Science Placement Test Sample Questions

Dutchess Community College 2/04

The placement test will contain 40 questions.
You will be asked to use a number two pencil, and read the instructions on the sheet.
Your directions will say to darken the letter of the BEST answer on the answer sheet.
Answers to this practice quiz are at the end.

1. The notation Cl^- indicates that the atom in question has:
   a. lost one electron
   b. gained one electron
   c. lost one proton
   d. gained one proton
   e. not enough information is given to answer the question

2. Place sodium in the appropriate category:
   a. atom
   b. tissue
   c. organelle
   d. molecule
   e. compound

3. A mole is
   a. the atomic number
   b. the oxidation number
   c. the atomic weight
   d. the valence number
   e. the AMU of a molecule in grams

4. RNA is a(n)
   a. double helix
   b. nucleotide
   c. nucleic acid polymer
   d. alpha globulin
   e. polypeptide

5. *CH_3COOH* is the molecular formula for a compound called *acetic acid*. This statement tells you that the dissociation products of acetic acid must be
   a. H_3 and C_2OOH
   b. H_2^+ and $C_2OOH_2^-$
   c. H_4 and C_2O_2
   d. H^- and CH_3COO^+
   e. H^+ and CH_3COO^-

6. Cellular respiration is a chemical process also known as the
   a. catabolism of DNA
   b. anabolism of starch
   c. oxidation of DNA
   d. oxidation of ATP
   e. oxidation of glucose

7. The *mitochondria* of a cell are the site of
   a. lysosomal action
   b. ATP production
   c. amino acid production
   d. protein synthesis
   e. DNA synthesis

8. The term *active transport* is best defined by
   a. the movement of water
   b. a process requiring ATP
   c. net movement of a substance from an area of high to low concentration
   d. a and b
   e. b and c

9. A solution with pH 5.8 is best described as being
    a. highly acidic
    b. slightly acidic
    c. highly alkaline
    d. slightly alkaline
    e. neutral

10. You place a 1% salt solution inside a sac whose pores are too small to allow the *solute* to pass. You then place the sac in a beaker of 10% salt solution. What will be the resulting movement?
    a. water will leave the sac by osmosis
    b. water will enter the sac by osmosis
    c. salt will leave the sac by osmosis
    d. salt will enter the sac by osmosis
    e. salt will enter the sac by facilitated diffusion

11. The building blocks of *DNA* are
    a. nucleotides
    b. polypeptides
    c. amino acids
    d. glucose molecules
    e. saturated fatty acids

12. If the temperature of a container containing a gas decreases, the pressure will
    a. Increase
    b. Decrease
    c. remain the same
    d. cannot be answered with the information given

13. *24.0 milliliters* equals _____liters?
    a. 0.024
    b. 0.24
    c. 24
    d. 2,400
    e. 24,000

14. You know that a certain drug is administered at 13 milligrams for every 100 pounds of body weight. How much of the drug do you give a person who weighs 120 pounds?
    a. 10 milligrams
    b. 13 milligrams
    c. 15.6 milligrams
    d. 1000 milligrams
    e. 1560 milligrams

15. Which of the following equals 10^{-8} *grams*?
    a. 8 grams
    b. 8/10 grams
    c. 8/1000 grams
    d. 1/100000000 grams
    e. 100,000,000 grams

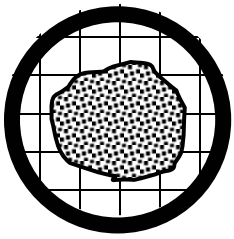
16. Which is the smallest measurement listed?
    a. Micrometer
    b. Millimeter
    c. Decameter
    d. Nanometer
    e. Megameter

17. Choose the correct conversion factor (2.2 kg = 1 lb. OR 2.2 lb. = 1 kg) and use it to convert a weight of 22 lbs to kg.

