

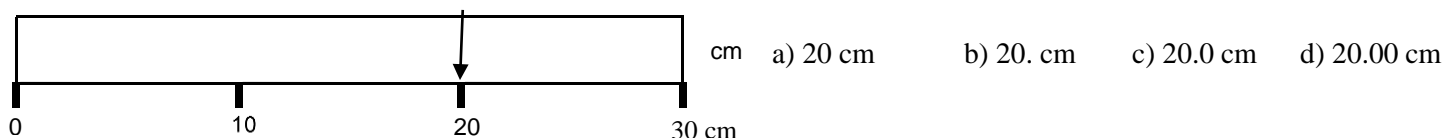
Mark the answers for Questions 1-41 on your Scantron. Each Question is worth 2 pt. In some cases you will be asked to mark more than one answer.

Chp 1.8 (Scientific notation)

1. How is this (105,006) written in correct scientific (exponential) notation?
A) 1.0×10^5 B) 1.05006×10^5 C) 1.1×10^5 D) 1.05×10^5
2. Write the following in decimal form, 7.49×10^3
A) 0.00749 B) 749 C) 749,000 D) 750 E) 749.0
3. Which of the following numbers is (are) equivalent? 1) 147000×10^{-3} 2) 1.47×10^3 3) 1,470
A) 1 and 2 B) 2 and 3 C) 1 and 3 D) none of them E) all of them

Chp 1.9 (Significant digits and rounding)

4. Round the following number to 2 significant figures: 105,006
A) 100,000 B) 105,000 C) 1.1×10^5 D) 1.1×10^6
5. Round the following number to 3 significant figures: 546.85 grams.
A) 546 B) 547 C) 546.9 D) 540
6. Which of the following measurements is paired CORRECTLY with significant figures?
A) 0.005 m / 3 sig. fig. B) 510 m / 3 sig. fig. C) 0.510 m / 3 sig. fig. D) 0.051 m / 3 sig. fig.
7. What is the correct way to express the following measurement?



8. The numerical value for $56,000 \div 7.89$ is equal to, with the proper number of significant figures:
A) 70.976 B) 71 C) 70.98 D) 71.0
9. What is the correct answer for $\frac{2610.0 + 11.7 + 0.22}{2.590}$ (This is a significant figures problem.)
A) 1012.32 B) 1012.3 C) 1012 D) 1010 E) 1000
10. Which of the following is an exact value?
A) 0.035 kg B) 5 books C) 9.25 g D) 361 miles

Chp 1.10 – 1.13 (Units of measurement).

11. Which of the following is a mass unit?
A) cg B) mL C) dm D) yd
12. Which of the following is the correct unit for length?
A) cg B) mL C) dm D) gal
13. Which of these samples has the smallest mass?
A) 160 μg B) 0.0016 g C) 0.0016 mg D) 0.000000016 kg

Chp 1.14 (Temperature scales)

14. Temperature scales. Which of the following temperatures is the lowest?

Useful information: $F - 32 = 1.8C$ and $K = C + 273$

- A) 0 °C B) 0 °F C) 32 °F D) 212 K

Chp 1.16 (Unit conversion)

15. Which of the following conversion factors is correct for converting from grams to kilogram?

- A) 1 g = 1000 kg B) 1000 g = 1 kg C) 100 g = 1 kg D) 1 g = 100 kg

16. Convert 152 miles into kilometers, using proper significant figures.

- A) 94.4 km B) 94 km C) 244.57 km D) 245 km

17. How many mL of solution are there in 0.0500 L?

- A) 50.0 mL B) 0.50 mL C) 500. mL D) 0.0000500 mL

18. What is the total dose of drug required for a 140 lb patient if the amount required is 28 mg drug/kg bodyweight?

- A) 1.8 mg B) 1.8 g C) 3.9 mg D) 3.9 g

Chp 2.1 & 2.2 (Classification of matter)

19. All the different kinds of substances that make up all of the material of the universe are known collectively as:

- A) elements B) compounds C) matter D) electrolytes

20. Which of the following is a *physical change*? Mark all that apply.

- A) Boiling water
B) Dissolving kool-aid
C) Frying an egg.
D) Oxygen combines with hydrogen to produce water.

