

大同大學 101 學年度研究所碩士在職班入學考試試題

考試科目：科技英文

所別：電機工程研究所

共 1 頁

註：本次考試 不可以參考自己的書籍及筆記； 不可以使用字典； 不可以使用計算器。

請將以下英文翻譯成中文

1. Imagine a future in which wireless power transfer is feasible: cell phones, household robots, mp3 players, laptop computers and other portable electronics capable of charging themselves without ever being plugged in, freeing us from that final, ubiquitous power wire. Some of these devices might not even need their bulky batteries to operate. A team from MIT's Department of Physics, Department of Electrical Engineering and Computer Science, and Institute for Soldier Nanotechnologies (ISN) has experimentally demonstrated an important step toward accomplishing this vision of the future. (20%)
2. Whenever a sine-wave signal is applied to a linear circuit, the resulting output is sinusoidal with the same frequency as the input. In fact, the sine wave is the only signal that does not change shape as it passes through a linear circuit. However, the output sinusoid will in general have a different amplitude and will be shifted in phase relative to the input. (20%)
3. The formation control of multiple mobile robots has been studied by many researchers owing to various applications such as cooperative transport, reconnaissance, search, and so on. For example, in exploring a wide range of areas, a group of mobile robots is more effective than a single mobile robot. To the best of our knowledge, there is no research for the formation control of mobile robots in the environment with skidding and slipping effects. (20%)
4. In the past, bulky "linear" power supplies were designed with transformers and rectifiers from the ac line frequency to provide low level dc voltages for electronic circuits. Late in the 1960s, use of dc sources in aerospace applications led to the development of power electronic dc-dc conversion circuits for power supplies. In a well-designed power electronics arrangement today, called a *switch-mode power supply*, an ac source from a wall outlet is rectified without direct transformation. The resulting high dc voltage is converted through a dc-dc converter to the 3, 5, and 12 V, or other level required. (20%)
5. Let $p(t)$ and $g(t)$ be continuous functions on the interval (a, b) and let t_0 be in (a, b) . Then the **initial value problem (IVP)**
$$y' + p(t)y = g(t), \quad y(t_0) = y_0$$
has a unique solution on the entire interval (a, b) . (20%)

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