TT TEXTBOOK TESTBANKS

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Name:_____ Class:_____ Date:_____

IGOB Chapter 01: Science and Measurement

1. A student is conducting an experiment to determine the effect of pH on enzyme activity. The student predicts that enzyme activity will be highest at a neutral pH and decrease at both acidic and basic pH levels. Which step of the scientific method is the student performing when they make this prediction?

a. Hypothesis
b. Experimentation
c. Observation
d. Analysis

ANSWER: a

2. A researcher is studying the effect of temperature on the solubility of a salt in water. They first measure the solubility at 25 °C, then at 35 °C, and finally at 45 °C. Which step of the scientific method does this represent?

a. Experimentation
b. Analysis
c. Conclusion
d. Hypothesis

ANSWER: a

3. Convert the following number from standard notation to scientific notation:
2350 g
ANSWER: 2.35×10^{3} g

4. Convert the following number from standard notation to scientific notation:
0.00941 mL
ANSWER: 9.41×10^{-3} mL

5. Convert the following number from scientific notation to standard notation:
7.42×10^{7} m

ANSWER: 74,200,000 m

6. Convert the following number from scientific notation to standard notation:
1.35×10^{-4} g

ANSWER: 0.000135 g

7. Evaluate $\dfrac{0.5794}{2.60 \times 10^{-3}}$ using a calculator.

ANSWER: 223

8. During an experiment, a chemist notes several observations. Which of the following is a qualitative observation?

a. The solution turned from blue to green.
b. The solution's temperature increased by 10 degrees Celsius.

IGOB Chapter 01: Science and Measurement

c. The mass of the reactant was 5 grams.
d. The pH of the solution was measured to be 7.4.

ANSWER: a

9. During an experiment, a chemist records several observations. Which of the following is a quantitative observation?
a. The volume of the gas produced was 2.5 liters.
b. The mixture turned cloudy.
c. The substance dissolved completely.
d. The liquid emitted a strong odor.

ANSWER: a

10. When making a measurement with a ruler, what is the correct procedure to ensure the most accurate reading?
a. Estimate to one digit beyond the smallest division markings.
b. Always round to the nearest whole number.
c. Record only the digits that correspond to the smallest division markings.
d. Always have three significant figures in the measurement.

ANSWER: a

11. When properly reading the volume of liquid in a syringe, which of the following practices should be followed?
a. Read the volume at the top of the barrel seal.
b. Read the volume in the middle of the barrel seal.
c. Estimate the volume to the nearest whole number.
d. Record the largest volume marking, ignoring the position of the barrel seal.

ANSWER: a

12. Which of the following statements is false?
a. Any zeros to the left of all nonzero digits are significant.
b. Any zeros between significant digits are significant.
c. Any zeros to the right of all nonzero digits in a number with decimal-place digits are significant.
d. All the digits in the coefficient of a number in scientific notation are significant.

ANSWER: a

13. Which of the following numbers has exactly three significant digits?
a. 903
b. 0.030
c. 70.00
d. 4000

ANSWER: a

IGOB Chapter 01: Science and Measurement

14. How many significant digits are in the number 0.00340?
    a. Three
    b. Four
    c. Two
    d. Five

ANSWER: a

15. How many significant digits are in 0.0026510 g?

ANSWER: 5

16. How many significant digits are in 55,200 km?

ANSWER: 3

17. Calculate the following sum and round the answer to the proper number of digits: 24.50 g + 2.784 g + 5.9 g
    a. 33.2 g
    b. 33.184 g
    c. 33.18 g
    d. 33 g

ANSWER: a

18. Calculate the following and round answer to the proper precision:

$489.51\ \text{cm} - 49.561\ \text{cm} + 25.7\ \text{cm}$

ANSWER: 465.6 cm

19. Perform the following calculation and select the answer with the correct number of significant digits:
$5.2478\ \text{cm} \times 5.89\ \text{cm}$

    a. $30.9\ \text{cm}^2$
    b. $30.909542\ \text{cm}^2$
    c. $31\ \text{cm}^2$
    d. $30.910\ \text{cm}^2$

ANSWER: a

20. Perform the following calculation and report the answer to the correct number of significant digits (including correct units).

$$\frac{5.89\ \text{g}}{7.6\ \text{cm}^3}$$

ANSWER: $0.78\ \frac{\text{g}}{\text{cm}^3}$

21. Which of the following are *not* considered to be exact numbers?
    a. measured quantities

b. defined quantities
c. integers within formulas
d. counted numbers

ANSWER: a

22. Paracetamol (acetaminophen) is a widely used over-the-counter pain reliever and a fever reducer. It is commonly sold as tablets, each containing 500 mg of the drug (assume two significant digits). If a person takes three tablets in a 12-hour period, what is the total mass of paracetamol consumed by the person in that period?
a. 1.0 g
b. 1.5 g
c. 2.0 g
d. 2.5 g

ANSWER: b

23. Ibuprofen is a common nonsteroidal anti-inflammatory drug (NSAID) used to reduce pain and inflammation. The label on a bottle of ibuprofen tablets says "do not exceed 6 tablets in 24 hours". If each tablet contains 200 mg of the drug (assume two significant digits), calculate the maximum daily dosage.
ANSWER: 1200 mg

24. Determine the result of the following calculation to the proper number of significant digits.

$$\frac{(35.67\ \text{g} - 14.61\ \text{g})}{44.27\ \text{mL}}$$

a. 0.4757 g/mL
b. 0.48 g/mL
c. 35.34 g/mL
d. 35 g/mL

ANSWER: a

25. Determine the result of the following calculation to the proper number of significant digits.
$(45.64\ \text{mL})(0.396\ \text{g/mL}) + 156.89\ \text{g}$

