國立雲林科技大學
101 學年度碩士班暨碩士在職專班招生考試試題

系所：電子光電所
科目：半導體元件

1. Explain or define the following terms:
   (a) Ionization energy of acceptors in a semiconductor (5%)
   (b) Mobility of charge carriers (5%)
   (c) Fermi energy level in a semiconductor (5%)
   (d) Effective mass of electrons (5%)

2. Make a comparison between the p-type and the n-type semiconductors. (15%)

3. Describe the effects of the dopant concentrations on the built-in potential of a p-n junction diode. (15%)

4. Draw the typical log(J)-V characteristics of an ideal pn diode and indicate the current components from reversed- to forward-biases . (15%)

5. The charge distribution in a device is showed in Fig. 1, where $Q_1+Q_2=Q_3$. Draw the curves of electric field vs. distance and electric potential vs. distance. (20%)

6. Explain (a) flat band voltage, (b) fixed oxide charge and (c) surface potential. (15%)

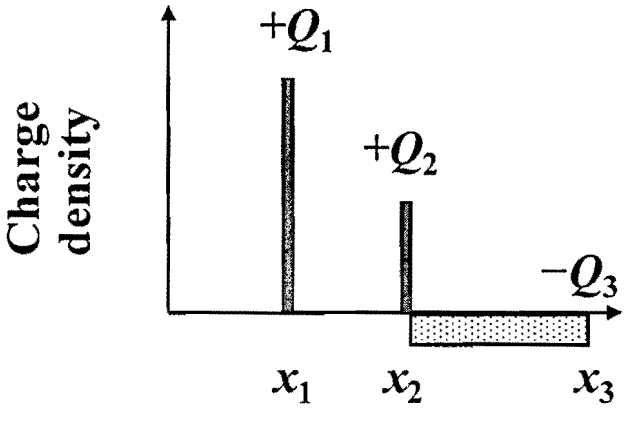

Fig.1