

淡江大學九十三年學年度碩士班招生考試試題

系別：資訊工程學系

科目：邏輯導論與機率論

准帶項目請打「○」否則打「×」
簡單型計算機
×

本試題共 / 頁

1. Implement the following Boolean function with NAND gates: (10%)

$$F = A(CD + B) + B\bar{C}$$

2. Show the steps and reasons to establish the validity of the argument: (10%)

$$\begin{array}{l} u \rightarrow r \\ (r \wedge s) \rightarrow (p \vee t) \\ q \rightarrow (u \wedge s) \\ \hline \neg t \\ \hline \therefore q \rightarrow p \end{array}$$

3. Show the steps and reasons to establish the validity of the argument: (10%)

$$\begin{array}{l} \forall x[p(x) \vee q(x)] \\ \forall x[(\neg p(x) \wedge q(x)) \rightarrow r(x)] \\ \hline \therefore \forall x[\neg r(x) \rightarrow p(x)] \end{array}$$

4. Convert the following expression to its corresponding clausal form: (10%)

$$\forall x[(\forall y P(x, y)) \Rightarrow \neg(\forall y Q(x, y) \Rightarrow R(x, y))]$$

5. What is the resolution principle? (10%)

6. Evaluate the following formula: (15%)

$$\frac{1}{6} \sum_{1 \leq n} \left(\frac{5}{6}\right)^{n-1}$$

7. Let A and B be two events. Derive the Bayesian rule. (15%)

8. Given the following prior and conditional probabilities, calculate $p(H_1|E_1E_2E_3)$. Show each step in details. (20%)

Probability	Hypothesis		
	$i = 1$	$i = 2$	$i = 3$
$p(H_i)$	0.40	0.35	0.25
$p(E_1 H_i)$	0.3	0.8	0.5
$p(E_2 H_i)$	0.9	0.0	0.7
$p(E_3 H_i)$	0.6	0.7	0.9