

## **APEGA Exams to cover foundational science in GKE**

### **APEGA Exam 04-Prelim-1 Calculus (covers math 1a)**

Limits, continuity; differentiation, derivatives of the elementary functions (including trigonometric and exponential functions and their inverses), related rates, the mean Value Theorem, curve sketching, extremum problems, the definite integral, the Fundamental Theorem of Calculus, techniques of integration, area, volume, arc length, moments and centres of mass, parametric and polar considerations, sequences, series, Taylor series functions of several variables, partial derivatives, and applications.

### **APEGA Exam 04-Prelim-3 Physics (covers physics 1a)**

Basic mechanics (Motion: in one and two dimensions. Conservation Laws: energy and momentum. Newton's Laws: applied to point masses. Equilibrium of point masses and rigid bodies); Waves and related subjects (simple harmonic motion, travelling waves, simple acoustics); Electricity (electric forces and fields, electrostatic potential, capacitors); Magnetism (magnetic fields, electro-magnetic induction); Circuits (simple D.C. and A.C. circuits).

### **APEGA Exam 04-Prelim-4 Chemistry (covers chemistry for 1a)**

Stoichiometry; Chemical periodicity; Basic reaction types; Gases; Condensed phases; Chemical equilibrium; Acid-base equilibria; Thermochemistry; Entropy and chemical spontaneity; Electrochemistry; Chemical kinetics; Atomic structure and quantum theory; Chemical bonding; Solids; liquids; intermolecular forces; Organic chemistry; Nuclear chemistry.

### **APEGA Exam 04-Prelim-2 Computing (CS in 1b)**

Candidates must develop familiarity with a high level programming language – one of Fortran, Pascal or C – and develop facility in writing computer programs. Organization of stored program computers; principles of structured programming – input/output, assignment, selection and repetition, modular design using functions and procedures/subroutines, data structures including arrays and text files; design and testing of algorithms; introduction to numerical methods – curve fitting, numerical integration, root finding.