) Doesn't exist
B) Allows one to solve problems
C) Allows one to answer questions efficiently and effectively
D) Is something that is not important
E) B and C are correct.

2) Which of the following statements is a testable and falsifiable hypothesis? 2) _____
A) It is wrong to eat meat.
B) Physical health is maintained by a proper balance of psychic energy.
C) Vitamin C boosts the function of the immune system to protect us from colds.
D) Ghosts are responsible for spreading the flu.

3) Which statement is a testable hypothesis? 3) _____
A) Living in a haunted house will decrease your risk for cancer.
B) Consumption of carrots will decrease your risk for cancer.
C) Being a bad driver will make you unhealthy.
D) The saber tooth tiger was an omnivore.
E) Having a clean aura will make you healthy.

4) All of the following are testable hypotheses except: 4) _____
A) Eating meat will make you a bad person
B) Drinking green tea will reduce stress
C) Eating whole grains reduces heart disease
D) A high fiber diet will increase heart health
E) Lycopene found in tomatoes helps maintain a healthy prostate

5) In order to be a scientific hypothesis it must be: 5) _____
A) Falsifiable
B) Testable
C) Able to proven true
D) A proposed explanation for one or more observations
E) A, B and D are correct.

6) What type of reasoning uses if/then statements to make predictions? 6) _____
A) Deductive B) Inductive C) Persuasive D) Scientific

7) Consider the hypothesis, “Eating dark chocolate will reduce heart attacks.” Which of the following statements is the best prediction based on this hypothesis? 7) _____

A) If people with heart problems eat dark chocolate, then their heart will repair sooner than people who don’t consume the dark chocolate.
B) If people with heart problems eat dark chocolate, then antioxidants in the chocolate will bind to their heart muscle cells and repair them.
C) If a person doesn’t eat dark chocolate, then they will get a heart attack very easily.
D) If people with heart problems eat dark chocolate, then the antioxidants in the chocolate will reduce their stress, lessening the risk of heart attacks.
E) All of the above are equally good predictions based on the hypothesis.

8) Something that is not constrained by the laws of nature and its behavior cannot be predicted using our current understanding of the natural world is called: 8) _____

A) Supernatural
B) Religious
C) Hypothesis
D) Scientific theory
E) Deductive reasoning

9) If you were doing an experiment that was testing the hypothesis that cacti only grow in sandy soil, which of the following would be a correct controlled experiment? 9) _____

A) Experimental group of cacti in various types of soil and the control group of cacti in sandy soil, with all groups in the same climate
B) Experimental group of cacti in various types of soil with lots of sunshine and the control group of cacti in sandy soil with lots of shade
C) Experimental group of cacti in sandy soil and the control group of cacti in various types of soil, with both groups in the same climate
D) Experimental group of cacti in sandy soil with lots of sunshine and the control group of cacti in clay soil with lots of shade
E) Experimental group of cacti in various types of soil with lots of shade and the control group of cacti in sandy soil with lots of sunshine

10) A set of actions or observations designed to test specific hypotheses are called a/an: 10) _____

A) Observation
B) Data
C) Prediction
D) Experiment
E) Hypothesis

11) The variable that is being manipulated by the scientist in an experiment is called: 11) _____

A) Dependent B) Placebo C) Independent D) Control

12) The _____ in an experiment is the group that is not manipulated and not exposed to the experimental treatment. 12) _____

A) Control
B) Experimental group
C) Independent variable
D) Dependent variable
E) A and C are correct.

13) When opinions influence the results of an experiment the experimental result are said to be: 13) _____
A) Double blind
B) Random
C) Correlated
D) Biased
E) Controlled

14) If you were testing the effects of a Drug S on reducing stress, the control group would receive: 14) _____
A) The Drug S and a placebo
B) Nothing
C) A placebo or sugar pill
D) Time management information
E) A different drug then the experimental group

15) When individuals in an experiment do not know which group they belong to but the researchers do, this is called a: 15) _____
A) Double blind experiment
B) Creative experiment
C) Random experiment
D) Blind experiment
E) Critical experiment

16) All of the following criteria is a must for medical research except: 16) _____
A) Double blind experiments
B) Randomized experiments
C) Endanger the subjects
D) Placebo-controlled experiments
E) All are criteria that is part of the gold standard of medical research.

