國立雲林科技大學
100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

總分 100 分 共 6 題

1. Selection problem set: [16%]

(1) Following experimental and physic phenomena may prove particle with wave properties.
(A) SEM (B) tunneling (C) hydrogen spectra (D) photoelectrical effect

(2) When temperature is increased, the Fermi-level of p-type semiconductor is
(A) closed to E_V (B) far from E_C (C) closed to E_{Fi} (D) unchanged

(3) In Hall-measurement, the magnetic field is upper ward and the current is followed from left to right. The frond of a semiconductor is measured positively biased. This semiconductor is
(A) n-type (B) p-type (C) intrinsic (D) undecided

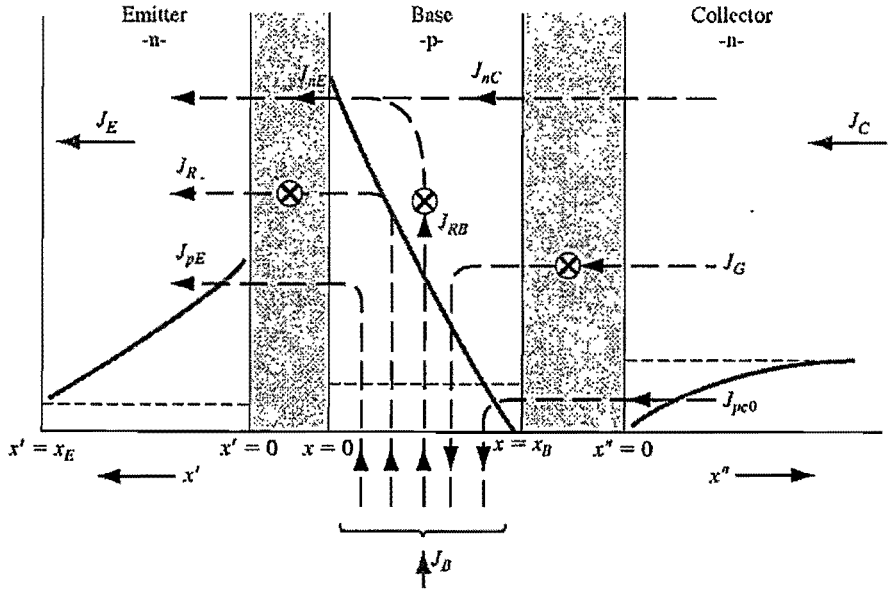
(4) The n-type and p-type semiconductors show the same doping concentration which shows smaller resistance?
(A) n-type (B) p-type (C) the same (D) undecided

2. How make metal-semiconductor be an Ohmic contact? [16%]

3. Explain (a) the quasi-Fermi level, (b) effective mass of electron in material, and (c) ionized impurity scattering [18%]

4. Explain two physical mechanisms of the reverse-bias breakdown in a pn junction. [15%]

5. The current components of an npn bipolar transistor in forward-active mode is shown in the figure. Write down the definition of "**Emitter Injection Efficiency Factor**," and explain how to improve it. [20%]



6. For an n-channel enhancement-mode MOSFET and an n-channel depletion-mode MOSFET, (a) explain their difference in the channels, (b) explain their difference in the threshold voltages. [15%]