ANSWER: 175.0 g

26. Which of the following *incorrectly* matches an SI unit with the physical quantity that it measures?
a. gram (g), volume
b. kelvin (K), temperature
c. second (s), time
d. meter (m), length

ANSWER: a

27. Which of the following correctly matches an SI prefix with its corresponding value?
a. kilo- (k), 10^2

IGOB Chapter 01: Science and Measurement

b. mega- (M), 10^6

c. centi- (c), 10^{-1}

d. milli- (m), 10^3

ANSWER: b

28. Which unit is larger: mg or µg?
ANSWER: mg

29. Rank the following SI prefixes in order from smallest to largest value: micro- (µ), kilo- (k), milli- (m), and centi- (c).
ANSWER: micro- (µ), milli- (m), centi- (c), kilo- (k)

30. Determine which of the following values is given in English units.
a. 3.5 lb
b. 5.4 km
c. 2.0 L
d. 271.2 K
ANSWER: a

31. A liquid vitamin supplement for children is sold in a concentration of 100 mg/2.5 mL. If a child needs a dose containing 80 mg of the vitamin, how many milliliters (mL) of the supplement should be given?
a. 1.0 mL
b. 1.5 mL
c. 2.0 mL
d. 2.5 mL
ANSWER: c

32. An antacid solution is sold in a concentration of 300 mg/5.0 mL. If an adult requires a 15 mL dose of the antacid, how many milligrams (mg) of the active ingredient does this dose contain?
ANSWER: 900 mg

33. The recommended daily allowance for vitamin D is 600 IU. Given that 1 IU of vitamin D is equivalent to 0.025 µg, express this recommended daily allowance in micrograms (µg). Assume that the given values contain two significant digits.
a. 15 µg
b. 20 µg
c. 25 µg
d. 30 µg
ANSWER: a

34. The recommended daily allowance for vitamin E is 15 mg. Given that 1 mg of vitamin E is equivalent to

IGOB Chapter 01: Science and Measurement

0.67 IU, express this recommended daily allowance in IU. Assume that the given values contain two significant digits.
ANSWER: 22 IU

35. A cough syrup contains 20.0% active ingredient by mass. If the entire contents of a bottle of cough syrup has a mass of 150.0 g, how many grams of the active ingredient are in the bottle?

a. 25.0 g
b. 30.0 g
c. 35.0 g
d. 40.0 g

ANSWER: b

36. A sports drink contains 12.0% glucose by mass. If the contents of a bottle of the sports drink has a mass of 500.0 g, how many grams of glucose are in the bottle?
ANSWER: 60.0 g

37. A hospital patient is prescribed 450.0 mL of a glucose solution to be delivered by intravenous (IV) drip. The drip rate of the IV is 6.0 mL/min. Determine the number of seconds that it will take for the patient to receive the prescribed 450.0 mL.

a. 4500 s
b. 5000 s
c. 5400 s
d. 6000 s

ANSWER: a

38. A hospital patient is prescribed 275 mL of a nutrient solution to be delivered by intravenous (IV) drip. The drip rate of the IV is 5.0 mL/min. Determine the number of seconds that it will take for the patient to receive the prescribed 275 mL.
ANSWER: 3300 s

39. A patient's blood sugar level measures 180 mg/dL. What is this blood sugar level in grams per liter (g/L)?

a. 0.18 g/L
b. 1.8 g/L
c. 18 g/L
d. 180 g/L

ANSWER: b

40. A patient's blood urea nitrogen (BUN) level measures 25 mg/dL. What is this BUN level in grams per liter (g/L)?
ANSWER: 0.25 g/L

41. A patient's blood calcium level is 9.5 mg/dL. Determine their blood calcium measurement in grams per milliliter (g/mL).

a. 0.000095 g/mL
b. 0.00095 g/mL
c. 0.0095 g/mL
d. 0.095 g/mL

ANSWER: a

42. A patient's blood triglyceride level is 150 mg/dL. Determine their blood triglyceride measurement in grams per milliliter (g/mL).
ANSWER: 0.0015 g/mL

43. The maximum recommended single dose of ibuprofen for adults is 10.0 mg/kg of body weight every six hours. Calculate the maximum single dose in milligrams for an adult that weighs 135 lbs. There are 2.2046 lb per kilogram.
ANSWER: 612 mg

44. A sample of a liquid has a mass of 250.0 g and a volume of 200.0 mL. What is the density of the liquid in grams per milliliter?
a. 0.800 g/mL
b. 1.250 g/mL
c. 1.500 g/mL
d. 2.000 g/mL

ANSWER: b

45. What is specific gravity?
a. a measure of density relative to water
b. a measure of concentration relative to blood
c. a measure of mass relative to glucose
d. a measure of volume relative to urine

ANSWER: a

46. The density of lead is 11.3 g/mL. Calculate the mass of a block of lead that can displace a volume of 27.0 mL of water when submerged.
ANSWER: 305 g

47. Calculate the density of a rectangular metal block that is 15.00 cm long, 5.00 cm wide, and 2.00 cm thick, and has a mass of 450 g.
ANSWER: 3.0 g/cm^3

48. A liquid sample has a mass of 256 g and a density of 0.7025 g/mL. Determine the volume of this sample.
ANSWER: 364 mL

49. A rubber ball has a density of 0.92 g/mL. In which of the following liquids would it sink?
a. Ethanol (density = 0.789 g/mL)

b. Castor oil (density = 0.969 g/mL)
c. Glycerol (density = 1.26 g/mL)
d. Water (density = 1.00 g/mL)

ANSWER: a

50. The specific gravity of mercury is 13.6. Calculate the density of mercury in g/mL. (The density of water is 1.00 g/mL.)
ANSWER: 13.6 g/mL