

Arch 463
ECS
Fall 2001

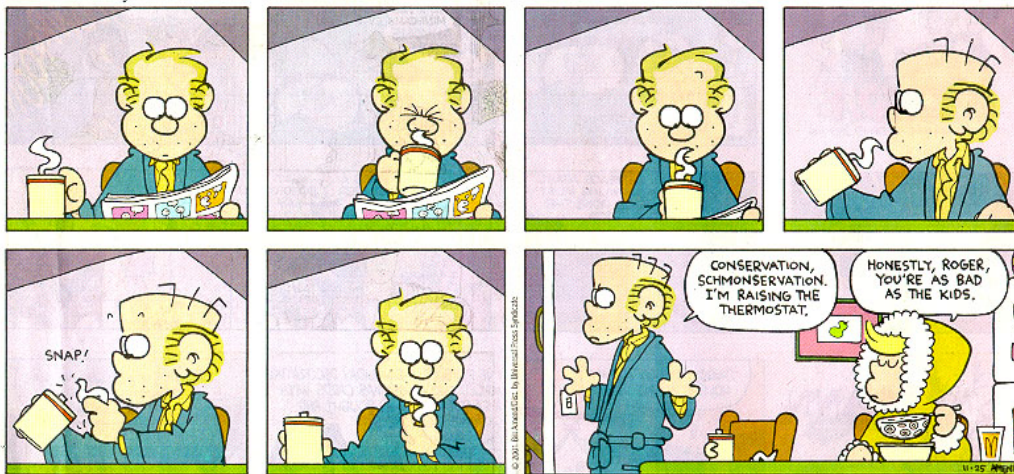
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FINAL

40 Multiple Choice Questions

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

FOXTROT/ by Bill Amend



1. Passive systems for environmental control
 - A. can enhance human comfort in buildings
 - B. require engineers for their design
 - C. lower first costs for all buildings
 - D. all of the above

2. A resident of Baton Rouge, Louisiana, relaxing on a park bench on a hot August afternoon can enhance comfort by
 - A. convection
 - B. seeking shade
 - C. reduced metabolism
 - D. any of the above

3. In a manner analogous to your metabolism, an internally dominated, curtain-walled skyscraper gains heat through
 - A. solar radiation
 - B. location in a warm/hot environment
 - C. the people, lights, and machines that occupy it
 - D. all of the above

4. A skin dominated load building will have a balance point temperature
- above 80°F
 - just below the shading line temperature
 - near 45°F
 - below freezing
5. Vernacular architecture of a region can give modern architectural designers examples of
- appropriate high tech materials
 - workable passive heating and cooling strategies
 - high-style design initiatives
 - none of the above
6. In a hot arid Northern hemisphere climate, on a south-facing slope, the best location for a passively heated and cooled residential building is
- on the hill crest
 - at the brow of the hill
 - just below mid slope
 - at the foot of the hill
7. The thermal winds caused by a large city
- blow diurnally east and west
 - always blow toward the city center
 - are more powerful than prevailing winds
 - none of the above
8. In Panang, Malaysia, (5°NL) the first day next year that you can photograph the sun illuminating the true north-facing wall of Ken Yeang's high-rise is
- January 1
 - March 1
 - March 22
 - June 22
9. You can determine the radiant temperature of wall in an actual building with
- a Kestrel weather meter
 - a spot pyranometer
 - a gray HOBO Temp/RH
 - all of the above



10. An open office floor in a high-rise that has a glazed north and south facade with buffer spaces on the east and west most likely has
- A. one thermal zone
 - B. 3 thermal zones
 - C. 6 thermal zones
 - D. 9 thermal zones
11. An uninsulated concrete wall in Spokane that is earth-sheltered provides the most effective thermal comfort during
- A. the heating season
 - B. the cooling season
 - C. the transition seasons
 - D. all of the above
12. In winter the surface temperature of the inside of an exterior wall of a residence is cooler than the indoor air temperature because
- A. an insulating air film clings to the wall's surface
 - B. the wall is thermally massive
 - C. both of the above
 - D. none of the above
13. A straw bale wall can be advantageous in a passively cooled residence because
- A. of its high thermal mass
 - B. it ensures a radiant barrier is present
 - C. it has a high insulating value
 - D. all of the above
14. The northern hemisphere window orientation that delivers the most heat gain per square foot in mid winter is
- A. horizontal
 - B. west
 - C. south
 - D. southeast
15. Materials that act as effective thermal mass have
- A. the highest specific heat
 - B. the highest density
 - C. the lowest conductance
 - D. none of the above
16. To be effective a direct gain passive solar heating system must have
- A. thermal mass
 - B. night insulation
 - C. a low-e external reflector
 - D. all of the above

