**ES486 Lecture Review Exercise Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**University of Delft Lecture Review Questions: Composition of Oil and Gas**

Watch the video lecture at the following URL:

<https://ocw.tudelft.nl/course-lectures/pgeo-l3-composition-oil-gas/?course_id=12985>

and review the following related lecture slides:

<https://people.wou.edu/~taylors/es486_petro/PGeo_L3_Petroleum_Geology_-_Lecture_3_08.pdf>

Answer the review questions below. Use internet search resources as needed to augment your answers. Provide sketches or image-capture diagrams where required.

1. From the video introduction: In terms of the food chain, photosynthesis, carbon cycle and biomass production on planet; what are the four primary organic compounds that form the source biomass material for fossil fuels?
2. Which of these compounds did you have for breakfast today?
3. Review slide 2, What is the elemental composition of fossil fuel hydrocarbons in weight percent?
   1. Carbon b. Hydrogen c. Nitrogen-Sulfer-Oxygen
4. True or False: oil and gas hydrocarbons are primarily deoxygenated compared to source biomass materials listed in question 1 above.
5. List the three main groups of organic compounds that form the main components of natural hydrocarbons.
6. Examine slide 3, describe the basic shape of the molecular structure of paraffin compounds, draw a sketch or image capture. What is the simplest form of fossil fuel gas with the paraffin structure? What is it’s chemical formula?
7. Examine slide 4, describe the basic shape of the molecular structure of the Napthenes and Aromatics, what is the difference between the two groups? Provide examples of each. Draw a sketch or image capture to illustrate your answer.
8. Examine slide 7 and 8, list some examples of compounds found as residue in crude oil composed of N-S-O compounds.
9. Examine slides 10 and 11; what are the most common crude oils composed of worldwide? List the common type of distilled and refined hydrocarbon products that are derived from the following organic groups:
   1. Paraffins b. Napthenes c. Aromatics
10. Examine slides 13 and 14. What is the most common type of natural gas derived from the subsurface. What is the difference between “wet” gas and “dry” gas?
11. Describe the basic differences between the following refined fossil fuel products that consumers use:
    1. Gasoline b. Kerosene c. jet and diesel fuel d. lubricating oil
12. Watch the end of the video and summarize the “pitch drop experiment”, why is it historically significant?