

# Scantron Test Sheet 100/W



Form No. 95677

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**SCORING & PRINTING OPTIONS:**

RESCORE     MULTIPLE ANSWER SCORING  
 CORRECT ANSWER     MARK X     TOTAL ONLY  
 MARK ONLY ONE

**KEY ID**  
(A) (B) (C) (E)

FEED IN THIS DIRECTION

- T F**
- 1 A (B) (C) (D) (E)
- 2 A B C (D) E
- 3 A (B) (C) (D) (E)
- 4 A B C D (E)
- 5 (A) (B) (C) (D) (E)
- 6 A (B) C D E
- 7 A (B) (C) (D) (E)
- 8 A B C (D) E
- 9 A (B) (C) (D) (E)
- 10 A B C (D) E
- 11 A (B) (C) (D) (E)
- 12 A B C (D) E
- 13 A (B) (C) (D) (E)
- 14 (A) B C D E
- 15 A (B) (C) (D) (E)
- 16 A B (C) D E
- 17 A (B) (C) (D) (E)
- 18 A B (C) D E
- 19 A (B) (C) (D) (E)
- 20 (A) B C D E
- 21 A (B) (C) (D) (E)
- 22 A B (C) D E
- 23 A (B) (C) (D) (E)
- 24 A (B) C D E
- 25 A (B) (C) (D) (E)

- T F**
- 26 A B C (D) E
- 27 A (B) (C) (D) (E)
- 28 (A) B C D E
- 29 (A) (B) (C) (D) (E)
- 30 (A) B C D E
- 31 (A) (B) (C) (D) (E)
- 32 A (B) C D E
- 33 A (B) (C) (D) (E)
- 34 (A) B C D E
- 35 A (B) (C) (D) (E)
- 36 A B (C) D E
- 37 A (B) (C) (D) (E)
- 38 A (B) C D E
- 39 (A) (B) (C) (D) (E)
- 40 A B C (D) E
- 41 A (B) (C) (D) (E)
- 42 A (B) C D E
- 43 A (B) (C) (D) (E)
- 44 A B C (D) E
- 45 (A) (B) (C) (D) (E)
- 46 A B (C) D E
- 47 A (B) (C) (D) (E)
- 48 A (B) C D E
- 49 A (B) (C) (D) (E)
- 50 A B C (D) E

- T F**
- 51 A (B) C (D) (E)
- 52 A B C (D) E
- 53 A (B) C (D) (E)
- 54 A (B) C D E
- 55 A (B) (C) (D) (E)
- 56 A B (C) D E
- 57 A (B) (C) (D) (E)
- 58 A B C D E
- 59 A (B) (C) (D) (E)
- 60 A B C (D) E
- 61 A (B) (C) (D) (E)
- 62 A B C D E
- 63 A (B) (C) (D) (E)
- 64 A B C D E
- 65 A (B) (C) (D) (E)
- 66 A B C D E
- 67 A (B) (C) (D) (E)
- 68 A B C D E
- 69 A (B) (C) (D) (E)
- 70 A B C D E
- 71 A (B) (C) (D) (E)
- 72 A B C D E
- 73 A (B) (C) (D) (E)
- 74 A B C D E
- 75 A (B) (C) (D) (E)

- T F**
- 76 A B C D E
- 77 A (B) (C) (D) (E)
- 78 A B C D E
- 79 A (B) (C) (D) (E)
- 80 A B C D E
- 81 A (B) (C) (D) (E)
- 82 A B C D E
- 83 A (B) (C) (D) (E)
- 84 A B C D E
- 85 A (B) (C) (D) (E)
- 86 A B C D E
- 87 A (B) (C) (D) (E)
- 88 A B C D E
- 89 A (B) (C) (D) (E)
- 90 A B C D E
- 91 A (B) (C) (D) (E)
- 92 A B C D E
- 93 A (B) (C) (D) (E)
- 94 A B C D E
- 95 A (B) (C) (D) (E)
- 96 A B C D E
- 97 A (B) (C) (D) (E)
- 98 A B C D E
- 99 A (B) (C) (D) (E)
- 100 A B C D E

ANSWER KEY INFO.				PERFORMANCE ASSESSMENT				
# OF KEYS ITEM COUNT				% OF TOTAL SCORE		POINTS EARNED		
0	0	0	0	100 = 100%				
1	1	1	1	E Q U I P M E N T S	0	0	0	0
2	2	2	2		1	1	1	1
3	3	3	3		2	2	2	2
4	4	4	4		3	3	3	3
5	5	5	5		4	4	4	4
6	6	6	6		5	5	5	5
7	7	7	7		6	6	6	6
8	8	8	8		7	7	7	7
9	9	9	9		8	8	8	8
					9	9	9	9

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FEED IN THIS DIRECTION

NUMBER CORRECT	
PERCENT CORRECT	
ROSTER NUMBER	
SCORE	
RESCORE	



COMBINED POINTS EARNED	
COMBINED PERCENT CORRECT	
LETTER GRADE	
SCORE	
RESCORE	



STUDENT ID NUMBER									
0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

**MARKING INSTRUCTIONS**

- Use a No. 2 Pencil
- (A) (B) (C) (D) (E)
- Fill oval completely
- (A) (B) (C) (D) (E)
- Erase cleanly

NAME Key

SUBJECT \_\_\_\_\_

PERIOD \_\_\_\_\_ DATE \_\_\_\_\_



**Part 2: Lab**

Thermodynamics Task: Determine the heat of combustion in *kJ/gram* of the candle.

