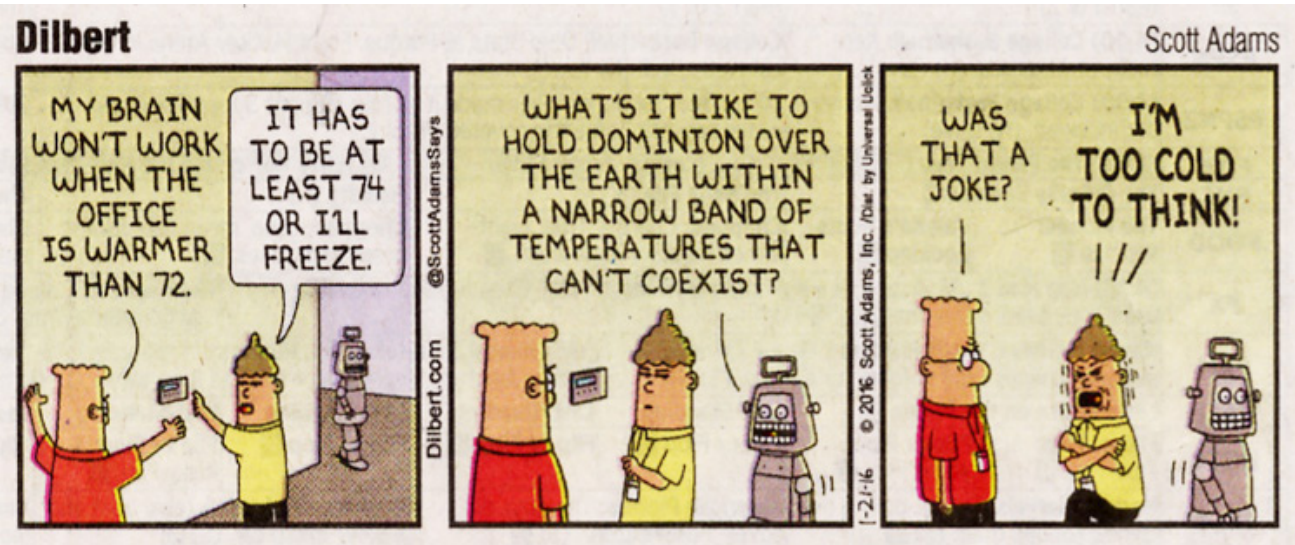
Arch 463
ECS
Fall 2016 Name_____

FINAL

40 Multiple Choice Questions

Part 1—Review Questions on material covered in Midterms I & II



1. The Climate Consultant is a powerful site analysis tool because
   A. it plots your climate on the psychometric chart
   B. it prioritizes appropriate passive strategies
   C. it allows you to view wind wheel data for selected seasons or months
   D. all of the above

2. An architect has located her new building in the optimal position on a hillside in a temperate climate, it's sited
   A. at the hilltop
   B. on the brow of the hill
   C. near the middle of the hillside
   D. at the foot of the hill

3. The thermal load on a building that is not beneficial to passive design during both summer and winter is
   A. conduction
   B. infiltration/ventilation
   C. radiation
   D. none of the above

4. Plotting seasonal diurnal balance point temperatures for each thermal zone of a building helps identify
   A. differing effective passive strategies
   B. the adaptive comfort zone
   C. the EUI of the building
   D. all of the above

5. In order to achieve comfort on a cold, cloudy winter night, a person must
   A. lose a bit of heat to the environment
   B. gain a bit of heat from the environment
   C. have an elevated metabolism rate
   D. none of the above

6. A proven vernacular response to a hot arid climate is
   A. high thermal mass
   B. night ventilation
   C. shading
   D. all of the above

7. The currently popular Passive House movement favors
   A. the light and tight philosophy
   B. the mass and glass philosophy
   C. a combination of both of the above
   D. none of the above

8. To meet the Architecture 2030 Challenge, a building to be built in 2025 must
   A. be carbon neutral
   B. consume no more than 10% of fossil fuel-generated energy of an average building of its type
   C. consume no more than 30% of fossil fuel-generated energy of an average building of its type
   D. consume no more than 50% of fossil fuel-generated energy of an average building of its type

