

科目：計算理論 A

日期：105 年 7 月 27 日 第 1 頁 共 1 頁

請“✓”明 ✓不可看書 可看書

* 請將答案依題號順序寫入答案卷

答題時字跡需工整，否則不予計分。Write your answers legibly; otherwise you will get zero score.

- I. (15%) Consider the problem: given two TM's M_1 and M_2 , determine whether $L(M_1) \cap L(M_2) \neq \emptyset$. Is the problem semi-solvable? Prove your answer.
- II. (15%) A vertex cover for a graph $G=(V, E)$ is a set $C \subseteq V$ such that for every $(u,v) \in E$, either u or v is in C . Show that the decision problem: “given G and k , determine whether G has a vertex cover of size k or less”, is NP-complete.
- III. (20%) This problem is about the halting problem.
 - A. What is the halting problem?
 - B. Show that the halting problem is not decidable.

◎請用深黑色鋼筆或原子筆出題

命題老師簽名：

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1. (10%) Prove or disprove that the class of regular languages is closed under the operation of intersection.
2. (10%) Prove or disprove that the class of context languages is closed under the operation of intersection.
3. (10%) Prove or disprove that the intersection of a regular language and a context free language is a context free language.
4. (10%) Prove or disprove that $L = \{ a^i b^i c^j \mid i \neq j \}$ is context-free.
5. (10%) Prove or disprove that $L = \{ a^i b^j c^k \mid i \neq j \text{ or } j \neq k \text{ or } k \neq i \}$ is context-free.

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