17) All of the following are examples of good model organisms used in medical research except: 17) _____
A) Rats
B) Dogs
C) Mice
D) Birds
E) Chimpanzees

18) All are benefits of random assignment except: 18) _____
A) Helps minimize bias by the researcher in selecting individuals
B) It helps ensure the people who need the treatment are put in the experimental group
C) Decreases systematic differences between the two groups
D) Eliminates differences between the two groups in a variety of variables
E) All of the statements are benefits.

19) When the researcher makes consistent errors in the measurement and evaluation of results it is called: 19) _____
A) Statistical error
B) Standard error
C) Observer bias
D) Random assignment
E) Bias

20) When a researcher makes a connection between two variables it is said that they are making a: 20) _____
A) Observation
B) Random guess
C) Statistical test
D) Prediction
E) Correlation

21) In order to be considered statistically significant: 21) _____
A) The results should have less then 5% probability that differences in results are due to chance alone
B) The standard error should greater than 5%
C) The sample size should be large
D) A and B are correct.
E) A and C are correct.

22) If you had results that state that 23% of the experimental group experienced a decrease in acne breakouts with treatment and the 10% of the control group experienced an increase in acne breakouts without treatment. What would you need to do to examine the results to determine the effect of chance on the experiment? 22) _____
A) Statistical testing
B) Random Assignment
C) Correlations
D) Chi-Square analysis
E) Predictions

23) When experimenters look at their data they need to determine what is the that the results are due to sampling error? 23) _____
A) Standard error
B) Confidence interval
C) Probability
D) Correlation
E) Statistical error

24) What can a statistical test NOT tell us? 24) _____
A) The chance of sampling error
B) The probability that the results obtained were due to sampling error
C) The accuracy of an experiment
D) The amount of variability in a sample
E) The probability that the differences between the experimental and control group were due to chance

25) The standard error is used to generate the: 25) _____
A) Sampling error
B) Confidence interval
C) Statistical testing
D) Statistical error
E) Sample size

26) The process of peer reviewing of reports of research: 26) _____
A) Is only valuable with anecdotal evidences
B) Is considered a waste of time in primary sources
C) Helps increase confidence in scientific information
D) Is done by other researchers who critique the results and conclusions
E) A and B are correct.

27) All of the following are examples of primary sources except: 27) _____
A) *Journal of the American Medical Association*
B) *Nature*
C) *New York Times*
D) *Science*
E) All are examples of primary sources.

28) Which of the following statements is considered an example of anecdotal evidence? 28) _____
A) Research shows dark chocolate contains 25% cocoa and cocoa is rich in antioxidants.
B) Research shows beta-carotene is an antioxidant that also converts to Vitamin A in the body.
C) Aunt Ruth says that drinking dandelion tea will cure acne, it did for her.
D) Scientists have found through extensive research that fiber helps regulate bowel movements.
E) All are examples of anecdotal evidence.

29) You are reading an article about a new diet drug and want to know if the information is accurate. You should check: 29) _____
A) Wehther the article confused correlation with causation
B) What results were conveniently omitted
C) The source of the media reports
D) What experimental results were given
E) You should check for all of these when reading secondary sources.

30) All of the following are considered secondary sources except: 30) _____
A) Magazine articles
B) Television advertisements
C) News reports
D) Science journals
E) Newspapers

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

31) A _____ (2 words) is an explanation of a set of related observations based on well-supported hypotheses from several different, independent lines of research. 31) _____

32) In order to be a scientific hypothesis it must be _____ and _____. 32) _____

33) Using a series of specific observations in order to discern a general principle and construct a hypothesis is called _____ reasoning. 33) _____

34) Using a general principle to predict an expected observation is called _____ reasoning. 34) _____

35) To help minimize bias, one should set up _____ experiments. 35) _____

36) A _____ is an ineffective treatment that is intentionally given to control groups. 36) _____

37) The study of the distribution and causes of diseases in the human population is called _____. 37) _____

38) A specialized branch of mathematics used in the evaluation of data is called _____. 38) _____

39) The difference between the sample of the population being tested and the population as a whole is called _____. 39) _____

40) A _____ (2 words) result is defined as one that has a 5% probability or less of being due to chance alone. 40) _____

41) A statistical measure of the amount of variability in a sample is often expressed as the _____. 41) _____

42) A _____ source is one that provides scientific information in an abbreviated manner in news articles, etc. 42) _____

43) A _____ source is one that is written by the researchers and has been peer-reviewed. 43) _____

44) _____ (2 words) is advice from one person's personal experience. 44) _____

MATCHING. Choose the item in column 2 that best matches each item in column 1.

