Arch 463
ECS
Fall 2015 Name_____

Midterm I

30 Multiple Choice Questions

1. Humanity's ecological footprint first exceeded the earth's biological capacity in the
   - A. 1950s
   - B. 1970s
   - C. 1980s
   - D. last decade

2. There is an interesting correlation between the location of the cities for which mayors have signed the agreement to meet or exceed the Kyoto Pact targets and
   - A. the location of nuclear power plants
   - B. the location of LEED Platinum and Gold certified buildings
   - C. the location of state funded universities
   - D. none of the above

3. Who among the following has spoken strongly in favor of mitigating global warming?
   - A. Ed Mazria
   - B. Pope Francis
   - C. Pope Benedict
   - D. all of the above

4. The Climate Consultant is a powerful site analysis tool because
   - A. it gives easy to interpret graphic representations of climate data
   - B. it can analyze over 2,000 climates worldwide
   - C. you can focus your analysis, e.g. compare Wind Wheels for June and October
   - D. all of the above

5. On-site site analysis can be aided by
   - A. sun path charts on which to plot solar obstructions
   - B. hand-held environmental measurement instruments
   - C. careful observation of vegetation and topography
   - D. all of the above

6. On what day of the year does the sun rise at the same time of day in San Diego and Moscow (Moscow is due north of San Diego)?

A. the summer solstice
B. the fall equinox
C. the winter solstice
D. never

7. To easily understand the sun's interaction with a building of complex geometry

A. you could use an LOF Sun Angle Calculator
B. you could use an elevational sun chart
C. you could use a physical model and a heliodon
D. all of the above

8. Prevailing winds are caused by

A. the earth's shape and rotation on axis
B. large bodies of water (oceans!)
C. the earth's tilt and path around the sun
D. none of the above

9. An operable window is categorized as

A. a filter to sun and light
B. a switch to breeze and ventilation
C. a barrier to rain
D. all of the above

10. The microclimatic differences at Steptoe Butte are caused by its topography, sun exposure, and

A. spring-fed streams
B. prevailing winds
C. the city effect of nearby Spokane
D. all of the above

11. Thermal breezes are inherent to
    A. the city effect
    B. the valley effect
    C. on-shore and off-shore breezes
    D. all of the above

12. A design strategy that can help mitigate the city effect is implementing
    A. transit-oriented design
    B. energy-efficient design
    C. on-site water retention
    D. all of the above

13. In the Pacific Northwest, Moscow's milder than expected winters and Sequim's more arid than expected climate
    A. are caused by prevailing winds and topography
    B. are explained by proximity to the Pacific Ocean
    C. are the result of El Niño
    D. all of the above

14. The most humid microclimate found at Steptoe Butte is located
    A. at the base of the butte
    B. at the summit
    C. in the northeast quadrant
    D. none of the above, it's all very dry

15. In a single family residence the loads that most determine the extent of heating season are
    A. generated by low outdoor temperatures
    B. generated by occupants
    C. generated by lights and equipment
    D. all of the above

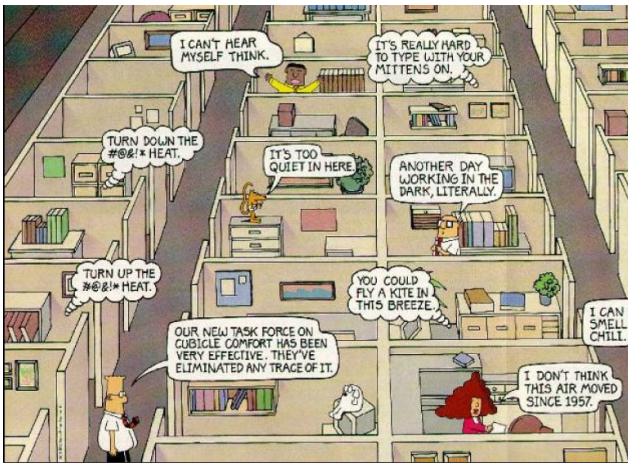
16. Balance point temperature analysis of a building helps identify
    A. effective shading strategies
    B. heating and cooling seasons
    C. the EUI of the building
    D. all of the above

17. Creating future climate files is important because
    A. even TMY3 climate data is historic
    B. future building performance can be modeled
    C. today's new buildings will survive well into the future
    D. all of the above

18. Modeled Energy Use Intensity (EUI) calculations can help
    A. compare efficiency of similar building types
    B. determine an energy budget for on-site generation
    C. determine if the building can meet Architecture 2030 goals
    D. all of the above

19. Villages of stand-alone single-family dwellings is a common vernacular response to
    A. hot arid climates
    B. hot humid climates
    C. cold climates
    D. all of the above