9. Delaying thermal modeling of building performance until all design issues are resolved
   A. gives very accurate measurement of energy efficiency
   B. ensures high performance in future climates
   C. assures optimal design was attained
   D. none of the above

10. The best weather files for modeling a proposed building's performance are
   A. TMY files
   B. TMY2 files
   C. TMY3 or EPW files
   D. EPW files morphed to model the 2020 climate

11. Vertical exterior fins on a north-facing curtain wall can
    A. provide effective shading
    B. aid natural ventilation for a room with only north windows
    C. maintain good views
    D. all of the above

12. In a glass curtain-wall high-rise, adjacent rooms with similar thermal needs can be in the same thermal zone if
    A. they are on the same floor
    B. they have the same orientation
    C. they are on different floors
    D. all of the above

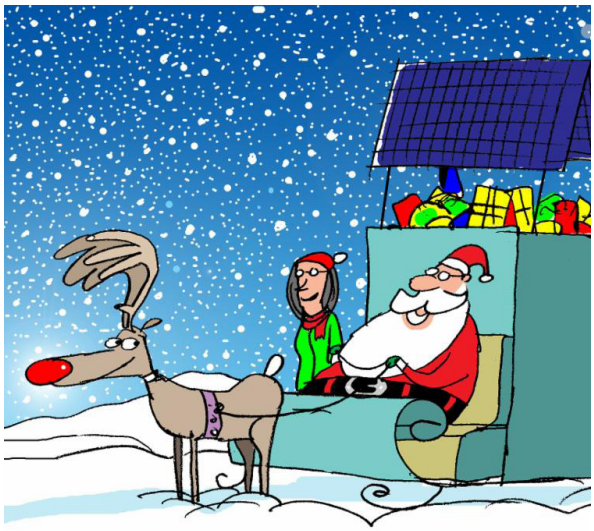
13. Dynamic facades are most effectively oriented to
    A. the south
    B. the north
    C. the east and west
    D. all of the above are equally effective

14. HEED modeling of passive performance of the Brillhart House showed that shifting the elongated axis from N-S to E-W would
    A. greatly improve passive performance
    B. reduce the average high indoor temperature in the summer
    C. make winter indoor temperatures much higher
    D. none of the above

15. Richard Rogers' Chiswick Park development is analogous to Village Homes in that
    A. it focuses on solar shading
    B. it separates vehicular and pedestrian traffic
    C. it captures storm water in cisterns
    D. all of the above

16. The Clearwater Times building in Florida features a solar roof for
    A. absorptive space cooling
    B. direct space heating
    C. electricity generation
    D. all of the above

17. The active solar collectors that must track the sun's motion for maximum efficiency are
    A. concentrating collectors
    B. building-integrated flat plate collectors
    C. evacuated tube collectors
    D. none of the above



"Since I went solar, I'm spared the gas emissions."

18. The common feature of active systems in the Mayhew house and the Bevans house is
    A. air collectors
    B. thermal mass heat storage
    C. radiant heating
    D. none of the above

19. The most effective energy conservation feature of the Illinois Center in Chicago by Helmut Jahn is
    A. its 17-story atrium space for solar gain
    B. its effectively daylighting scheme
    C. its off-peak electrical use to make big blocks of ice
    D. all of the above

20. Roof-top PVs are used to generate electricity at
    A. the Crystal in London
    B. NASA Sustainability Base
    C. the California Academy of Sciences
    D. all of the above

Part 2—Questions on New Material

21. A Greek Hypocaust heating system is most similar to
    A. a wood burning stove
    B. a forced-air furnace
    C. a hydronic radiant slab
    D. a displacement ventilation system

22. To achieve high performance cooling in summer months in hot, humid Houston, Texas, a heat pump could be
    A. air-coupled
    B. ground-coupled
    C. replaced by a swamp cooler
    D. any of the above

23. The size and capacity of an HVAC system can be reduced by
    A. good passive design
    B. using water to deliver heat or coolth
    C. specifying a VAV system
    D. none of the above

