

**NCEES Principles and Practice of Engineering Examination
 Electrical and Computer—COMPUTER ENGINEERING Exam Specifications
 Effective Beginning with the April 2009 Examinations**

- The exam is an 8-hour open-book exam. It contains 40 multiple-choice questions in the 4-hour morning session, and 40 multiple-choice questions in the 4-hour afternoon session. Examinee works all questions.
- The exam uses both the International System of units (SI) and the US Customary System (USCS).
- The exam is developed with questions that will require a variety of approaches and methodologies, including design, analysis, and application. Some questions may require knowledge of engineering economics.
- The knowledge areas specified as examples of kinds of knowledge are not exclusive or exhaustive categories.

	Approximate Number of Questions
I. Computer Systems	32
A. Numeric and Nonnumeric Formats	4
1. Number representation	
2. Character representation	
3. Encoding schemes	
4. Error detection and correction	
B. Computer Architecture	28
1. Computer organization	
2. Processor-controlled systems	
3. Processor structures	
4. Memory systems	
5. Hardware fault tolerance	
6. System performance	
II. Hardware	20
A. Digital Devices	4
1. Memory devices	
2. Standard modular devices (e.g., multiplexers)	
B. Digital Electronics	6
1. Basic solid-state devices	
2. Operating parameters	
3. Tristate logic	
4. Data conversion and instrumentation	
5. VLSI circuits	
6. Timing design and analysis	

C.	Digital Circuits	6
1.	Arithmetic hardware	
2.	Synchronous	
3.	Asynchronous	
4.	Testability	
5.	Programmable hardware	
D.	Hardware Description Languages	4
1.	Testbench software	
2.	Analysis and design	
3.	Synthesis issues	
4.	Assertions and verification	
III.	Software	20
A.	System Software	6
1.	Operating systems	
2.	Real-time operating systems	
3.	Computer security	
4.	Device drivers	
5.	Interrupts	
B.	Development/Applications	10
1.	Software design and documentation methods	
2.	Quality assurance	
3.	Fundamental constructs	
4.	Programming language characteristics	
5.	Development tools	
C.	Software Maintenance	4
1.	Configuration management	
2.	Software update	
3.	Change control	
IV.	Networks	8
A.	Computer Networks	4
1.	Protocols	
2.	OSI (layer) model	
3.	Topology	
4.	Hardware	
5.	Security	
B.	Physical Layer Implementation	2
1.	Synchronization techniques	
2.	Transmission media	
3.	Asynchronous	
4.	Wireless	
5.	Optical	

C. Information Theory

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1. Data compression
2. Channel capacity
3. Sampling theory