ENVS 1042 FINAL EXAM Sum'15 7/28-7/31

1. What is the largest reservoir of fresh water? _____
   a) land ice b) lakes c) ground water
   d) soil moisture e) rivers

2. If the average precipitation over North America is 30", how much infiltrates into ground water? _____
   a) 0.1" b) 8.9" c) 21" d) 9"

3. "ET" refers to _____
   a) extra-terrestrial b) pan evaporation
   c) infiltration d) evaporation plus plant respiration

4. A phreatophyte is a _____
   a) desert plant b) prairie plant c) mountain plant d) city plant
   e) any of the previous as long as the plant roots can reach water

5. The units of basin yield are _____
   a) acre-feet b) cubic feet c) cubic feet per second d) gallons

6. A drainage basin is _____
   a) a cave b) a pit for oil field waste
   c) all land that contributes water to a stream d) rooftop rainwater collection basin

7. The amount of water that city planners consider adequate for a family of 4 for one year is _____
   a) 900 gallons b) 223 gallons per day
   c) 4 acre-feet d) one acre-foot

8. An example of non-consumptive water use is _____
   a) household + agriculture b) agriculture + industry
   c) household+ industry d) toilet flushing

9. A flood with a Recurrence Interval (R) of 100 years will occur during every approximately100 years T F

10. "Greenbelting of urban areas tends to make floods _____
    a) last longer, lower crest b) "flashy", lower crest
    c) Last longer, higher crest d) "flashy", higher crest

11. The total amount of dissolved mineral material in water is called _____
    a) Total dissolved solids b) Chemical oxygen demand
    c) Biological oxygen demand d) Suspended load

12. "Hard water" refers to _____which has properties of _____ _____
    a) distilled water, not good to drink
    b) water high in Ca^{2+} and Mg^{2+}, coagulates soap
    c) water high in Na^{+} and K^{+}, tastes salty d) ice, you can skate on it

13. The toxic heavy metals released into streams by acidic mine drainage are _____
    a) calcium (Ca), sodium(Na), uranium (U), zinc (Zn)
    b) magnesium (Mg), sulphate (SO_4^{2-}), Cd, HCO_3^-
    c) sodium, calcium, bicarbonate (HCO_3^-)
    d) cadmium (Cd), lead (Pb), zinc (Zn), iron (Fe)

_____

14. Another term for "parts per million" is _____
    a) milligrams/liter b) micrograms/liter
    c) 1/10,000 d) 1/1,000,000,000

15. Acidity (pH) is the term used for the amount of H^+ dissolved in water.
    On the pH scale, which is slightly acidic? (same pH as rainwater)
    a) 5.6 b) 7.2 c) 1 d) 9 _____

16. "Aquifer" refers to _____
    a) Underground river
    b) A subsurface unit with adequate porosity to hold a useable amount of water
    c) A subsurface unit with adequate porosity to hold water and good permeability (flow)
    d) A water-loving plant

17. Organic compounds such as gasoline, oil, and asphalt _____
    Are released into the groundwater by a process whose acronym is
    a) USEPA b) LNAPL c) DNAPL d) LUST

18. The standard waste water treatment (primary and secondary) T F
    Consists of filtration, aerobic digestion, sludge removal,
    BOD removal, and chlorination to disinfect.

19. Common pharmaceuticals such as antibiotics, anti-depressants, T F
    and estrogens (birth control pills) are not removed during
    ordinary wastewater treatment. One evidence for this is predominantly
    female fish populations below municipal water treatment plants

20. In Lake Powell, salinity is increased by _____
    a) siltation b evaporation
    c)) bank storage d) pumping water to Los Angeles

21. Energy is defined as
    a) Work/time b) Force x distance _____
    c) Ability to do work d) Get up and go

22. The Watt is a unit of _____
    a) work b) power c) steam d) hours

23. Coal is
    a) The compressed remains of ancient plants b) from dinosaurs _____
    c) forests that got buried in a sand dune d) ancient sea creatures

24. Rank of coal refers to
    a) how old it is b) How much energy it contains _____
    c) How much natural gas it contains d) how much oil it has in it

25. The highest rank coal is
    a) bituminous b) lignite c) anthracite d) captain _____

26. Grade of coal refers to
    a) the amount of energy in the coal b) the amount of impurities in the coal _____
    c) How many points you get in ENVS 1042 d) the ease of mining