a. 0.1kg
b. 1 kg
c. 10 kg
d. 100 kg
e. 48.4 kg

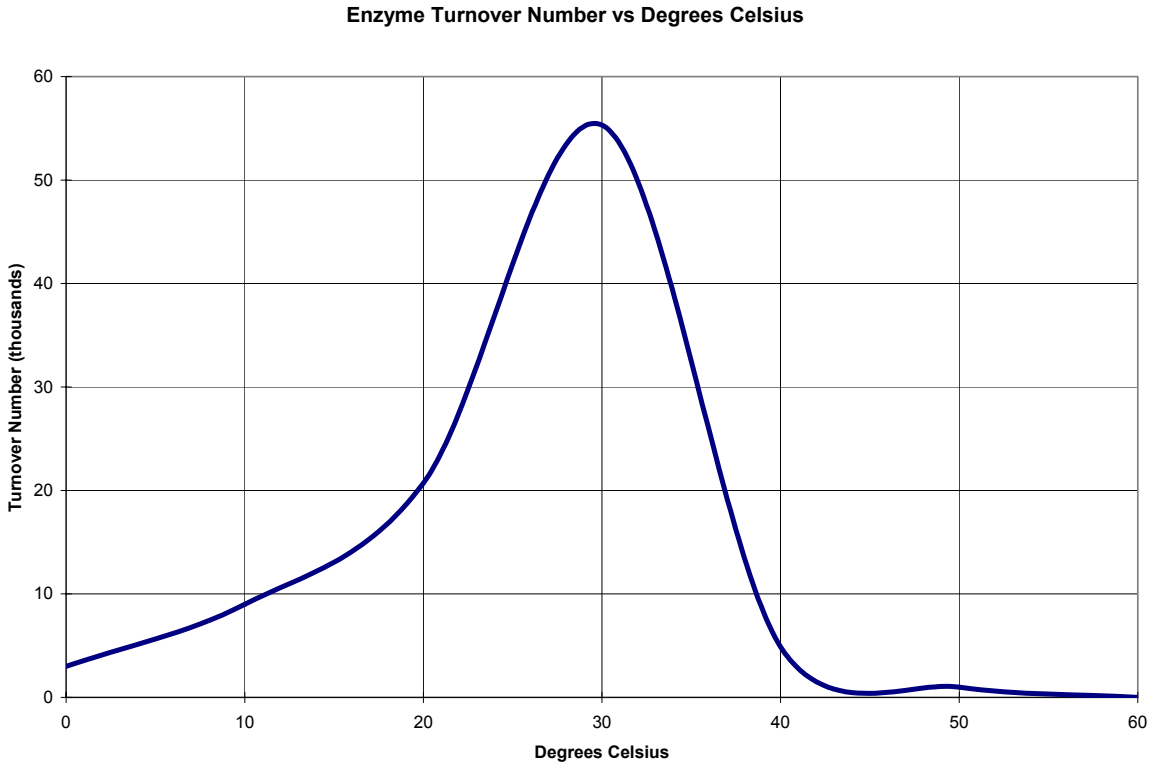
18. You are observing a cell under a grid. Each square of the grid measures 0.33 mm. Which of the following best approximates the *horizontal diameter of the cell* you are observing?

a. 0.33mm
b. 0.66mm
c. 0.99mm
d. 660mm
e. 990mm



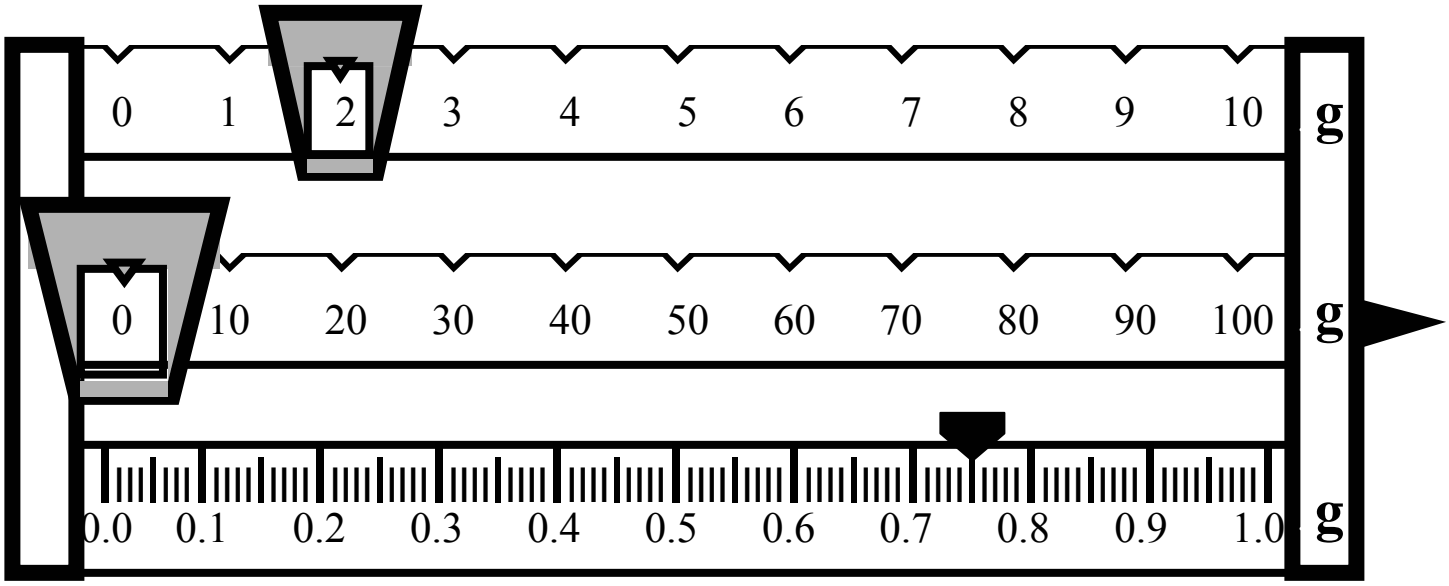
19. Analyze the graph below and choose from a-e to draw the most appropriate conclusion.

