

# 國立臺北科技大學 101 學年度碩士班招生考試

系所組別：2240 電腦與通訊研究所丁組

## 第一節 數位邏輯設計 試題

第一頁 共一頁

### 注意事項：

1. 本試題共五題，配分共 100 分。
2. 請標明大題、子題編號作答，不必抄題。
3. 全部答案均須在答案卷之答案欄內作答，否則不予計分。

一. Show that the following equation is valid:

$$\begin{aligned} & A'BC'D + (A'+BC)(A+C'D') + BC'D + A'BC' \\ & = ABCD + A'C'D' + ABD + ABCD' + BC'D \end{aligned} \quad (20\%)$$

二. Find a minimum sum-of-products expression for

$$F(a,b,c) = \sum m(0,1,2,5,6,7) \quad (20\%)$$

三. Find a network of AND and OR gates to realize

$$f(a, b, c, d) = \sum m(1,5,6,10,13,14) \quad (20\%)$$

四. Realize  $f(a, b, c, d) = \sum m(0,3,4,5,8,9,10,14,15)$  using 3-input NOR gates.

(20%)

五. A sequential network has one input (X) and one output (Z). The network examines groups of four consecutive inputs and produces an output  $Z=1$  if the input sequence 0101 or 1001 occurs. The network resets after every four inputs. Find the Mealy state graph. (20%)