General Procedure (does not include measurements you need to take!):

1. Obtain a soda can and ring stand.
2. Add water to the soda can and suspend it from the ring stand.
3. Light the candle and use it to heat the sample of water.
4. Blow out the candle and clean up.

Data Table (10 points)

Measurement	Data
initial mass of candle	g
final mass of candle	g
initial temp H <sub>2</sub> O	°C
final temp H <sub>2</sub> O	°C
mass H <sub>2</sub> O	g

Analysis/Calculations

1. Determine the heat of combustion of the candle in kJ/gram. (12 points)

$$Q = m_{H_2O} (4.18) (\Delta T) \leftarrow \text{in Joules } \left( \frac{1000 \text{ kJ}}{1 \text{ J}} \right) = \text{kJ}$$

$$Q_{\text{candle}} = - Q_{H_2O}$$

$$\Delta H_{\text{combust}} = \frac{Q_{\text{candle}}}{\text{gram}} \leftarrow \text{should be } \ominus \text{ find answer}$$

2. A) Write the balanced equation for the combustion of a candle made from C<sub>25</sub>H<sub>52</sub>. (4 points)



- B) If 2.00 grams of C<sub>25</sub>H<sub>52</sub> are burned, how many grams of oxygen are required? (4 points)

$$2 \text{ g } C_{25}H_{52} \left( \frac{1 \text{ mol}}{352.7 \text{ g}} \right) \left( \frac{38 \text{ mol}}{1 \text{ mol}} \right) \left( \frac{32.0 \text{ g}}{1 \text{ mol}} \right) = 6.90 \text{ g } O_2$$

- C) If 2.00 grams of C<sub>25</sub>H<sub>52</sub>, how many total mL of product will be produced at 1.10 atm and 22.0°C? (5 points)

$$2.0 \text{ g } \left( \frac{1 \text{ mol}}{352.7 \text{ g}} \right) \left( \frac{25+26 \text{ mol}}{1 \text{ mol}} \right) = 2.29 \text{ mol product}$$

$$1.10 (V) = (2.29) (.08206) (295)$$

$$V = 6.36 \text{ L} \rightarrow 6360 \text{ mL}$$

Gas Laws Task:

33.3 mg

Science Olympiad Students

A compound contains only C, H, and N. It was analyzed by an extraordinary class of AP Chemistry students.

~~One group~~ burned a 35.0 mg sample of the compound completely and 33.5 mg of CO<sub>2</sub> was collected. The water portion of this analysis was accidentally dumped down the sink. Fortunately ~~another group~~ <sup>they also analyzed</sup> was analyzing the sample for nitrogen by the Dumas method. They used a 65.2 mg sample at 740 torr and 25° C and collected 35.7 mL of N<sub>2</sub> gas. ~~A third group~~ <sup>then they</sup> measured the effusion rate of the compound and found that the compound effused at a rate of 24.6 mL/min while Neon (Molar Mass = 20.18 g/mol) <sup>argon</sup> effused at a rate of 26.4 mL/min under the same conditions.

- A) Determine the % C, % H, and % N in the compound (9 pts)
- B) Find the empirical formula of the compound. (2 pts)
- C) What is the molar mass of the compound? (2 pts)
- D) What is the molecular formula of the compound? (2 pts)



(A) %C  $.0333 \text{ g CO}_2 \left( \frac{12 \text{ g C}}{44 \text{ g CO}_2} \right) = \frac{.009082 \text{ g C}}{.0350 \text{ g comp}} \times 100 = 25.9\% \text{ C}$

%H  $100 - 25.9 - 61.1 = 13.0\% \text{ H}$

%N  $(740) (.0357) = (n) (62.36) (298)$   
 $n = .00142 \text{ mol N}_2 \left( \frac{28.02 \text{ g N}}{1 \text{ mol N}_2} \right) = \frac{.0398 \text{ g N}}{.0652 \text{ g comp.}}$   
 61.1% N

(B)  $25.9 \text{ g C} \left( \frac{1 \text{ mol}}{12.01 \text{ g}} \right) = \frac{2.16 \text{ mol}}{2.16} = 1$

$13.0 \text{ g H} \left( \frac{1 \text{ mol}}{1.01 \text{ g}} \right) = \frac{12.87 \text{ mol}}{2.16 \text{ mol}} = 5.96 \rightarrow 6$

$61.1 \text{ g N} \left( \frac{1 \text{ mol}}{14.01 \text{ g}} \right) = \frac{4.36 \text{ mol}}{2.173} = 2$

C<sub>1</sub>H<sub>6</sub>N<sub>2</sub> = emp.

$$\sqrt{\frac{M_{m1}}{M_{m2}}} = \frac{R_2}{R_1}$$

$$\sqrt{\frac{X}{39.95}} = \frac{26.4}{24.6}$$

Mm = 46.01  
 emp mass = 46.09 } emp?  
 molecular mass = 46.09