Match the following terms to the correct definition.

45) Using specific observations to determine a general principle 45) _____

46) An educated guess or proposed explanation for a certain observation 46) _____

47) An explanation of a set of related observations based on a well supported hypothesis that has not been disproven by several different lines of research 47) _____

48) Using a general principle to predict specific expected outcomes 48) _____

49) This uses if/then statements to state what is expected from testing a hypothesis 49) _____

A) hypothesis

B) inductive reasoning

C) prediction

D) scientific theory

E) deductive reasoning

Match the following terms to complete the following sentences.

50) When studying effects of fruit on LDL levels, if there is an increase in fruit consumption and a decrease in LDL levels this is a _____. 50) _____

51) When opinions of the researcher and/or participants of the study influence the data, it is called _____. 51) _____

52) A _____is/are a connection or relationship between two variables. 52) _____

53) _____ is/are useful when the experiments would be highly unethical to perform on humans. 53) _____

A) correlation

B) negative correlation

C) model organisms

D) positive correlation

E) bias

Match each of the following statistical terms with its correct definition.

54) The statistical measure of the amount of variability in a sample 54) _____

55) This refers to the number of individuals chosen for the study/experiment. 55) _____

56) Results that have a 5% probability or less of being due to chance alone 56) _____

A) sample size

B) standard error

C) statistically significant

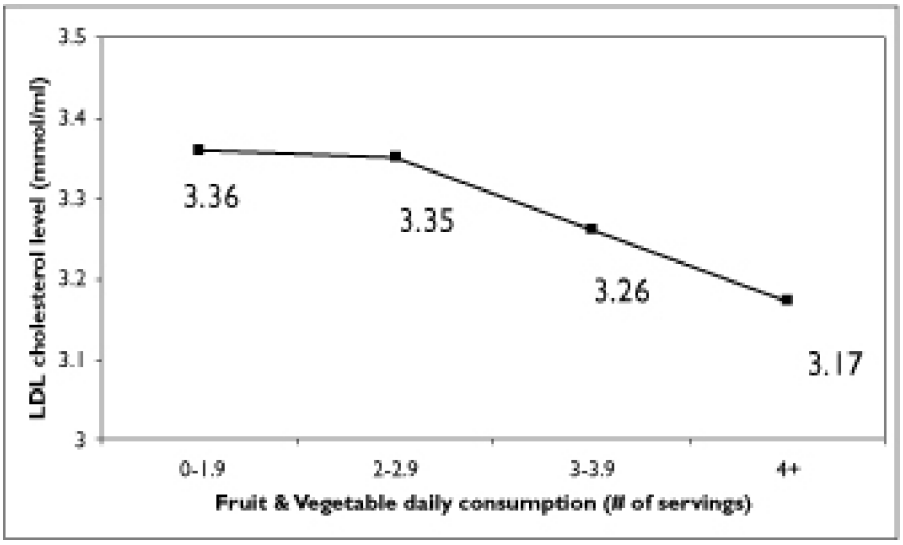
D) sampling error

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

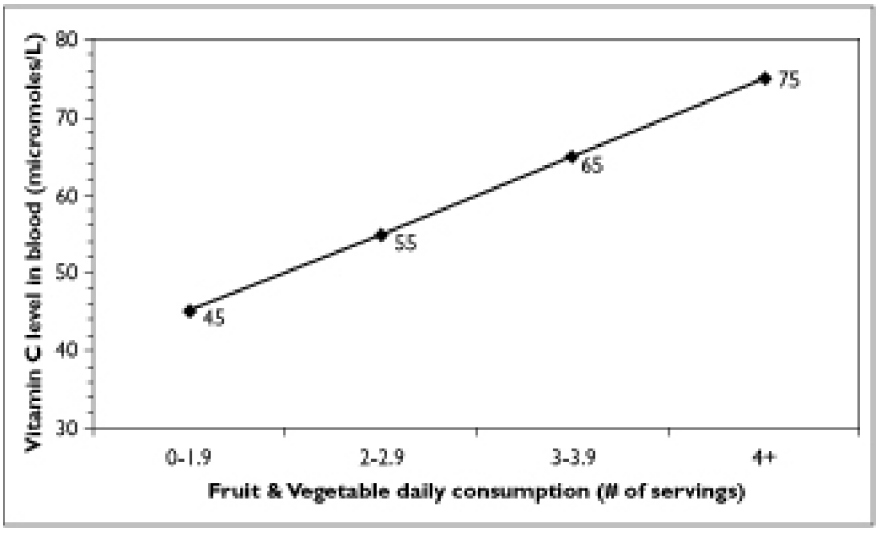
57) Ulcers were considered to be chronic and life-long problems caused by spicy and acidic foods. Scientists Robin Warren and Barry Marshall discovered a bacterium named *Heliocbacter pylori* in samples of ulcer tissues from patients. What hypothesis did these two scientists propose for the main cause of ulcers? What was the radical way that Barry Marshall first tested this hypothesis? 57) _____

58) Researchers want to test the hypothesis that Drug X lowers blood pressure. They use random assignment to divide individuals to the experimental and control groups. Each group had initial blood pressure readings. The experimental group was given Drug X and the control group was given a placebo pill. What is the dependent variable and what is the independent variable? 58) _____