24. For a large mixed-use building the ideal HVAC system would be
    A. single duct reheat
    B. double duct
    C. single duct variable volume (VAV)
    D. three-pipe

25. To save energy and maintain comfortable indoor air conditions you'd design the HVAC system to include
    A. an energy wheel
    B. an economizer
    C. a set-back thermostat
    D. all of the above

26. The HVAC cooling tower at Boston City Hall is integrated into the design scheme
    A. by placing it in a pavilion on the roof
    B. by using the atrium entry space as an air plenum
    C. by treating it as a decorative site element
    D. by reducing its size via passive design

27. You're designing a 45-story office building, so you should plan for
    A. a rooftop mechanical space
    B. a mid-building (23rd floor, perhaps) mechanical floor
    C. a basement mechanical space
    D. all of the above

28. Strategies for integrating HVAC systems in buildings include
    A. integration with lighting systems
    B. integration with structural systems
    C. expressing the HVAC as a design element
    D. all of the above

29. The roof cowls at Arup Campus in Solihull are designed to
    A. provide daylighting
    B. enhance cross-ventilation
    C. give user control of indoor conditions
    D. all of the above

30. The white shading louvers on the SW facade of the north-most Arup Campus building
    A. are controlled by the building management system
    B. are user controlled
    C. are controlled by the building management system with user override
    D. none of the above

31. Above normal levels of _____ can lead to poor indoor air quality.
    A. off-gassing from book bindings
    B. radon
    C. volatile organic compounds
    D. all of the above (below)

32. The sick building syndrome can best be mitigated by
    A. providing mechanical ventilation
    B. allowing natural ventilation
    C. both of the above
    D. none of the above

33. The common factor in compression and in absorption cooling is
    A. use of heat pumps
    B. lack of cooling towers
    C. heat transfer through change-of-state
    D. none of the above

34. Intelligent buildings
    A. rely completely on the BMS for HVAC control
    B. do not use passive strategies
    C. require a focus on the building core
    D. none of the above

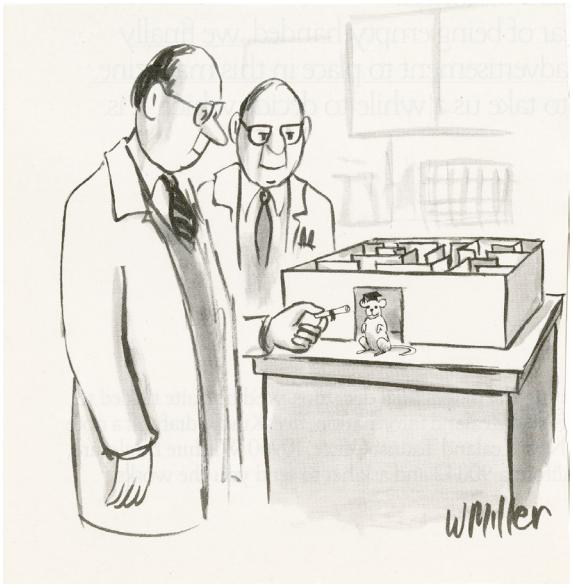
35. Which of these British green buildings generates no on-site energy?
    A. The Crystal
    B. Scottish Parliament
    C. John Hope Gateway
    D. London City Hall

36. Like many green buildings London City Hall features
    A. an on-line dashboard that reports building performance
    B. a PV-roof
    C. operable windows
    D. all of the above

37. The most common type of vertical circulation for steep sites is
    A. a wheel
    B. a funicular
    C. an elevator
    D. a gondola

38. Which of the following elevator types is most feasible for a high-rise building of 20 stories or more

A. traction
B. hydraulic
C. rack and pinion
D. all of the above



39. Post occupancy evaluation (POE) is most effective

A. before commissioning
B. just after commissioning
C. about 1 year after occupancy begins
D. when done periodically over the life-span of the building

40. POE considers

A. energy use metrics from bills or meters
B. on-site measurements
C. occupant surveys
D. all of the above

Done now! Have a happy and restful holiday!