21. Which of the following is a chemical reaction?

- A) Rusting of iron
B) Slicing a ham
C) Liquefying oxygen
D) Melting ice

22. Which of the following is a homogeneous mixture?

- A) A cup of black coffee
B) Ground black pepper
C) Iron filings and sulfur
D) Oil and vinegar salad dressing

23. Which of the following is an element?

- A) Carbon dioxide B) Sodium C) Ammonia D) Sand

24. Which of the following combinations represents compounds rather than elements?

I. O₃ II. CCl₄ III. S₈ IV. H₂O

- A) I + II B) III + IV C) I + III D) II + IV

25. Which of the following is a pure substance?

- A) Sugar B) Sand C) Gold D) Maple syrup

26. Which of the following is an example of a heterogeneous mixture?

- A) Sugar water B) Oil/vinegar salad dressing C) Air D) Vodka

Chp 2.4 (Physical properties of matter)

27. Which of the following substances has the lowest density?

- A) A mass of 1.5 kg and a volume of 1.2 L
B) A mass of 25 g and a volume of 20 mL
C) A mass of 750 g and a volume of 700 mL
D) A mass of 5 mg and a volume of 25 uL

Chp 2.5 (States of matter)

Match each of the terms on the left with the meaning on the right.

28. Melting	A) The change from liquid to solid.
29. Evaporation	B) The change from gas to liquid.
30. Sublimation	C) The change from gas to liquid.
31. Deposition	D) The change from solid to gas.
32. Condensation	E) The change from liquid to gas.
33. Freezing	AB) The change from solid to liquid.

34. Which of the following statements best describes a gas?

- A) Definite shape and volume
B) Indefinite shape and volume
C) Indefinite shape but definite volume
D) Definite shape but indefinite volume

35. Matter is nearly incompressible in which of these states?

- A) Gas B) Liquid C) Solid D) Solid and liquid

Chp 2.6 (Gas laws)

36. A sample of oxygen at room temperature occupies a volume of 500. L at 1.75 atm. What would be the volume of this gas at 2.50 atm at the same temperature?

- A) 350. L B) 286 L C) 0.0035 L D) 714. L E) 0.0029 L

37. If the volume of a gas container at 32.0 °C changes from 1.55 L to 755 mL, what will the final temperature be?

- A) 149 °C B) 353 °C C) 273 °C D) -124 °C

CHP 2.9

38. Using the specific heats for each of the substances listed below, determine which of these substances will show the largest temperature increase, if equal masses of each were heated with the same quantity of energy.

Remember: $Q = C_p \times g \times \Delta T$

- A) air (0.24 cal/g °C)
B) gold (0.031 cal/g °C)
C) iron (0.11 cal/g °C)
D) paraffin wax (0.60 cal/g °C)

How much heat is necessary to change a 52.0 g sample of water at 33.0 °C into steam at 110.0 °C? This problem requires several steps since temperature changes and a phase change takes place. Do the calculations below to calculate the total heat for this process.

A) (4 pt) Solve for the heat required to increase the water temperature from 33.0 °C to 100.0 °C.

$$(C_{p(\text{water})} = 1.0 \text{ cal/g} \cdot ^\circ\text{C})$$

B) (3 pt) Solve for the heat required to change the water into steam (no change in temp). ($\Delta H_{\text{vap}} = 540. \text{ cal/g}$)

C) (4 pt) Calculate the heat required to change the temperature of the steam from 100.0 °C to 110.0 °C.

$$(C_{p(\text{steam})} = 0.483 \text{ cal/g} \cdot ^\circ\text{C})$$

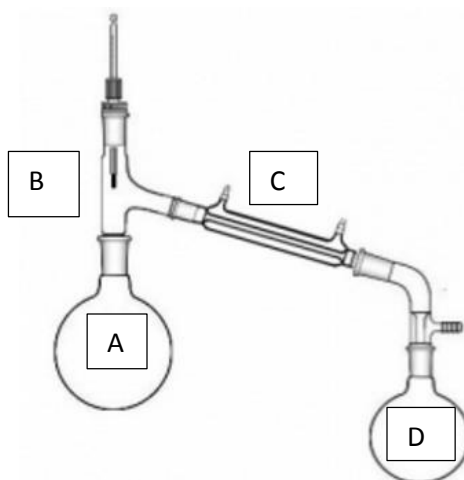
D) (3 pt) Calculate the heat required for the whole process, _____ the calculated heats from above.

Below is a diagram of a distillation apparatus. Use the labels in the diagram to answer the following questions on your Scantron answer sheet.

