

Chem 400A Section 1 Quiz – Jan. 28, 2019 KEY

Answer the questions on a 5-answer scantron form. All questions are equally weighted. There are 25 questions in total. Read the questions carefully!

1. What is the value of a **'food' Calorie (CAL)** in terms of **'scientific' joules**? **B**
a) 1000 J/CAL **b) 4180 J/CAL** c) 1 J/CAL d) 4.18 J/CAL e) 0.00418 J/CAL
2. As of 2017, what is the **single biggest source of energy** used in the US? **C**
a) nuclear fission b) natural gas **c) petroleum** d) coal e) solar
3. What is the main purpose of a **'reformer'** in petroleum refining? **D**
a) Decrease percentage of branched chain hydrocarbons
b) Shorten long chain hydrocarbons to C6-C10 chain length
c) Convert saturated hydrocarbons to alkenes
d) Increase the percentage of branched chain hydrocarbons
e) Hydrogenate aromatics to saturated hydrocarbons
4. Catalytic cracking is done using **zeolite** catalysts. A zeolite is: **C**
a) A porous metal framework
b) A transition metal catalyst
c) A rigid and porous aluminosilicate structure
d) Silica
e) An iron oxide
5. **Vaseline or 'petroleum jelly'** is comprised of what petroleum fraction? **C**
a) Polycyclic aromatic hydrocarbons
b) C11-C12 chains
c) Mostly > C25 chains
d) Comes from non-petroleum sources
e) Is the glycerine fraction
6. The most common gasoline **anti-knock agent** until about 1975 was: **A**
a) **Pb(CH₂CH₃)₄** b) ethanol c) methanol d) benzene e) manganese

14. Most uranium is made of the ^{238}U isotope. Which of the following statements about ^{238}U is true? **B**
- a) ^{238}U is fissile
 - b) ^{238}U is radioactive with a very long half life**
 - c) ^{238}U is not radioactive but can be made into radioactive ^{239}Pu by exposure to neutrons
 - d) ^{238}U slowly converts into ^{235}U over time
 - e) None of the above
15. Which of the following is **NOT** related to the absorbed radiation dose? **D**
- a) Gray (Gy)
 - b) Roentgen (Rg)
 - c) REM
 - d) Becquerel (Bq)**
 - e) Sievert (Sv)
16. What is the main source of natural background radiation for people living at sea level? **B**
- a) Gamma rays from space
 - b) Radon gas**
 - c) Potassium in food and water
 - d) Potassium in concrete, soil and stone
 - e) Uranium ores
17. Which country currently leads the world in uranium ore production? **D**
- a) France
 - b) US
 - c) Canada
 - d) Kazakhstan**
 - e) South Africa
18. Which of the following gases is a precursor to acid rain? **C**
- a) CO
 - b) CH_4
 - c) SO_2**
 - d) ozone
 - e) none of the above
19. Photochemical smog, particularly the brown haze seen over major cities, is mainly due to: **A**
- a) High NO_2 and ozone concentrations**
 - b) Condensation
 - c) Methane
 - d) CO
 - e) None of the above
20. Scrubbers to remove SO_2 gas take advantage of what feature of this molecule? **A**
- a) It is acidic and reacts with base**
 - b) It is basic and reacts with acid
 - c) It is easily charged and therefore removable by electrostatic methods
 - d) It has very low volatility and can be condensed out
 - e) None of the above

21. **CFC's** are (or were): **E**
- a) Chlorofluorocarbons
 - b) Used as refrigerants
 - c) Used as aerosol propellants in spray cans
 - d) Believed to be responsible for destruction of the stratospheric ozone layer
 - e) **All of the above**
22. **Freon-12** has the formula: **B**
- a) CFCl_3
 - b) **CF_2Cl_2**
 - c) CHCl_3
 - d) $\text{CFCl}_2\text{CCl}_3$
 - e) C_2F_4
23. **Ozone** in the stratosphere is consumed by a dark (*non-photochemical*) reaction with what? **A**
- a) **Cl atoms**
 - b) F atoms
 - c) ClO
 - d) intact CFC molecules
 - e) none of the above
24. **HCFC's** differ from the original CFC's in what way? **E**
- a) Contain double bonds
 - b) Contain no chlorine
 - c) Contain bromines
 - d) Contain no hydrogens
 - e) **None of the above are strictly true**
25. Which gas has the **largest global warming potential** at **equal** concentrations? **C**
- a) CO_2
 - b) CH_4
 - c) **N_2O**
 - d) N_2
 - e) O_2

END