



# The Hong Kong College of Anaesthesiologists

## Intermediate Fellowship Examination

**Written Paper in Physiology**  
Friday, 9 July 1999, 09:00 h. – 11:00 h.

Answer ALL questions

1. Define dew point, relative humidity, and absolute humidity. Explain factors that affect the performance of heat and moisture exchangers in humidifying inspired gases in patients requiring mechanical ventilation.
2. Describe the normal central venous pressure wave. How and why does it change in complete heart block?
3. Explain the effects on cerebral blood flow and intra-cranial pressure of changing a healthy person from the supine to the head-down position.
4. Compare the action potentials of skeletal and myocardial muscle fibres. Why is tetanic contraction possible in skeletal but not in myocardial muscle fibres?
5. A patient with diabetic ketoacidosis has an arterial  $PCO_2$  of 25 mmHg (3.3 kPa). Explain the cause of the abnormal arterial  $PCO_2$ , and the direction of accompanying changes in arterial pH, base excess, actual bicarbonate, and standard bicarbonate.
6. What is “autoregulation”? How does autoregulation work and what cause it to fail in the kidney?
7. Explain how arterial baroreceptors respond to control a sudden rise in arterial pressure.
8. Evaluate the use of peak expiratory flow rate in assessing airway resistance.
9. Discuss the physiologic consequences of a biliary fistula leading to complete loss of bile secretion outside the body.
10. Explain the coagulation abnormalities in patients with disseminated intravascular coagulation.
11. Outline the factors that affect uterine blood flow in a pregnant woman at term.
12. Outline the haemodynamic parameters derived from the pulmonary artery catheter in a patient with cardiac tamponade.