INTRODUCTION

The Canadian Engineering Qualifications Board of Engineers Canada issues the Examination Syllabus that includes a continually increasing number of engineering disciplines.

Each discipline examination syllabus is divided into two examination categories: compulsory and elective. A full set of Electrical Engineering examinations consists of nine, three-hour examination papers. Candidates will be assigned examinations based on an assessment of their academic background. Examinations from discipline syllabi other than those specific to the candidates' discipline may be assigned at the discretion of the constituent member.

Before writing the discipline examinations, candidates must have passed, or been exempted from, the Basic Studies Examinations.

The constituent members will supply information on examination scheduling, textbooks, materials provided or required, and whether the examinations are open or closed book.

ELECTRICAL ENGINEERING EXAMINATIONS

GROUP A

COMPULSORY EXAMINATIONS (SEVEN REQUIRED)

07-Elec-A1 Circuits

Electric circuit components: lumped parameter models. Nodal and mesh analysis of linear, passive circuits; equivalent networks. Steady state analysis of lumped parameter, time-invariant circuits: differential equation formulation, sinusoidal inputs, frequency response, impulse response, and transfer functions. Laplace transform analysis and circuit transient response. Two-port circuit models and analysis.

07-Elec-A2 Systems and Control

System models, impulse response functions, and transfer functions. System input-output and convolution. Root locus analysis and design. Feedback and stability: Bode diagrams. Nyquist criterion, frequency domain design. State variable representation. Simple PID control systems.

07-Elec-A3 Signals and Communications

Analysis of continuous-time signals: Fourier series and Fourier transform; magnitude, phase, and power spectra. Analysis of discrete-time signals: Nyquist sampling theorem; the Z-transform. Analog communication systems: amplitude and frequency modulation and demodulation. Digital communication systems: pulse code modulation; bandpass modulation and demodulation techniques.

07-Elec-A4 Digital Systems and Computers

Combinational, sequential, and synchronous logic circuits. Register level design of digital systems. Computer arithmetic, central processing unit, memory systems and peripherals. Assembly language programming, interrupts, and interfacing and communication. Computer architecture..

07-Elec-A5 Electronics

Semiconductor devices; diodes and thyristors. Bipolar and field effect transistors as linear devices and switches. Bias circuits, basic amplifiers, small-signal equivalent circuits, transfer functions, and frequency response. Operational amplifiers and comparators. Digital integrated circuits and logic families: TTL, TTL-LS, and CMOS.

07-Elec-A6 Power Systems and Machines

Magnetic circuits and transformers. Wye and delta connected three-phase systems. Generation, transmission, and distribution of electric power. Three-phase transformers. AC and DC machines. Three-phase synchronous machines and three phase induction motors.

07-Elec-A7 Electromagnetics

Field concepts. Maxwell's equations, integral and differential forms. Free space and guided wave propagation, transmission lines. Radiation from current elements.

GROUP B

ELECTIVE EXAMINATIONS (TWO REQUIRED)

07-Elec-B1 Digital Signal Processing

Discrete-time signals and systems: system input-output and convolution, Z-transform and transfer functions. Discrete-time Fourier transform (DFT) and Fast Fourier transform (FFT). Design of finite impulse response (FIR) and infinite impulse response (IIR) filters. DSP implementation considerations.

07-Elec-B2 Advanced Control Systems

Modelling of engineering systems; state variables and transfer function representations. Analytical and numerical solutions of state variable equations. Observability, controllability, stability; classical design, stabilization by pole assignment. Systems with delay. Systems with noise. Computer control, discrete systems. System identification; least squares.

07-Elec-B3 Digital Communications Systems

A/D conversion, source coding; signal sets, line codes, modulation, optimal reception, demodulation, performance in noisy channels, error detecting and correcting codes. Radio communications; link analysis and performance, terrestrial and satellite communications.

07-Elec-B4 Information Technology Networks

Layered architecture, circuit-switching networks, peer-to-peer protocols and data link layer, medium access control protocols, local area networks, packet-switching networks, TCP/IP, ATM networks, cellular networks, paging and wireless networks, telephone networks.

07-Elec-B5 Advanced Electronics

Device models: circuit behaviour, high frequency, and feedback. Multi-stage amplifiers, oscillators, current mode op-amps, non-linear circuits. Power amplifiers and linear regulators. Instrumentation: differential amps, optical isolators, and analog-digital and digital-analog converters.

07-Elec-B6 Integrated Circuit Engineering

Integrated Circuit Design: MOS circuit design methods; specification; use of CAD design tools. Non-ideal effects. Mask level layout. Integrated Circuit Fabrication: basic knowledge of IC processing techniques. Digital and analog IC's: basic building blocks. Design considerations for submicron CMOS and bipolar devices.

07-Elec-B7 Power Systems Engineering

Power system representation and analysis. Components: power transmission lines, transformers, synchronous machines. Distribution: power flow, operations, and control. Fault analysis and power system protection. System stability.

07-Elec-B8 Power Electronics and Drives

Principles and modelling of electric machines: dc machines, induction machines, and synchronous machines. Power electronic devices and converters: choppers, inverters, cycloconverters, and switched power supplies. Electric drives: torque and speed control, and field and vector oriented control techniques.

07-Elec-B9 Electromagnetic Field, Transmission Lines, Antennas, and Radiation

Field radiation equations. Distributed circuits: steady-state transmission line equations; impedance transformation, Smith charts, matching. Transients. Coaxial lines, waveguides. Antennas: infinitesimal elements, linear antennas, radiation resistance, antenna patterns, gain.

07-Elec-B10 Electro-Optical Engineering

Optical transmission: waveguide modes, fibre optic propagation characteristics. Optoelectronics: lasers, sources and detectors, couplers, modulators, guided wave devices. Applications.