39. Where would a salt-water solution be placed in order to separate the salt from the water by distillation?

40. Where will the salt be at the end of the distillation?

41. Where will the pure water be at the end of the distillation?



PERIODIC CHART OF THE ELEMENTS

1 H 1.00797																	2 He 4.0026				
3 Li 6.939	4 Be 9.0122															5 B 10.811	6 C 12.0112	7 N 14.0067	8 O 15.9994	9 F 18.9984	10 Ne 20.183
11 Na 22.9898	12 Mg 24.312															13 Al 26.9815	14 Si 28.086	15 P 30.9738	16 S 32.064	17 Cl 35.453	18 Ar 39.948
19 K 39.102	20 Ca 40.08	21 Sc 44.956	22 Ti 47.90	23 V 50.942	24 Cr 51.996	25 Mn 54.9380	26 Fe 55.847	27 Co 58.9332	28 Ni 58.71	29 Cu 63.54	30 Zn 65.37	31 Ga 69.72	32 Ge 72.59	33 As 74.9216	34 Se 78.96	35 Br 79.909	36 Kr 83.80				
37 Rb 85.47	38 Sr 87.62	39 Y 88.905	40 Zr 91.22	41 Nb 92.906	42 Mo 95.94	43 Tc (99)	44 Ru 101.07	45 Rh 102.905	46 Pd 106.4	47 Ag 107.870	48 Cd 112.40	49 In 114.82	50 Sn 118.69	51 Sb 121.75	52 Te 127.60	53 I 126.904	54 Xe 131.30				
55 Cs 132.905	56 Ba 137.34	*57 La 138.91	72 Hf 178.49	73 Ta 180.948	74 W 183.85	75 Re 186.2	76 Os 190.2	77 Ir 192.2	78 Pt 195.09	79 Au 196.967	80 Hg 200.59	81 Tl 204.37	82 Pb 207.19	83 Bi 208.980	84 Po (210)	85 At (210)	86 Rn (222)				
87 Fr (223)	88 Ra (226)	†89 Ac (227)	104 Rf (261)	105 Db (262)	106 Sg (266)	107 Bh (262)	108 Hs (265)	109 Mt (266)	110 ? (271)	111 ? (272)	112 ? (277)										

* Lanthanide Series

58 Ce 140.12	59 Pr 140.907	60 Nd 144.24	61 Pm (147)	62 Sm 150.35	63 Eu 151.96	64 Gd 157.25	65 Tb 158.924	66 Dy 162.50	67 Ho 164.930	68 Er 167.26	69 Tm 168.934	70 Yb 173.04	71 Lu 174.97
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† Actinide Series

90 Th 232.038	91 Pa (231)	92 U 238.03	93 Np (237)	94 Pu (242)	95 Am (243)	96 Cm (247)	97 Bk (247)	98 Cf (249)	99 Es (254)	100 Fm (253)	101 Md (256)	102 No (256)	103 Lr (257)
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USEFUL CONVERSION FACTORS AND RELATIONSHIPS

Length

SI unit: meter (m)

- 1 km = 0.62137 mi
- 1 mi = 5280 ft
- = 1.6093 km
- 1 m = 1.0936 yd
- 1 in. = 2.54 cm (exactly)
- 1 cm = 0.39370 in.
- 1 Å = 10⁻¹⁰ m

Mass

SI unit: kilogram (kg)

- 1 kg = 2.2046 lb
- 1 lb = 453.59 g
- = 16 oz
- 1 amu = 1.6605402 x 10⁻²⁴ g

Temperature

SI unit: Kelvin (K)

- 0 K = -273.15°C
- = -459.67°F
- K = °C + 273.15
- °C = $\frac{5}{9}$ (°F - 32°)
- °F = $\frac{9}{5}$ °C + 32°

Energy (derived)

SI unit: joule (J)

- 1 J = 1 kg·m²/s²
- 1 J = 0.2390 cal
- = 1 C x 1 V
- 1 cal = 4.184 J
- 1 eV = 1.602 x 10⁻¹⁹ J

Pressure (derived)

SI unit: Pascal (Pa)

- 1 Pa = 1 N/m²
- = 1 kg/m·s²
- 1 atm = 101,325 Pa
- = 760 torr
- = 14.70 lb/in²
- 1 bar = 10⁵ Pa

Volume (derived)

SI unit: cubic meter (m³)

- 1 L = 10⁻³ m³
- = 1 dm³
- = 10³ cm³
- = 1.0567 qt
- 1 gal = 4 qt
- = 3.7854 L
- 1 cm³ = 1 mL
- 1 in³ = 16.4 cm³

GAS LAW EQUATIONS and CONSTANTS

$$P_1V_1 = P_2V_2$$

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

$$\frac{V_1}{T_1} = \frac{V_2}{T_2}$$

$$\frac{V_1}{n_1} = \frac{V_2}{n_2}$$

$$\frac{P_1}{T_1} = \frac{P_2}{T_2}$$

$$22.4 \text{ L} = 1 \text{ mol @ STP}$$

$$PV = nRT$$

$$R = 0.0821 \text{ L·atm/K·mol}$$

SCRATCH PAPER