

THE NATIONAL COUNCIL OF EXAMINERS FOR ENGINEERING AND SURVEYING

PRINCIPLES AND PRACTICE OF ENGINEERING EXAMINATION

**ARCHITECTURAL**

EFFECTIVE APRIL 2003

	Approximate Percentage of <u>Examination</u>
<b>I. General Knowledge</b>	<b>12%</b>
A. Building Systems	5%
1. Functions of building systems (e.g., arch., struct., mech., elec., & plumb.)	
a. VAV box vs. constant volume and impact on structures	
2. Fire protection systems relevant to elec., mech., & struct. design/components	
3. Conditions for retrofit or re-use of existing structure with respect to system integration	
4. Aspects of building performance that affect human comfort	
5. Knowledge of which building systems or functions are critical in emergencies	
6. Understanding of framing alternatives as they relate to elec., mech., & struct. design	
B. Construction and Building Materials	4%
1. Terminology - lighting, electrical, mechanical, and structural	
2. Basic construction methods and materials	
3. Knowledge of material behavior and properties (e.g., heat transfer, volume change)	
C. Lateral Load and Displacement Issues	1%
1. Lateral load and displacement effects on mechanical, electrical, architectural systems	
D. Codes, Regulations, Statutes	2%
1. Model codes	
2. Code of ethics	
3. ADA and its implications for elec., mech., & struct. design/components	
<b>II. Construction Management</b>	<b>15%</b>
A. Economic and Financial Issues	6%
1. Control of Purchase Order, monitoring items relative to lead time & place of item, etc.	
2. Building cost estimating	
3. Value engineering	
4. Quantity take-off methods	
5. Bonding, taxes, profit/overhead, & permits on estimating	
B. Construction Processes	4%
1. Erection process and sequence as it affects load transfer and support	
2. Administration of information (e.g., discovered site conditions, change orders, etc.)	
C. Project Management	5%
1. Scheduling (sequence of activities)	
2. Quality control throughout project	
3. Impact on design and construction of alternative project delivery systems	
<b>III. Electrical &amp; Lighting Systems</b>	<b>23%</b>
A. Theory	9%
1. Electrical power circuit theory	
2. Short-circuit theory	
3. Load flow	
4. Power factor correction	
5. Overcurrent protective device coordination	
B. Basic Electrical Knowledge	14%
1. Grounding systems	
2. Basic electrical construction methods & materials	

Architectural (continued)	Approximate Percentage of <u>Examination</u>
3. Overcurrent protection	
4. Branch circuit and feeder conductor sizing	
5. Lighting systems	
6. HVAC systems (knowledge specifically related to power distribution issues)	
7. Life safety systems (e.g., generators, batteries, exit lighting, fire alarms)	
8. National Electrical Code	
<b>IV. Mechanical Systems</b>	<b>23%</b>
A. Theory	8%
1. Fan laws	
2. Pump laws	
3. Psychrometrics	
4. Air pressure drop (static pressure/velocity pressure)	
5. Humidity/latent load (e.g., moisture added or removed)	
B. Basic Mechanical Knowledge	15%
1. Types of pumps and pumping systems	
2. Fire protection sprinkler and standpipe classifications	
3. Steam pressure classifications	
4. Pipe expansion (e.g., expansion joints, loops, anchors)	
5. Duct materials	
6. Insulation (e.g. piping, ductwork)	
7. Valves and fittings	
8. Outside air quantities/ventilation per codes/ASHRAE standards	
9. Combustion air requirements/sizing	
10. HVAC system types (e.g., air cooled/water cooled, air, heat pumps, split systems)	
11. Chiller types	
12. Boiler types	
13. Criteria for diffuser/register/grille selection (throw, noise, pressure drop)	
14. Sanitary waste and vent systems (routing, sizing, slope)	
15. Domestic waste (routing, sizing, slope)	
16. Roof drainage (routing, sizing, slope)	
<b>V. Structural Systems</b>	<b>27%</b>
A. Loads and Analysis	11%
1. Types and methods of calculating design loads (e.g., wind, live)	
2. Different types of analysis and design philosophies or methods	
3. Material and member behavior in response to specific loading conditions	
4. Structural serviceability issue requirements (e.g., vibrations, deflections)	
B. Design	16%
1. Design and construction requirements for fire (e.g., firewalls, material fire rating)	
2. Material-specific code requirements	
3. Structural systems	
4. Elastic and plastic design procedures	
5. Connections	
6. Foundation types and design procedures	
<b>TOTAL</b>	<b>100%</b>

Note:

1. The knowledge areas specified under A., B., C., ... etc., are examples of kinds of knowledge, but they are not exclusive or exhaustive categories.
2. This examination contains 80 multiple-choice questions. Examinee works all questions.