20. Dynamic forms that can respond to changes in weather are most important in
    A. hot arid climates
    B. hot humid climates
    C. temperate climates
    D. cold climates



21. What determines comfort in an office building?
    A. ASHRAE Standards
    B. the thermostat
    C. the occupants
    D. architectural design

22. ASHRAE Standard 55, adaptive comfort, asserts that
    A. 80% of occupants will be comfortable at 72ºF
    B. occupants will be comfortable at higher temperatures with higher CLO levels
    C. naturally ventilated building are comfortable at higher summer temperatures than mechanically cooled buildings
    D. all of the above

23. A passive solar heated home
    A. must maximize south aperture
    B. must balance winter solar gain with thermal mass heat storage
    C. will overheat in the summer
    D. all of the above

24. The easiest façade to shade so it excludes all summer sun is the
    A. East
    B. South
    C. West
    D. North

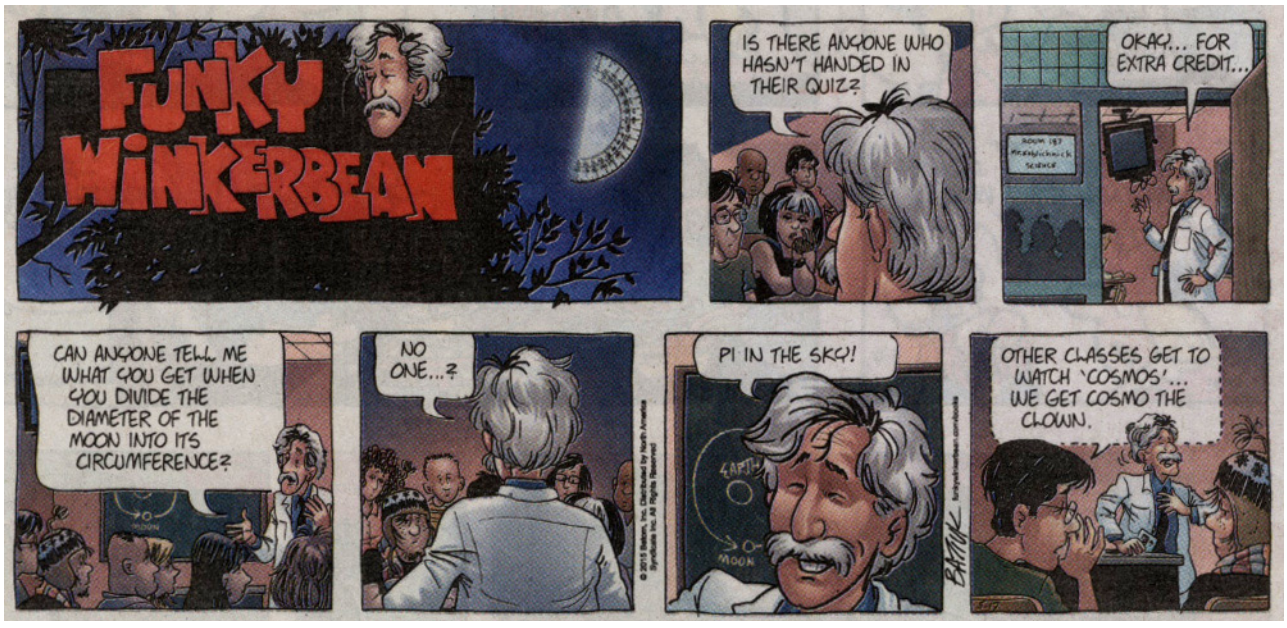
25. Native deciduous trees can act as an effective shading device
    A. only on the south side of the building
    B. because their amount of foliage is sensitive to the shift of the overheated period toward the fall
    C. because they also provide evaporative cooling
    D. all of the above

26. Technological improvements in glazing since the 1930s have
    A. improved glass' R-value
    B. minimized thermal bridges
    C. decreased SHGCs
    D. all of the above

27. 2.75" thick Kalwall with Silica Aerogel insulation
    A. has an R-Value of about 20
    B. is almost crystal clear
    C. is unfortunately a poor source of daylight
    D. all of the above

28. The R-Value of a composite wall of three materials with U-Values of 0.2, 0.25, and 0.5 is
    A. 0.95
    B. 1.05
    C. 11
    D. 13.33

29. Placing insulation on the exterior of a CMU wall is advantageous because
    A. it eliminates thermal bridges through the block
    B. it activates the block's thermal mass capability
    C. it places the dew point temperature in the insulation level rather than in the block
    D. all of the above



30. Stack ventilation can be greatly improved by
    A. allowing solar gains in the stack
    B. external ventilation inlets at the bottom of the stack
    C. increasing the diameter of the stack
    D. all of the above