系所組別： 體育健康與休閒研究所甲組

考試科目： 運動生理學

考試日期：0220，節次：2

※ 考生請注意：本試題 □可 ☑不可 使用計算機

一、名詞解釋(40%，每題 5 分)：

1. cardiac output
2. double-blind research design
3. blood boosting
4. osteoporosis
5. slow-twitch fibers
6. resting metabolic rate
7. muscle spindle
8. oxygen debt

二、申論題(40%，每題 20 分)：

1. Provide ideal meal prior to competition. Explain why?
2. Explain the principles of training.

三、請簡要說明下列英文摘要[引自 Journal of Applied Physiology (2010): 109(6), 1628-1634]的內容(20%)：

Very little attention has been given to the combined effects of aging and disuse as separate factors causing deterioration in muscle mechanical function. Thus the purpose of this study was to investigate the effects of 2 wk of immobilization followed by 4 wk of retraining on knee extensor muscle mechanical function (e.g., maximal strength and rapid force capacity) and muscle fiber morphology in 9 old (OM: 67.3 ± 1.3 yr) and 11 young healthy men (YM: 24.4 ± 0.5 yr) with comparable levels of physical activity. Following immobilization, OM demonstrated markedly larger decreases in rapid force capacity (i.e., rate of force development, impulse) than YM (~ 20-37 vs. ~ 13-16%; $P < 0.05$). In contrast, muscle fiber area decreased in YM for type I, IIA, and IIx fibers (~ 15-30%; $P < 0.05$), whereas only type IIa area decreased in OM (13.2%; $P < 0.05$). Subsequent retraining fully restored muscle mechanical function and muscle fiber area in YM, whereas OM showed an attenuated recovery in muscle fiber area and rapid force capacity (tendency). Changes in maximal isometric and dynamic muscle strength were similar between OM and YM. In conclusion, the present data reveal that OM may be more susceptible to the deleterious effects of short-term muscle disuse on muscle fiber size and rapid force capacity than YM. Furthermore, OM seems to require longer time to recover and regain rapid muscle force capacity, which may lead to a larger risk of falling in aged individuals after periods of short-term disuse.