

Answer the following questions by circling the letter for the best response. Show your work where requested. If you simply provide a correct answer without showing work, you will receive ½ credit. You may find the information below useful

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) / 1.8 \quad ^{\circ}\text{F} = (1.8^{\circ}\text{C}) + 32 \quad \text{K} = ^{\circ}\text{C} + 273.15 \quad ^{\circ}\text{C} = \text{K} - 273.15 \quad 1 \text{ cal} = 4.184 \text{ J}$$
$$q = m C \Delta T$$

1) Which state of matter has atomic spacing that is close together with an indefinite shape?

- A) liquid
- B) solid
- C) gas
- D) plasma
- E) none of the above

2) Which state of matter has indefinite shape and is compressible?

- A) liquid
- B) solid
- C) gas
- D) plasma
- E) none of the above

3) Which of the following items is a chemical property?

- A) the paint color on a new red Corvette
- B) the odor of spearmint gum
- C) the melting and boiling point of water
- D) the tarnishing of a copper statue
- E) none of the above

4) Which of the following is a heterogenous mixture?

- A) wine
- B) 1% salt solution
- C) raisin bran
- D) air
- E) none of the above

5) If you hold a solid piece of pure gallium metal in your hand, your body heat will melt the gallium into its liquid form. This illustrates which of the following?

- A) distillation
- B) physical change
- C) chemical change
- D) chemical property
- E) none of the above

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6) When methane is burned with oxygen, the products are carbon dioxide and water. If you produce 9 grams of water and 11 grams of carbon dioxide from 16 grams of oxygen, how many grams of methane were needed for the reaction? $\text{CH}_4 + \text{O}_2 \rightarrow \text{H}_2\text{O} + \text{CO}_2$ **SHOW YOUR WORK**

WORK

- A) 4
- B) 20
- C) 31
- D) 40
- E) none of the above

9g + 11g = 20g of product. Due to the law of conservation of mass, 20g of reactants was required. Therefore 20g - 16g = 4g of CH_4 was needed.

7) How many joules are there in a 355 calorie snack bar? **SHOW YOUR WORK**

- A) 2.55×10^5
- B) 1.49×10^3
- C) 1.07×10^3
- D) 6.09×10^4
- E) none of the above

$$\frac{355 \text{ cal}}{1 \text{ cal}} \times 4.184 \text{ J} = 1485.32 \text{ J}$$

Round to 3 digits

8) What is the value of 335 K on the Celsius temperature scale? **SHOW YOUR WORK**

- A) 62
- B) 167
- C) 608
- D) 66.4
- E) none of the above

$$^{\circ}\text{C} = 335 - 273.15 = 61.85$$

Round to decimal point

9) What is the value of 27°C on the Fahrenheit temperature scale? **SHOW YOUR WORK**

- A) -6.8
- B) 106
- C) 300
- D) 81
- E) none of the above

$$^{\circ}\text{F} = (1.8 \cdot 27) + 32 = 80.6$$

Round to 2 digits

10) Given the table of specific heat values below, what is the identity of a 26.2 g metal sample that increases by 12°C when 73.9 J of energy is absorbed? **SHOW YOUR WORK**

Element	Specific Heat (J/g $^{\circ}\text{C}$)
Au	0.128
Ag	0.235
Cu	0.385
Fe	0.449
Al	0.903

$$^{\circ}\text{C} = \frac{q}{m\Delta T} = \frac{73.9 \text{ J}}{(26.2 \text{ g})(12^{\circ}\text{C})} = 0.235 \text{ J/g}^{\circ}\text{C}$$

- A) Fe
- B) Al
- C) Au
- D) Ag
- E) none of the above