



# The Hong Kong College of Anaesthesiologists

## Intermediate Fellowship Examination

### Written Paper in Physiology

**11 July 2025 (Friday)**

**09:00 - 11:00 hours**

#### **Instructions:**

- There are twelve pre-labelled answer books. Please make sure you answer the questions in the respective answer books.
- 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.

- List the physiological functions of potassium. (20%) Explain how plasma potassium concentration is regulated in the body. (80%)**
- Describe the cardiovascular changes with normal aging.**
- Describe the production and physiological actions of prostaglandins on vascular, bronchial and uterine smooth muscles.**
- Draw a labelled diagram to illustrate the central venous pressure tracing. Include in your diagram the time points when ventricular systole and diastole occur. (50%)**
  - Explain the physiological basis for each of the component of the pressure waveforms. (50%)**
- Describe the protective mechanism(s) of the liver against (i) pathogens (50%) and (ii) hypoglycaemia. (50%)**
- Discuss the effects on (i) intracranial pressure (50%) and (ii) cerebral perfusion pressure (50%) after initiation of pneumoperitoneum at 15 mmHg, with a head down position.**
- Describe and explain the clinical manifestations and mechanisms of four types of immune-mediated transfusion reactions.**
- Describe the physiological mechanisms that facilitate tissue oxygenation in the intrauterine fetus.**

9. Describe the mechanism(s) of the loop of Henle that contribute(s) to water, sodium and chloride balance in the body.
10. Classify different methods of preventing intraoperative hypothermia. (60%) Explain how forced air warming device can reduce body heat loss. (40%)
11. Describe the effects of placing a healthy individual in the right lateral decubitus position on lung ventilation and perfusion in the following two different conditions:
  - a. awake, breathing spontaneously; (50%)
  - b. under general anaesthesia, paralysed and with intermittent positive pressure ventilation. (50%)
12. Compare and contrast the spinal neural circuits involved in (i) when the patella tendon is tapped (50%) and (ii) when the foot steps onto a sharp object. (50%)

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