59) Looking at the following graph, what correlation can be derived from this data? Is this considered to be a positive or negative correlation? 59) _____



60) Looking at the following graph, what correlation can be derived from this data? Is this considered to be a positive or negative correlation? 60) _____



ESSAY. Write your answer in the space provided or on a separate sheet of paper.

61) Use the scientific method to explore and solve one of these everyday problems
   a. Observation: Car will not start.
   b. Observation: File won't print.
   c. Observation: Bread will not rise in oven.

62) A study is being done to test if Sweetener X in foods is causing bladder cancer. The hypothesis is that high levels of Sweetener X cause bladder cancer. The model organisms that will be used are rats. Explain how you would set up an experiment to test this hypothesis.

1) E
2) C
3) B
4) A
5) E
6) A
7) D
8) A
9) A
10) D
11) C
12) A
13) D
14) C
15) D
16) C
17) D
18) B
19) C
20) E
21) E
22) A
23) C
24) C
25) B
26) E
27) C
28) C
29) E
30) D
31) scientific theory
32) testable; falsifiable
33) inductive
34) deductive
35) double-blind
36) placebo
37) epidemiology
38) statistics
39) sampling error
40) statistically significant
41) standard error
42) secondary
43) primary
44) anecdotal evidence
45) B
46) A
47) D
48) E
49) C
50) B

51) E
52) A
53) C
54) B
55) A
56) C
57) Hypothesis would be that infection with the H. pylori bacterium causes ulcers. Barry Marshall consumed a sample of the bacterium and suffered from acute gastric distress.
58) The dependent variable is blood pressure and the independent variable is Drug X/Placebo.
59) As the daily consumption of fruit and vegetables increased the LDL cholesterol levels decreased and this is negative correlation.
60) As the daily consumption of fruit and vegetables increased the levels of Vitamin C in the blood increased and this is an example of a positive correlation.
61) Students answer will vary depending on what option they pick and how the instructor teaches the scientific method
62) Answers may vary. Example answer: Set up four groups of ten mice for the experimental group and set up one group of ten mice for the control group. Make sure all groups are in identical surroundings such as temperature, water, bedding, etc. Give the first experimental group 100 grams of food with 10 mg of sweetener X, give the second experimental group 100 grams of food with 30 mg of sweetener X, give the third experimental group 100 grams of food with 60 mg of sweetener X, and give the fourth experimental group 100 grams of food with 90 mg of sweetener X. The control group would get the same kind and amount of food without any sweetener.