a. the higher the temperature the higher the turnover rate; b. the most efficient turnover occurs at low temperatures; c. the most efficient turnover occurs at 30^{o}C temperature; d. turnover rates increases temperature; e. very low and very high temperature increase turnover rate



20. The following is a diagram of a scale known as a triple beam balance that measures objects in grams. Read the total weight indicated on the scale in grams.

a. 2 grams
b. 275 grams
c. 2.75 grams
d. 20.75 grams
e. 207.5 grams



Read the following paragraphs, and answer the questions below based on the information in the paragraph.

Lactose, a disaccharide sugar present in milk, consists of 2 smaller monosaccharide sugars, glucose and galactose. When lactose is ingested, it must be hydrolyzed into the two smaller molecules before it can be absorbed into the blood by the cells of the small intestine. An enzyme is secreted by the cells of the small intestine and must be present in order for lactose to be digested.

Lactose intolerance is due to the inability to digest the sugar lactose, which is found in milk. It was assumed that most individuals could digest lactose and therefore intolerance was the unusual condition. When test doses of lactose were administered to American blacks and whites, none of whom had had gastrointestinal complaints, there were some startling findings. Whereas only from 6 to 15 percent of the whites showed clinical symptoms of intolerance, about 70 percent of the blacks were intolerant. This immediately suggested that many human adults might be unable to digest lactose and more specifically, that there might be significant differences among ethnic groups. This possibility was soon confirmed by examining two different tribes in Uganda. It was found that only 20 percent of the cattle herding Tussi tribe were intolerant to

lactose but that 80 percent of the non-cattle herding Ganda tribe were intolerant. Soon many other ethnic groups were found to be intolerant to lactose.

To test for lactose intolerance, one would have to ingest a dose of lactose, which has been standardized at two grams of lactose per kilogram of body weight up to a maximum of 100 grams. One can then check for clinical symptoms of lactose intolerance, which include gas and diarrhea. These symptoms are variable and therefore not reliable.

One can do an intestinal biopsy to measure the activity of the enzyme involved in the digestion of lactose. This is inconvenient for the subject being tested. The preferred method to assess for lactose intolerance is to measure the increase in blood glucose levels as the lactose is digested. This is a direct measure of lactose breakdown and false-negative results are rare if the glucose is measured 15 minutes after lactose is administered.

21. How much lactose should be administered to test a person who weighs 65 kilograms?
    a. 37 grams
    b. 3.7 grams
    c. 65 grams
    d. 100 grams
    e. 130 grams

22. One can infer from this paragraph that
    a. lactose is broken down into glucose
    b. glucose is broken down into lactose
    c. diarrhea is a bad disease
    d. intestinal biopsies are used to test for lactose intolerance

23. How much lactose should be administered to a child who weighs 42 kilograms?
    a. 42 grams
    b. 21 grams
    c. 84 grams
    d. 2.1 grams
    e. 100 grams

24. Members of the Ganda tribe are tested with a dose of lactose. What percent of them will show the normal increase in blood glucose level?
    a. 10
    b. 15
    c. 20
    d. 40
    e. 80

25. One learns from these paragraphs that
    a. lactose intolerance is very unusual
    b. lactose intolerance is genetically determined
    c. all adults are lactose intolerant
    d. many people are falsely diagnosed
    e. a person who is lactose intolerant may get diarrhea from drinking milk

Answers

1. b
2. a
3. e
4. c
5. e
6. e
7. b
8. b
9. b
10. a
11. a
12. b
13. a
14. c
15. d
16. d
17. c
18. c
19. c
20. c
21. d
22. a
23. c
24. c
25. e