Field Theory Equations:

Gravity	Electric
Force: $$F_G = G\frac{m_1 m_2}{r^2}$$ F_G - Force of gravity (of attraction) (N) G - 6.67x10^{-11} Nm^{2}kg^{-2} r - distance separating centers (m) $m_{1\&2}$ - the two masses (kg)	Force: $$F_E = k\frac{q_1 q_2}{r^2}$$ F_E - Coulomb Force (of repulsion) (N) k - 8.99x10^9 Nm^{2}C^{-2} r - distance separating centers (m) $q_{1\&2}$ - the two charges (C)
Field: $$g = \frac{F}{m}$$ g - gravitational field strength (N/kg) F - force exerted by field on the mass (N) m - the mass (kg) $$g = G\frac{M}{r^2}$$ g - g near a point mass <u>toward</u> mass (N/kg) G - 6.67x10^{-11} Nm^{2}kg^{-2} M - the mass (kg) r - distance from the point mass (m)	Field: $$E = \frac{F}{q}$$ E - electric field strength (N/C) F - force exerted by field on charge (N) q - the charge (C) $$E = k\frac{q}{r^2}$$ (not in data packet) E - E near a point charge <u>away</u> from charge (N/C) k - 8.99x10^9 Nm^{2}C^{-2} q - the charge (C) r - distance from the point charge (m)
Energy: $$E_P = mV_g$$ E_p - gravitational potential energy (J) V_g - gravitational potential (J/kg) m - the mass (kg) $$W = m\Delta V_g$$ W - work required to move a mass (J) ΔV_g - change in gravitational potential (J/kg) $\Delta V = (V_{final} - V_{initial})$ m - the mass (kg)	Energy: $$E_P = qV_e$$ E_p - electrical potential energy (J) V_e - electrical potential (J/C or Volts) q - the charge (C) $$W = q\Delta V_e$$ W - work required to move a charge (J) ΔV_e - change in electrical potential (J/C or Volts) $\Delta V = (V_{final} - V_{initial})$ q - the charge (C)
Potential: $$V_g = -\frac{GM}{r}$$ V_g - gravitational potential near a point mass (J/kg) G - 6.67x10^{-11} Nm^{2}kg^{-2} M - the mass (kg) r - distance from the mass (m) $$g = -\frac{\Delta V_g}{\Delta r}$$ g - gravitational field strength (N/kg) ΔV_g - change in gravitational potential (J/kg) Δr - displacement in direction of the field (m)	Potential: $$V_e = \frac{kq}{r}$$ V_e - electrical potential near a point charge (J/C or Volts) k - 8.99x10^9 Nm^{2}C^{-2} q - the charge (C) r - distance from the charge (m) $$E = -\frac{\Delta V_e}{\Delta r}$$ E - Electric field strength (N/C or V/m) ΔV_e - change in electrical potential (J/C or Volts) Δr - displacement in direction of the field (m)
$$E_P = -\frac{GMm}{r}$$ E_p - gravitational potential energy of two masses (J) G - 6.67x10^{-11} Nm^{2}kg^{-2} M,m - the two masses (kg) r - distance separating centers (m)	$$E_P = \frac{kq_1 q_2}{r}$$ E_p - electrical potential energy of two charges (J) k - 8.99x10^9 Nm^{2}C^{-2} $q_{1\&2}$ - the two charges (C) r - distance separating centers (m)