



# The Hong Kong College of Anaesthesiologists Intermediate Fellowship Examination

Written Paper in Physiology  
Friday, 22 June 2007, 09:00 h. – 11:00 h.

All questions carry equal marks. Answer ALL of them. Questions 1, 2 and 4 contain two equal parts.

1. Describe the carriage of carbon dioxide in blood. Illustrate, with a clearly labelled diagram, the carbon dioxide dissociation curve and the Haldane effect.
2. With respect to the pulse oximeter,
  - a. Explain the physical principles involved
  - b. Outline the common sources of error in measurement.
3. Describe the immunological responses that occur in acute rejection of a transplanted organ.
4. Commercial airliners are pressurized to the equivalent of 2400 metres altitude (barometric pressure 76 kPa/ 570mmHg), with normal  $FiO_2$  of  $\sim 0.2$ .
  - a. Describe changes in partial pressures of alveolar and blood  $PO_2$  and  $PCO_2$  during a 12-hour flight at this cabin altitude (2400m) and pressure.
  - b. What is the effect of breathing air compared to breathing 100%  $O_2$  if sudden decompression occurs at an altitude of 10,000 metres (barometric pressure 25 kPa/187 mmHg)?
5. Describe how the body maintains and adapts to its blood glucose level during a 3 day fasting in a normal adult.
6. Describe briefly, with examples commonly found in clinical anaesthetic practice, the methods available for measuring the concentration or partial pressure of a specific gas inside a gas mixture.
7. Outline, with examples, how different hormones interact with their target cells to bring about the clinical effects.
8. Describe briefly the control of secretion, and the actions of natriuretic peptides in the human body.
9. Discuss the factors that cause myocardial ischemia.
10. Explain the mechanisms that ensure adequate tissue oxygenation in intrauterine fetus.
11. Describe the mechanisms that prevent formation of blood clot in normal blood vessels.
12. Outline the factors that influence intra-ocular pressure.

END OF PAPER