Arch 463
ECS
Fall 2003 Name_____

FINAL

40 Multiple Choice Questions

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

1. During the summer the comfort zone is
   A. warmer than the winter's comfort zone
   B. cooler than the winter's comfort zone
   C. expanded by evaporative cooling in hot humid areas
   D. constricted by lower summer clo

2. In temperate zones in the Southern Hemisphere the coldest day is most likely to be
   A. in May
   B. in August
   C. in October
   D. in January

3. The Horse Latitudes or doldrums are characterized by prevailing winds from the
   A. southwest
   B. northeast
   C. northwest
   D. none of the above

4. Moscow's wet and relatively mild winters are caused by
   A. a continental influence
   B. prevailing winds that seep through the Columbia River Gorge
   C. the city's solar orientation
   D. all of the above

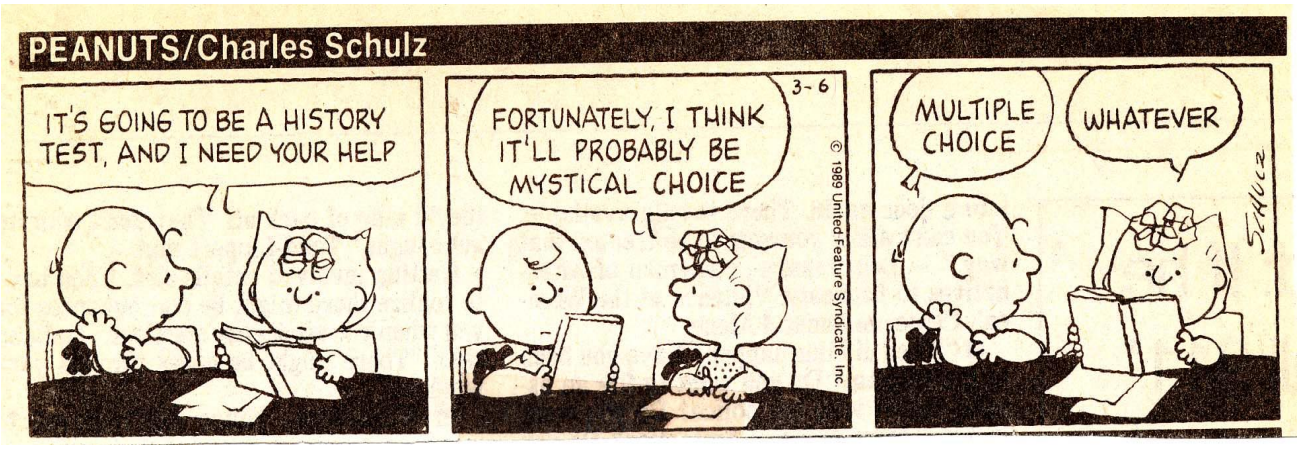
5. A Vital Signs Case Study is a valuable exercise
   A. only when the hypothesis is proven true
   B. only when the hypothesis is written well
   C. only when the hypothesis is proven false
   D. in and of itself, regardless of the truth or falsity of the hypothesis

6. In Melbourne, Australia the sun (potentially) shines on the south facade of each building
   A. only on the June equinox
   B. only on the December solstice
   C. from March 22 to September 21
   D. from September 22 to March 21

7. In Christian Norberg-Schultz's barrier-filter-connector-switch terminology a modern double-skin building like the Hooker Chemical building in Niagara Falls is
   A. connector dominated
   B. barrier dominated
   C. filter dominated
   D. a combination of all of the above

8. If a Spokane building's balance point temperature is 45°F,
   A. it's skin dominated
   B. it requires cooling all winter
   C. it's internally dominated
   D. it's a good passive design

9. In a straw bale wall, the bales have a U-value of 0.03 while the inner and outer plaster finishes have U-values of 0.1. The total R-value of the wall without considering inside and outside still air films is about
   A. R-4
   B. R-8
   C. R-35
   D. R-50



10. The passive solar system most suitable for an IDL building is
    A. direct gain
    B. indirect gain
    C. daylighting
    D. none of the above

11. The glazed aperture that will gain more heat in winter than in summer is
    A. west-facing
    B. east-facing
    C. south-facing
    D. all of the above

