



# The Hong Kong College of Anaesthesiologists

## Intermediate Fellowship Examination

### Written Paper in Physiology

22 February 2019 (Friday)

09:00 - 11:00 hours

#### Instructions:

- There are three pre-labelled answer books. Please make sure you answer the questions in the respective answer book.
- Write your candidate number on the cover of each answer book.
- Use ink or ball-point pen.
- Answer ALL questions. They are worth equal marks and you should spend approximately **ten minutes** for each question. For questions with multiple parts, allocation of marks is indicated in the brackets.

- Describe the factors that affect right ventricular output.**
- Outline the peri-operative factors that may delay gastric emptying.**
- Describe the absorption, distribution, storage and metabolism of iron in the body.**
- Compare and contrast the innate and adaptive immune systems.**
- Describe the distribution of pulmonary ventilation and perfusion in an anaesthetized and paralyzed patient receiving positive pressure ventilation in the lateral decubitus position (50% marks). Explain the changes to the distribution of ventilation and perfusion if ventilation is applied only to the dependent lung (50% marks).**
- Outline the cardiovascular changes at term pregnancy (70% marks). Explain why a parturient with moderate mitral stenosis is prone to acute pulmonary edema during the second stage of labour (30% marks).**
- Describe the effects on the central nervous system if an awake person is breathing a gas mixture containing 21% oxygen, 74% nitrogen and 5% carbon dioxide.**
- Define renal clearance (30% marks). Explain the use of (i) creatinine clearance and (ii) inulin clearance to measure glomerular filtration rate (70% marks).**
- What is anion gap? Describe the advantages and limitations in using anion gap for evaluation of acid-base abnormalities.**
- Describe the stress response to surgery and explain how it is mediated.**
- Draw a pressure volume curve of a spontaneous breath and define the different components of work of breathing (70% marks). Explain the respiratory pattern in a patient with restrictive lung disease that would result in minimum work of breathing (30% marks).**
- Outline the physical principles (50% marks) and the major sources of errors (50% marks) of using infrared spectroscopy to measure carbon dioxide partial pressure in respiratory gases.**