

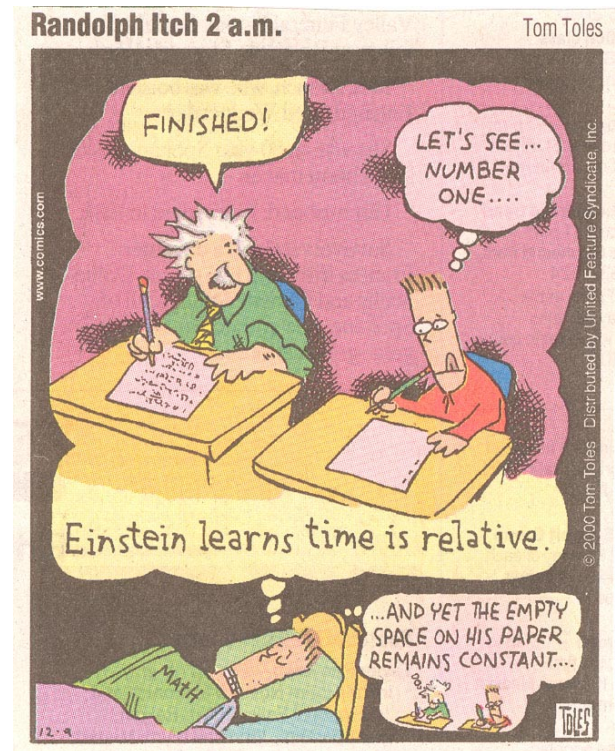
Arch 463  
ECS  
Fall 2004

Name \_\_\_\_\_

## Midterm II

### 30 Multiple Choice Questions

- A skytherm or roof pond can be classified as a
  - direct loss/direct gain system
  - indirect loss/direct gain system
  - indirect loss/indirect gain system
  - evaporative cooling system
- For a mid-rise office building in a temperate climate an appropriate passive cooling strategy is:
  - night ventilation and thermal mass
  - daylighting
  - external shading
  - all of the above
- Occupants of naturally ventilated buildings are comfortable at higher summer temperatures than occupants of air-conditioned buildings because
  - there is more air-flow
  - of adaptive comfort effects
  - air-conditioning is designed for lower temperatures
  - none of the above
- Stack ventilation can be improved in effectiveness by
  - increasing the height of the stack
  - allowing the sun to heat air inside the top of the stack
  - increasing the size of the inlet, outlet, and stack throat apertures
  - all of the above
- The shading device in the Kibbie Dome weight room is fairly ineffective because
  - it doesn't block 100% of the solar radiation that hits it
  - it's operable
  - it's inside the glass curtain wall
  - all of the above



6. A well-designed open slat horizontal shading devices are more effective than solid overhangs because they

- A. work well on east- and west-facing windows
- B. allow light to penetrate from above and heat to rise from below
- C. the slats allow winter heat gains
- D. Wrong, they're less effective!

7. Phoenix Public Library has an effective shading strategy because

- A. appropriate exterior devices are used for each facade
- B. no internal devices are used
- C. only the south facade requires shading
- D. the building is not daylighted

8. Thermal mass is effective in controlling temperature swings in buildings because

- A. it releases warm air at night
- B. it forms the skin of the building
- C. it absorbs radiation from warmer objects and radiates to cooler objects
- D. all of the above

9. The passive cooling strategy least likely to succeed in a temperate climate with hot-humid summers is

- A. shaded verandahs
- B. courtyards
- C. desiccant roof radiators
- D. stack ventilation

10. In an office that is heated to a temperature slightly above the standard comfort zone during the winter, you'd expect productivity of the staff to be

- A. more than normal
- B. normal
- C. less than normal
- D. there is no relationship between temperature and productivity

