1. Which products are commonly made from petroleum or petroleum byproducts?
   a. fry pans
   b. plastic sandwich bags
   c. gas station
   d. clothes with synthetic fibers like polyester

2. Petroleum is a non-renewable resource because
   a. products like oil can’t be recycled
   b. the bulk of the oil is burned at a rate faster than it forms
   c. it is difficult to obtain

3. Where are most of the world’s reserves located?
   a. S. America
   b. Africa
   c. Middle East
   d. N. America

4. Which area of the world must import petroleum to keep up with its rate of consumption?
   a. S. America
   b. Middle East
   c. Africa
   d. Western Europe

5. Which part of the apparatus is at the highest temperature?
   a. The liquid in the round flask
   b. The vapor near the thermometer
   c. The liquid dripping out of the condenser

6. How does fractional distillation separate mixtures like crude oil?
   a. Different viscosities
   b. Different boiling points

Use the table below to answer questions 7-8.

<table>
<thead>
<tr>
<th>Substance</th>
<th>Boiling Point (deg C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>78.3</td>
</tr>
<tr>
<td>Water</td>
<td>100</td>
</tr>
<tr>
<td>Cyclicene</td>
<td>80.7</td>
</tr>
<tr>
<td>Phenol</td>
<td>149.5</td>
</tr>
</tbody>
</table>

7. Which gas would be the easiest to separate using fractional distillation?
   a. Ethanol
   b. Water
   c. Cyclicene
   d. Phenol

8. Which gas would be the hardest to separate using fractional distillation?
   a. Ethanol
   b. Water
   c. Cyclicene
   d. Phenol

9. What liquid could be dripping into the collection beaker 3 minutes into the experiment?
   a. A: water
   b. B: Phenol
   c. C: Ethanol
   d. D: Water

10. What liquid is completely distilled from the original mixture 12 minutes into the experiment?
    a. A: Phenol
    b. B: Propanol
    c. C: Water
    d. D: Water

11. What liquid has not yet boiled 15 minutes into the experiment?
    a. A: Phenol
    b. B: Ethanol
    c. C: Water
    d. D: Water

Figure 4 shows a picture of a fractional distillation tower used to distill and separate crude oil. Use the information in the tower to answer questions 12-14.

12. Where is the column used to separate gasoline?
    a. A
    b. B
    c. C
    d. D

13. Where is the column used to separate kerosene?
    a. A
    b. B
    c. C
    d. D

14. Where is the column used to separate gasoline with the highest boiling point?
    a. A
    b. B
    c. C
    d. D

The table below shows several hydrocarbons and their boiling points. Use the table to answer questions 15-16.

<table>
<thead>
<tr>
<th>Hydrocarbon</th>
<th>Boiling Point (deg C)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>78.3</td>
</tr>
<tr>
<td>Propanol</td>
<td>97.0</td>
</tr>
<tr>
<td>Butanol</td>
<td>118.1</td>
</tr>
<tr>
<td>Pentanol</td>
<td>137.9</td>
</tr>
</tbody>
</table>

15. What two elements make up the majority of petroleum? (Mark two)
   a. hydrogen
   b. oxygen
   c. nitrogen
   d. carbon

16. Which hydrocarbon has the lowest boiling point?
    a. Ethanol
    b. Propanol
    c. Butanol
    d. Pentanol

17. If hydrocarbons are non-sustainable resources, what are sustainable resources?
    a. water
    b. oxygen
    c. hydrogen
    d. petroleum

18. Using a periodic table, determine how many electrons are in a neutral atom of chlorine?
    a. 17
    b. 26
    c. 35
    d. 43

19. How many electrons does a neutral atom of chlorine lose in the second energy level?
    a. 1
    b. 2
    c. 3
    d. 4

20. How many electrons are found in a neutral atom of chlorine?
    a. 17
    b. 26
    c. 35
    d. 43

21. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

22. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

23. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

24. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

25. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

26. How many electrons do atoms want to lose in its valence energy level to become noble gas?
    a. 1
    b. 2
    c. 3
    d. 4

27. When carbon atoms bond with hydrogen, the atoms share electrons. This is called a(n)
    a. covalent bond
    b. ionic bond
    c. hydrogen bond
    d. chemical bond
26. Which of the following formulas would have a molar mass of 44 grams/mole?

A. C₂H₆
B. C₂H₄
C. C₂H₂

27. How many hydrogen atoms would a hydrocarbon have with 14 carbon atoms?

A. 14
B. 28
C. 27
D. 30

28. Consider the given formulas of compounds. Which answer is the longest chain?

A. C₂H₆
B. C₂H₄
C. C₂H₂

29. Write the name or molecular formula for each of the following: 

<table>
<thead>
<tr>
<th>Molecular Formula</th>
<th>Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>C₆H₁₂</td>
<td>Hexane</td>
</tr>
<tr>
<td>C₆H₁₄</td>
<td>Hexane</td>
</tr>
<tr>
<td>C₇H₁₆</td>
<td>Heptane</td>
</tr>
</tbody>
</table>

30. Draw a structural formula for an example of the alkane C₆H₁₄, you have a positive C.

C: C-C-C-C-C-C

31. Write the molecular formula for an alkane with 2x + 2 - y hydrogen atoms.

C₂H₆

32. Draw a structural formula of a straight-chain alkane, C₆H₁₄, example.