12. An external shading device that is guaranteed to provide total shading for a west-facing window is
    A. a west-facing egg-crate
    B. a horizontal overhang
    C. fixed vertical fins
    D. none of the above

13. Vernacular architecture in temperate climates with hot-humid summers indicate that a viable strategy for passive cooling is
    A. stack ventilation
    B. shading
    C. separation of thermal zones
    D. all of the above

14. The most effective physiological cooling in courtyard buildings in hot arid climates is provided by
    A. trees and shrubs
    B. fountains
    C. the clear night sky
    D. masonry surfaces

15. Seasonal storage of thermal energy can be done in
    A. a rock bed
    B. a water tank
    C. the earth beneath a house
    D. all of the above

16. The most efficient orientation for the solar aperture of a direct gain house is
    A. due east
    B. due south
    C. due west
    D. southwest

17. A Larsen truss wall provides
    A. extra structural rigidity
    B. insulation exterior to the thermal mass wall
    C. a superinsulated envelope
    D. all of the above

18. The single pane glazing that reduces reradiation to the outside environment the most is
    A. clear glass
    B. blue-green glass
    C. gray glass
    D. bronze reflective glass

19. Double skin walls can be effective on the
    A. south facade
    B. west facade
    C. east facade
    D. all of the above

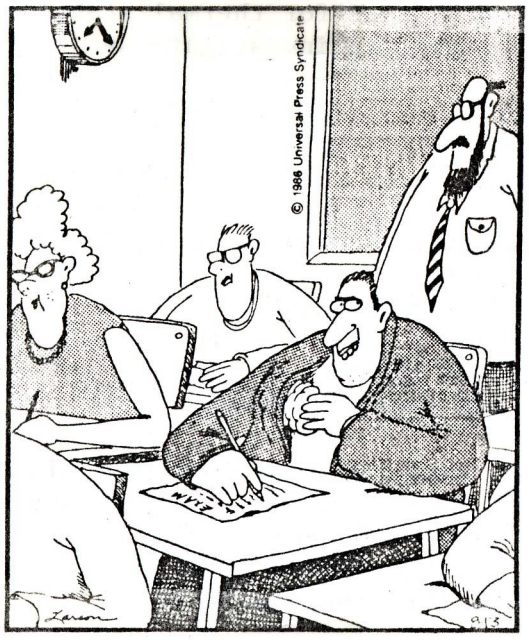
20. Bed Zed is an example of a residential complex that
    A. generates all its electricity from photovoltaics
    B. gives residents an opportunity to live sustainably
    C. uses Thrombe walls
    D. all of the above

Part 2—Questions on New Material

21. A building could be termed "sick" if it
    A. has humidity levels above 60%
    B. contains a low percentage of radon gas
    C. has mold growing in insulated walls
    D. all of the above

22. The remedy for sick buildings is
    A. natural cross ventilation
    B. positive ionization
    C. anti-oxidants
    D. all of the above

23. An intelligent building in Austria that features ergometric workstations with individual control of heating, cooling, lighting, and background noise would be characterized as the
    A. American approach
    B. Japanese approach
    C. European approach
    D. British approach



Midway through the exam,
Allen pulls out a bigger brain.

24. A recent building that is both environmentally friendly and intelligent is
    A. Arup Campus at Solihul, UK
    B. Comerzbank Frankfort
    C. Chesapeake Bay Foundation HQ
    D. all of the above

25. A heating system that provides warm feet and cool heads is
    A. the Greek hypocaust
    B. the Korean K'ang
    C. Frank Lloyd Wright's radiant slabs for Usonian houses
    D. all of the above

