



3. (a) Explain Biot-Savart's Law. (5)
- (b) Show that the magnetic field  $B$  at the centre of a long solenoid is twice that of the end. (10)
4. (a) State Lenz's Law and give its application. (6)
- (b) Explain in detail the difference between paramagnetic, diamagnetic and ferromagnetic materials. (9)
5. (a) What do you mean by polarisation in dielectrics ? (5)
- (b) Deduce a relation for the energy stored in a dielectric material. (10)
6. (a) State Barkhausen's criterion for self-sustaining oscillations. (3)
- (b) Using a well labeled circuit diagram, find out the frequency for a Phase Shift Oscillator. (12)
7. (a) Explain full-wave rectifiers and find the rectification efficiency and ripple factor for the same. (10)
- (b) How does a Zener Diode work as a voltage regulator ? (5)
8. (a) Prove the following identity by Boolean Algebra :
- $$X + YZ = (X+Y)(X+Z) \quad (5)$$
- (b) Draw a circuit for a half adder using NAND gates and write its truth table. (10)