

Arch 463  
ECS  
Fall 2003

Name \_\_\_\_\_

## Midterm II

### 30 Multiple Choice Questions

1. The glazed aperture orientation that will gain more heat through solar radiation in the summer than in the winter is

- A. horizontal
- B. north-facing
- C. west-facing
- D. all of the above

2. An indirect passive strategy that will be effective in a temperate climate with hot humid summers is

- A. a roof pond or skytherm
- B. daylighting
- C. a thermosiphon
- D. none of the above

3. When trees are used to create a wind barrier, they are most effective when the barrier

- A. is at least 75' wide
- B. has smaller coniferous trees or shrubs on the windward side
- C. creates a shorter, calmer eddy zone
- D. all of the above

4. Operable windows placed high on opposite walls of a 15' tall office bay are effective

- A. only if the inlet and outlet apertures are the same size
- B. because they remove the hottest air from the space
- C. only when exterior wind speeds exceed 200 feet per minute
- D. all of the above

5. External shading devices are more effective than internal shading devices because they

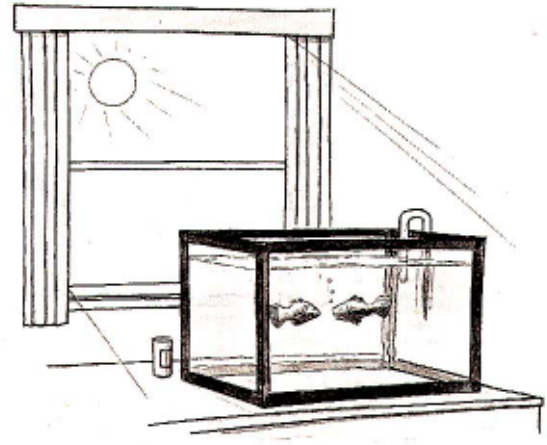
- A. cover more of the window surface
- B. only shade in the summer
- C. stop the radiation before it enters the building
- D. all of the above



6. An egg-crate shading device can be effective on a
- north-facing window
  - west-facing window
  - south-facing window
  - all of the above

7. Reduced productivity is associated with
- hot humid environments
  - cold environments
  - both of the above
  - neither too much or too little heat

8. The most effective thermal mass in a hot humid climate is
- water barrels
  - masonry walls
  - concrete floors
  - none of the above



"It's not the heat, it's the humidity."

9. Vernacular dogtrot houses are climatically effective in hot humid conditions because they
- have effective external shading devices
  - isolate high and low heat thermal zones
  - are cross-ventilated
  - all of the above
10. The belvedere in the Logan house is effective for
- cross-ventilation
  - stack ventilation
  - both of the above
  - ventilation only when the winds blow north or south
11. The type of courtyard that provides the most cooling for its adjacent building is
- a shallow one with a bare masonry floor
  - a medium deep one with potted plants
  - a deep, well-shaded one with a central fountain
  - a shallow one with a large central deciduous tree
12. A little big window approach to design
- doesn't provide adequate daylight
  - deprives occupants of views
  - is appropriate to hot environments
  - all of the above
13. Thermal mass is key to the performance of
- direct gain solar houses
  - indirect gain solar houses
  - nighttime heating in isolated gain solar houses
  - all of the above

14. To improve the performance of a Trombe wall in a passive solar residence you can install
  - A. night insulation
  - B. an external metallic reflector
  - C. thermo-recirculation vents
  - D. all of the above
  
15. Equipment that is unlikely to be included in an air collector-based active solar system is
  - A. a rock bed for seasonal heat storage
  - B. anti-freeze/surge tank protection
  - C. an air-to-water or air-to-air heat exchanger
  - D. none of the above
  
16. The common element in the Bevans house and Mayhew house is
  - A. similar solar collectors
  - B. use of remote collectors
  - C. thermal mass for seasonal heat storage
  - D. seamless integration with the back-up heating system
  
17. Helmut Jahn's State of Illinois Building in Chicago is not overwhelming successful because
  - A. its parti is similar to the Balcomb house, an SDL building
  - B. the internal loads are much larger than anticipated
  - C. it gains too much solar energy in summer
  - D. all of the above
  
18. The best of today's passive solar buildings employ
  - A. the glass and mass strategy
  - B. the light and tight strategy
  - C. computer simulation to tweak design decisions
  - D. all of the above
  
19. An advantage of superinsulated walls is
  - A. elimination of thermal bridges
  - B. ability to place vapor barrier deep in the wall
  - C. surface temperature near indoor air temperature
  - D. all of the above
  
20. Concrete masonry (CMU) walls with exterior insulation are thermally superior to those with in-cell insulation because
  - A. thermal breaks are avoided
  - B. structural and thermal requirement conflicts are avoided
  - C. the thermal mass is inside the insulated skin of the building
  - D. all of the above

21. Blue-green glass is most effective at rejecting solar energy when used
- A. as single-pane glazing
  - B. as double-pane glazing with clear glass on the inside
  - C. as double-pane glazing with clear glass on the outside
  - D. any of the above
22. An example of insulated glass is
- A. Kalwall
  - B. silica aerogel
  - C. bead wall
  - D. all of the above
23. Glass that can respond to changing sun conditions is
- A. fritted glass
  - B. electro-chromatic glass
  - C. photovoltaic glass
  - D. spectrally selective glass
24. Building integrated photovoltaics are a good idea because they
- A. double as the weather skin of the building
  - B. eliminate the need for moving parts
  - C. become a beautiful component of the building rather than an add-on
  - D. all of the above
25. The BIPVs are used for
- A. shading devices and the energy source for electric forklifts at Patagonia, Reno
  - B. shading devices at the Children's Museum in Rome
  - C. theoretically powering the electric cars at BedZed
  - D. all of the above
26. To be effective, exterior-glazed double skin walls must
- A. face south
  - B. contain solar control devices
  - C. be open to outside air only
  - D. all of the above
27. Double skin walls prove to be
- A. effective acoustic barriers
  - B. inexpensive first cost investments
  - C. fire inhibitors
  - D. all of the above

28. Earthships are effective solar houses because
- A. they're thermally massive
  - B. they're well-insulated
  - C. their apertures mainly face south
  - D. all of the above
29. After 25 years of occupancy, Village Homes most notable feature is its
- A. array of passive solar homes
  - B. lack of parking spaces
  - C. sense of community
  - D. overgrown weed-filled drainage swales
30. Chesapeake Bay Foundation's new LEED Platinum headquarters building was designed to
- A. providing adequate daylighting
  - B. recycle all its waste water
  - C. use natural ventilation year-round
  - D. all of the above

