

The Construction Industry  
"Building Envelope Moon Shot"

**FINAL EXAM**

1. **The construction industry is a \_\_\_\_\_annual industry and one of the largest parts of the US economy:**
  - a. \$1 billion
  - b. \$500 million
  - c. \$1 Trillion
  - d. \$50 million
  
2. **Some industry pundits and experts have suggested that the construction industry has inefficiency and waste of more than\_\_\_\_\_:**
  - a. none
  - b. 30%
  - c. auto
  - d. 5%
  
3. **The Building Envelope Moon Shot idea is to design, construct and commission the building envelope first in the computer before installing in the field and follows \_\_\_\_\_ as a role model of an industry organization.**
  - a. AISC
  - b. Auto industry
  - c. AIA
  - d. AGC
  
4. **A building is defined in terms of four primary systems EXCEPT:**
  - a. Structure
  - b. Envelope
  - c. Fixtures
  - d. Mechanical

5. In the 20<sup>th</sup> and 21<sup>st</sup> centuries, the key evolution from earlier construction modes to today's practice was the \_\_\_\_\_ of the building envelope from other building components
- a. Increasingly separate nature
  - b. Small Role
  - c. Rather insignificant cost
  - d. Low adoption
6. With respect to global energy use, buildings \_\_\_\_\_ industrial and transportation sectors
- a. Are greater consumers of energy than
  - b. Are Way Behind
  - c. Are Not significant factors compared to
  - d. Do not influence
7. As illustrated in NIST's Net-Zero Energy Residential Test Facility (NZERTF), a net-zero energy home produces \_\_\_\_\_ consumes over the course of a year.
- a. at least as much energy as it
  - b. more energy than it
  - c. a major amount of recycled refuse more than it
  - d. effluent that a resident cannot
8. Passive Houses, as espoused by the Passive House Institute allow for space heating and cooling related energy savings of up to \_\_\_\_ % compared with typical building stock and over 75% compared to average new builds:
- a. 20%
  - b. 10%
  - c. 90%
  - d. 50%

9. **The firm CyArk is utilizing a combination of laser scanning and aerial drones to document and preserve the world's treasures, including:**
- a. National Mall in Washington DC
  - b. Mount Rushmore
  - c. Temples in the Middle East and Greece
  - d. All of the above.
10. **The US Department of Energy's website entitled Building Energy Software Tools has a listing of \_\_\_\_\_ tools.**
- a. 10
  - b. 410
  - c. 50
  - d. 2000
11. **The structural steel industry was among the first to adopt 3D modeling tools throughout its supply chain and by working with :**
- a. Software Vendors
  - b. Educating the Market
  - c. Promoting the Benefits of EDI
  - d. All of the above.
12. **According to Peeter Nieler, as reported in AEC-business.com, there were \_\_\_\_\_ Virtual Reality Startups in the Spring, 2016.**
- a. 10
  - b. 419
  - c. 250
  - d. 2000

13. **The National Institute of Standards and Technology (NIST) published in 2004 a report entitled [A Cost Analysis of Inadequate Interoperability in the U.S. Capital Facilities Industry](#) that stated significant inefficiency and lost opportunity costs associated with interoperability problems was estimated to be in amount annually of:**
- a. Not significant
  - b. About a \$100 million
  - c. \$15.8 billion
  - d. \$4 Trillion
14. **The Denver Art Museum, by utilizing the benefits of BIM utilizing the AISC initiated CIS/2 workflows realized the following benefits:**
- a. Prevented 1,200 collisions of steel elements
  - b. Sped steel erection to the finish line three months early \$4 Trillion
  - c. Gave nearly \$400,000 in project funding back to the owner
  - d. All of the above.
15. **The “moonshot” concept has the following high profile examples:**
- a. John F Kennedy’s speech to Congress on May 25, 1961
  - b. Vice President Biden’s Cancer Moonshot announced June 28, 2016
  - c. Google X.
  - d. All of the above.
16. **The real beginning of the concept of the building envelope occurred with the invention of \_\_\_\_\_.**
- a. Mud foundations
  - b. Steel (and later reinforced concrete)
  - c. Thatch roofs
  - d. Heavy masonry

17. **When the wall became a \_\_\_\_\_ and no longer supported the upper floors and roof, it....gained in providing performance options**
- a. Non-structural screen
  - b. Pattern of doors and windows
  - c. Windowless barrier
  - d. Mud enclosure
18. **The role of owners in establishing \_\_\_\_\_ is critical to a project and to success of the building envelopes**
- a. Project software
  - b. Industry Conferences
  - c. Criteria and requirements
  - d. Social Events
19. **The construction of a typical single-family home generates \_\_\_\_\_ of waste**
- a. Insignificant
  - b. One pound
  - c. Several Gallons
  - d. Two to four tons
20. **The current state of practice in sustainability and building envelope design includes \_\_\_\_\_ as a key industry organization.**
- a. AAA
  - b. NIST
  - c. AMA
  - d. World Series
21. **Air Leakage protocols for building envelopes by \_\_\_\_\_ and Army Corps of Engineers have lead the industry in increasing .**
- a. Indian Health Service
  - b. U.S. General Services Administration (GSA)
  - c. Department of Prisons
  - d. OBO

22. **The technology NOT listed as an emerging innovative technology is**
- a. Virtual Reality (VR) and Augmented Reality (AR)
  - b. Steel Reinforcing
  - c. Laser Scanning and Aerial Drones
  - d. BIM (Building Information Models and Modeling)
23. **A measure of the impact of the moon shot idea is the size of the U.S. Government Real Assets portfolio world-wide, estimated in 2006 to include \_\_\_\_\_ total Federal Assets.**
- a. About 100,000
  - b. 1,253,621
  - c. Less than 500,000
  - d. A billion
24. **The Net-Zero Energy High Performance report includes a key recommendation involving \_\_\_\_\_.**
- a. Greater ventilation
  - b. Integrating the life-cycle of a building
  - c. Stronger foundations
  - d. Higher humidity levels.
25. **The Net-Zero Energy High Performance report suggests which of the following will help achieve the goal of net-zero consumption: \_\_\_\_\_**
- a. “Enhance the use of solar heat and light, energy storage, and natural ventilation
  - b. Reduce the impact of moisture and air infiltration
  - c. Develop construction techniques that enable superior technology integration and materials waste reduction, recycling, and reuse.”
  - d. All of the above
26. **The LBNL FLEXLAB lets users test energy-efficient building systems such as \_\_\_\_\_ and alternatives to ensure a building is as efficient as possible.**
- a. Mud foundations
  - b. Control systems and plug loads
  - c. Door knobs
  - d. Carpeting

27. **The concept of the \_\_\_\_\_ was mentioned by MIT Media Laboratory professors in a book called “When Things Start to Think”**
- a. Collaboration tools
  - b. Internet of Things
  - c. Domain Names
  - d. Search
28. **Sensors can make the building envelope \_\_\_\_\_ in order to respond to shifting environmental conditions as well as occupant activities and comfort levels.**
- a. Poor performing
  - b. Dynamic and adaptive
  - c. Resistant
  - d. Overloaded
29. **The emerging technologies of VR (virtual reality) and AR (augmented reality) have realized \_\_\_\_\_ .**
- a. Pushback from project teams
  - b. Increased positive client interactions
  - c. Cost increases
  - d. Heavy investment and training
30. **The ASIC CIS/2 standard had significant productivity gains, including \_\_\_\_\_ tons of steel on a Casino in Tuscon AZ**
- a. Increased project duration
  - b. 425
  - c. minimal
  - d. change orders and reduced