**Newton’s Law of Universal Gravitation**

What is the force of gravity between two supertankers, each of mass 300 000 kg, if they are separated by a distance of 1.0 km?

**Determine:**

1. The acceleration due to gravity of a planet with a mass double that of Earth.
2. The escape velocity for this new planet

**Coulomb’s Law**

Two small oppositely charged spheres experience a force of attraction of 1.4 x 10-2 N. What would happen to this force if:

1. The distance between the charges is quadrupled?
2. The magnitude of the charge on each is doubled?
3. Both (a) and (b) occur simultaneously?

**Field Strength**

What is the electric field strength (magnitude and direction) at point P between the two charges in the figure below?



**Conservation of Energy**

A particle carrying a charge of 10-5 C starts moving from rest in a uniform electric field of intensity 50 N/C.

1. Determine the force applied to the particle.
2. Determine the kinetic energy of the particle after it has moved 1.0 m.
3. If the particles speed is 2.5 x 104 m/s at this point, what is its mass?

**Electric Field Strength of Parallel Plates**

The potential difference applied to an adjustable parallel plate capacitor is 120 V. What is the plate separation if the field strength is 450 N/C?

**Current Carrying Wires**

Power lines 12 m from the ground carry 4.50 x 103 A of current across a farmer’s field. What magnetic field strength do the cattle directly underneath experience?

**Solenoids**

A circular coil with 12 turns and a radius of 2.5 cm carries a current of 0.52 A. What is the magnetic field strength at the centre of this coil?

**Force Between Parallel Wires**

An electric power line has two wires 3.5 m apart that each carry a current of 1.5 x 104 A. If the distance between each tower is 190 m, determine the force exerted on one of the wires over this distance.

**Charged Particles in Magnetic Fields**

What is the radius of curvature for an alpha particle, 6.64 x 10-27 kg, moving at 2.0 x 106 m/s in a magnetic field of 2.9 x 10-5?