27. A high rank coal of low grade is worth more than a low rank coal of high grade T F

28. Air pollution from coal burning includes many toxic trace heavy metals such as mercury, arsenic, selenium, and uranium. T F

29. Coal burning produces over 100% of carbon emissions in the world. T F

30. What is the efficiency of a coal-fired power plant?
a) 5% b) 34% c) 85% d) 95% _____

31. Which is more efficient?
a) gasoline motor b)an electric motor _____
c) incandescent light bulb d) human being

32. A method for getting rid of CO_2 is called "sequestration" by pumping CO2 back into the deep rocks of oil fields, thus putting it into the long-term reservoir rather than the short-term, bioavailable reservoir of the atmosphere. T F

33. Why is putting excess CO_2 back into the oceans (very easy to do) not a good idea environmentally? _____
a) it makes the oceans fizzy b) it raises the pH of the oceans
c) it lowers the pH of the oceans d) it just goes away

34. How would you explain to someone how the exponential function enables us to better predict the future of the coal/oil resource? _____
a) it explains the biomass of oil b) it's just a math trick to scare us
c) it explains how quickly a resource can be depleted d) it's only for experts

35. The biggest "weasel words" in talking of the lifetime of a resource are "At present rates of consumption". That means at 0% increase of production. T F

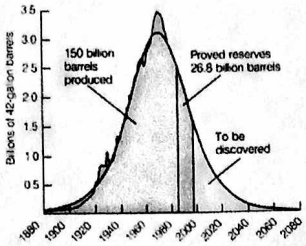
36. Oil and gas reserves are most abundant in which area of the world? _____
a) the Middle East b) USA c) Canada d) Russia

37. Solid or semi-solid forms of oil are found in oil shale and in tar sands. A major drawback to extracting this resource is the environmental damage. T F

38. What is the composition of the "natural gas" used as fuel? _____
a) "organic" gasoline b) methane
c) ozone d) carbon dioxide

39. How much energy does natural gas supply to the world? _____
a) 10% b) 24% c) 75% d) 95%

40. The newest, biggest, natural gas resource is from "tight shales". In tight shales, the gas will not flow to the well head. The industry technique to enable extraction of the resource is?
a) Deep water injection b) Hydraulic fracturing and horizontal drilling _____
c) Earthquakes d) mining the rock



41. What does the peak of the curve represent? _____
    a) When we get tired of driving our cars
    b) the point at which 50% of the oil is used up
    c) nothing at all, oil is infinite
    d) C+ grades

42. The ratio of ^{238}U to ^{235}U in naturally-occurring uranium is 10:1. T F

43. Which isotope is fissionable? _____
    a) ^{238}U b) Tritium c) Radon d) ^{235}U

44. How long does a site need to be stable geologically to be suitable for high-level waste disposal? _____
    a) 50,000 years
    b) a billion years
    c) a million years
    d) forever

45. Intermittency of supply is a problem with many alternative forms of energy generation, especially with wind and solar energy. Solutions to that problem are: _____
    a) Only use power when the wind blows or the Sun shines
    b) Put excess energy into the main energy grid system or into batteries
    c) Use fossil fuel as a back-up
    d) a) and b)
    e) b) and c)

46. The burning of coal, biomass, oil, as well as fission, fusion, and geothermal systems all have in common that the heat is used to generate steam, and most power plants are therefore giant steam engines T F

47. Drawbacks to biomass conversion to ethanol as a fuel supply are that it _____
    a) Provides 10% less energy from ethanol than regular gasoline
    b) causes less air pollution
    c) is sustainable
    d) may detract from food production by using prime farmland if corn is used
    e) a) and d)

48. Photovoltaic cells can convert sunlight to electrical energy at an efficiency of…
    a) 1% b) 5% c) 15% d) 100% _____

49. Geothermal energy production is _____
    a) limited to suitable areas
    b) may be polluting
    c) noisy
    d) a, b, and c

50. Fusion energy is _____
    a) The combining of light elements under great temperature and pressure to form a heavier element, releasing a huge amount of energy in the process.
    b) The same reaction that is found in the Sun and the H-bomb.
    c) Technologically easy; we will have fusion energy soon and all our problems will be over
    d) a and b
    e) All of the above