11. The natural phenomenon that produces the most cooling in a courtyard in an arid climate is

- A. shading
- B. evaporation
- C. night sky radiation
- D. stack ventilation



12. The best way to adequately daylight a two-story circulation space beneath a barrel vault without overheating is with
- A. a fully glazed vault that features low-e glass
  - B. a fully glazed vault that features insulating glazing like Kalwall
  - C. a fully glazed vault that features bronze tinted glass
  - D. a full length narrow slit skylight that features an effective shading strategy
13. Heating a direct gain solar house with a large southern aperture requires
- A. less total energy than a built-to-code house of the same size
  - B. more total energy than a built-to-code house of the same size
  - C. about the same amount of total energy than a built-to-code house of the same size
  - D. less solar energy than a built-to-code house of the same size
14. Movable nighttime insulation will improve the heating performance of
- A. a Trombe wall
  - B. a greenhouse
  - C. a direct gain system
  - D. all of the above
15. A roof pond or skytherm system works because
- A. it allows direct gain through the ceiling
  - B. it acts as a diurnally switchable radiant ceiling
  - C. evaporative cooling is best for arid climates
  - D. none of the above
16. The biggest advantage of active solar space heating systems is
- A. the energy can be used when it's needed
  - B. better efficiency than passive systems
  - C. that they always store heat seasonally
  - D. all of the above
17. Large passive solar heated buildings are most likely to be
- A. direct gain
  - B. indirect gain
  - C. isolated gain
  - D. all of the above
18. Helmut Jahn's State of Illinois Center in Chicago's most effective cost-saving strategy is
- A. direct solar gain
  - B. daylighting
  - C. ice making at night for daytime cooling
  - D. all of the above

19. Which is an example of a superinsulated wall
- A. a double 2x4 wood frame with three layers of R-11 insulation
  - B. a Larsen truss wall with insulated truss space and stud cavity
  - C. a straw bale wall with no additional insulation
  - D. all of the above
20. If you want to specify a thermal mass wall with masonry exposed on the inside and the outside, the best choice, thermally, is
- A. rigid insulation between an outer brick rainscreen and a CMU structural inner wall
  - B. a structural CMU wall with an in-cell insulating system
  - C. a poured in place concrete wall with vermiculite aggregate
  - D. a straw bale wall with interior and exterior stucco
21. An art deco home in Moscow features a west-facing curtain wall of single pane clear glass. It should be replaced with better glass because
- A. it will gain too much heat on hot summer afternoons
  - B. it will lose too much heat on cold winter nights
  - C. both of the above
  - D. there is no suitable replacement for this historical glazing
22. Thermopane glazings with an outer pane of blue-green, gray, or bronze are all equally effective at reducing near infrared heat gain. However, you'd select the blue-green glazing for your office building design because
- A. it will reradiate less far infrared into your building
  - B. it will allow more daylight to penetrate
  - C. it will blend in with the sky
  - D. all of the above
23. You want to specify insulated glazing for a view window. Your best choice would be
- A. Kalwall
  - B. bead wall
  - C. silica aero-gel
  - D. bronze thermopane
24. A disadvantage of using an integral photovoltaic roof for a suburban home is
- A. it can't produce as much power as the home needs
  - B. it requires expensive batteries to store the electricity
  - C. you can only use DC appliances with it
  - D. none of the above
25. The advantage of BIPVs over sun-tracking PVs is
- A. absence of movable parts that require maintenance
  - B. economy derived from serving at least two architectural purposes
  - C. design to fit the building and its site
  - D. all of the above

26. To be effective, double skin walls must
- have an all glass exterior wall
  - have a uniform three foot space between inner and outer wall
  - be open to outside air only
  - none of the above

27. Examples of buildings with double skins are limited to
- the UK and Europe
  - commercial and institutional uses
  - high rises
  - none of the above

28. Earthships can
- collect all the water they need in a desert climate
  - heat and cool themselves passively
  - treat all their wastes on site
  - all of the above

29. Among the ways that Mazria's Albuquerque Botanic Garden and Vinoly's Pittsburgh Convention Center have proven that sustainable design pays are
- by maintaining proper growing conditions for exotic plants with little or no energy use
  - with annual savings of millions of kilowatt hours in air-handling unit operation
  - with annual savings of millions of kilowatt hours in electric lighting use
  - all of the above

30. The least successful strategy in the Chesapeake Bay Foundation's new LEED Platinum headquarters building is
- providing adequate daylighting
  - generating electricity with a PV system
  - use of natural ventilation year-round
  - none of the above