17. A building-integrated photovoltaic array will
- A. reduce heating energy requirements
 - B. seasonally store thermal energy
 - C. contribute electrical energy to the building
 - D. all of the above
18. Passive systems for large buildings work best when
- A. their energy is used directly
 - B. a buffer space is used to manage energy flows
 - C. their energy is stored seasonally
 - D. all of the above
19. The single pane glazing that is effective at reducing far infrared energy transmission is
- A. clear
 - B. bronze
 - C. blue-green
 - D. gray
20. The west facade of a residence with a view of the Sea of Cortez calls for a
- A. picture window offering a panoramic view
 - B. zen window that frames the view
 - C. fritted glazing on all windows
 - D. an opaque buffer wall

Part 2—Questions on New Material

21. Given a grassy courtyard with a large central shade tree in a hot arid climate. To most improve the courtyard's ability to cool its surrounding building you could
- A. add a fountain beneath the tree
 - B. pave the courtyard with masonry
 - C. remove the tree
 - D. pave the courtyard and remove the tree
22. To maximize the potential for passive cooling in a hot humid climate you should
- A. use a wrap-around verandah
 - B. employ a belvedere
 - C. shade the site adjacent to the building with trees
 - D. all of the above
23. Oak Alley plantation features a vernacular house that derives its passive cooling from
- A. a desiccant roof
 - B. an oak alley
 - C. its dog trot configuration
 - D. all of the above

24. The building type that can help mitigate the city effect is
- A. a reflectively-glazed skyscraper
 - B. an internally-dominated masonry low-rise
 - C. a multi-level parking garage
 - D. none of the above
25. The city of Stuttgart mitigates a city effect phenomenon with
- A. mandated green roofs
 - B. linear parks in the valleys, allowing wind flow through the city
 - C. a vigorous green building program
 - D. extensive use of grasscrete as paving
26. Every HVAC system for large buildings provides
- A. heating
 - B. ventilation
 - C. air-conditioning
 - D. all of the above
27. Given a hotel with distinct peaks and valleys in its occupancy patterns. The most reasonable HVAC system is
- A. direct expansion
 - B. individual units
 - C. multi-sense
 - D. four-pipe
28. The high speed dual duct air–water system takes advantage of the best characteristics of all–air and all–water systems, including
- A. reduced architectural space for the distribution system
 - B. central control over air quality
 - C. quick response to changing thermal requirements
 - D. all of the above
29. An energy exchange wheel and an economizer will allow an all-air system to
- A. control humidity centrally
 - B. cool by forced ventilation when outdoor temperatures are below the shading line
 - C. warm fresh air during the heating season
 - D. all of the above
30. On a sunny day when the temperature rises and relative humidity falls,
- A. the enthalpy stays constant
 - B. the humidity ratio remains constant
 - C. the wet bulb temperature drops
 - D. all of the above

31. The psychrometric chart can be used to
- A. do passive cooling calculations
 - B. find the dew point of air at 76°F, 53% RH
 - C. convert btus to tons of cooling
 - D. all of the above
32. The mechanical cooling system that can be used effectively to heat as well as to cool is
- A. compression
 - B. absorption
 - C. evaporative
 - D. all of the above
33. A significant advantage of ground coupling a heat pump is
- A. more efficient cooling in extremely hot weather
 - B. ability to heat more efficiently during the fall and spring
 - C. lower first cost for the system
 - D. all of the above
34. The mechanical cooling system that removes latent as well as sensible heat is
- A. compression
 - B. swamp
 - C. desiccant
 - D. all of the above
35. To perform effective cooling an absorption cooler relies on
- A. change of state
 - B. expansion of gasses
 - C. active solar energy
 - D. all of the above
36. Bill Loosely's heat pump features
- A. seasonal storage of heat while in the cooling mode
 - B. copper pipes buried beneath the frost line
 - C. radiant heating in the floor
 - D. all of the above
37. The difference between Bill Loosely's heat pump and David Drown's is that David's
- A. ground coils are beneath the basement floor
 - B. can both heat and cool
 - C. uses water in the ground coils
 - D. all of the above

38. Ken Yeang's naturally ventilated high-rise in Penang serves as
- A. an example of successful strategies for hot humid climates
 - B. a failure that must always be air-conditioned
 - C. a success that is limited to night ventilation
 - D. an economic success only
39. The mechanical components that make a major impact in large buildings include
- A. mechanical floors
 - B. cooling towers
 - C. vertical and horizontal ductwork
 - D. all of the above
40. An architect who destined the architectural expression of mechanical systems was (is)
- A. Frank Lloyd Wright
 - B. Ludwig Mies vander Rohe
 - C. Louis I. Kahn
 - D. Richard Rogers



Have a happy holiday!