# 4B5 Quantum Technologies Formula sheet – 2 pages

1-D Time-independent Schrödinger equation,

*V*(*x*) is the potential, *E* is the total energy*.*

Quantum Energy Operator*.*

Quantum Momentum Operator*.*

Quantum Kinetic Energy Operator*.*

Planck’s constant = 6.626 x 10-34 Js

ReducedPlanck’s constant = 1.05 x 10‑34 Js

*e*  Electron charge = 1.6 x 10-19 C

*m* Free electron rest mass = 9.11 x 10‑31 kg

*c* Speed of light in vacuo = 2.998 x 108 ms-1

Spectrum of energy levels in Quantum

Harmonic Oscillator, where *wc* is the natural

resonant frequency of the system in rad s-1

Spectrum of energy levels in infinite Quantum

Well of length *L.*

Width (standard deviation) of matter wave-

Packet of initial width as a function of time, *t*.

Quantum continuity equation, where *j =*

probability flux.

1-D Probability flux.

WKB approximation to Transmission

Probability, *T*. Integration limits are the Classical turning points, *A & B.*