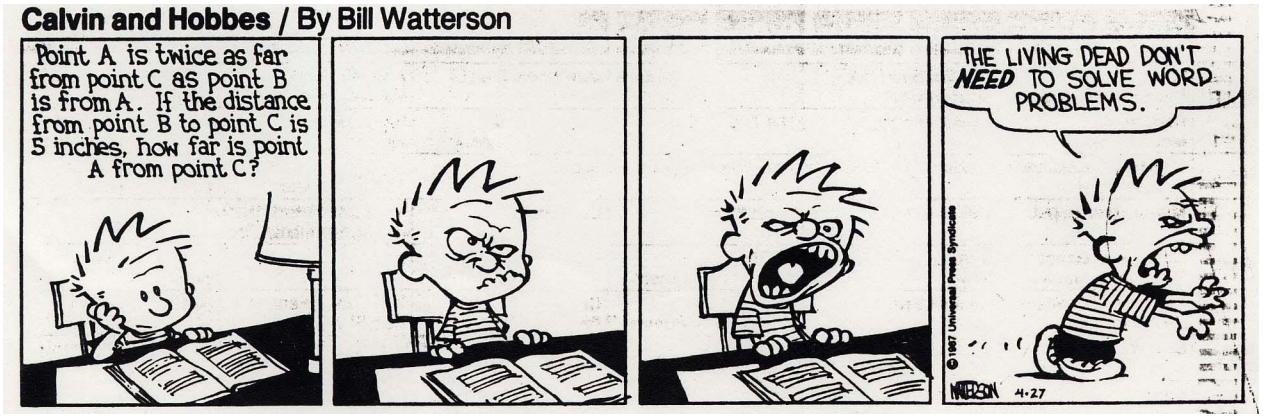
26. To solve the problem of a fireplace causing infiltration that chills your backside when you face the fire, you should
    A. place extra thermal mass in the flue
    B. supply combustion air directly to the firebox
    C. install a heatalator
    D. specify a ventilated glass door assembly to enclose the firebox

27. Modern forced-air furnaces are more energy efficient that older models because
    A. they burn natural gas rather than fuel oil
    B. they use high speed fans to distribute the heated air
    C. heat is extracted from the air that is expelled up the flue
    D. all of the above

28. Your local Walmart or Office Depot is most likely to be heated and cooled by
    A. a direct expansion (DX) system
    B. a variable air volume (VAV) system
    C. a multisense system
    D. any of the above

29. The best candidate for externally mounted supply ducts is
    A. an all air dual duct system
    B. an air/water high velocity dual duct system
    C. a four-pipe system
    D. all of the above

30. The HVAC component that provides conditioned fresh air to the heater or chiller is the
    A. energy exchange wheel
    B. economizer
    C. both of the above
    D. none of the above



31. The HVAC component that can be treated as an aesthetic element when integrated in the building design is

A. the cooling tower
B. the mechanical floor(s)
C. the duct work
D. all of the above

32. Among the earliest examples of HVAC integration is

A. Wright's Larkin Building
B. Kahn's Richards Labs at Penn
C. Corbu's United Nations Building
D. Rogers and Botta's Pompidou Centre

33. You can almost determine the enthalpy of an air mixture if you know

A. the dry bulb temperature
B. the wet bulb temperature
C. the relative humidity
D. the humidity ratio

34. An energy exchange wheel allows you to plot a diagonal on the psychrometric chart because

A. it removes moisture from the air
B. it adds heat to the air
C. it removes heat and adds moisture
D. it exchanges heat and water between fresh and exhaust air

35. The mechanical cooling system that is driven by a hygroscopic salt solution is

A. absorption cooling
B. compression cooling
C. evaporative cooling
D. all of the above

36. The mechanical cooling system that doesn't require a cooling tower is
    A. absorption cooling
    B. compression cooling
    C. geoexchange cooling
    D. evaporative cooling

37. Rogers' Chiswick Park is characterized by its
    A. roof-mounted mechanical cooling systems
    B. multitude of expressive shading systems
    C. buildings with entry atriums
    D. all of the above

38. Chiswick Park's automated awnings are mounted on
    A. all facades
    B. all east and west facades
    C. only facades that have no horizontal shading devices
    D. all south facades

39. The most economical elevator for a four-story National Park building sited on a granite ridge with about two feet of soil is
    A. hydraulic
    B. electric traction
    C. platform
    D. escalators

40. The elevator in Pei's pyramidal addition to the Louvre is
    A. hydraulic with a hidden tank room
    B. traction with hidden penthouse
    C. a new invention
    D. none of the above

Have a happy holiday!