



**The Hong Kong College of Anaesthesiologists**  
**Intermediate Fellowship Examination**  
**Written Paper in Physiology**  
**1 February 2023 (Wednesday)**  
**09:00 - 11:00 hours**

**Instructions:**

- a. There are twelve pre-labelled answer books. Please make sure you answer the questions in the respective answer book.
- b. Write your candidate number on the cover of each answer book.
- c. Use ink or ball-point pen.
- d. 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.

1. **Outline the key features of the coronary circulation (50%). Explain the factors that determine myocardial oxygen delivery (50%).**
2. **List the characteristics of pulmonary circulation that is different from systemic circulation (30%). Elaborate the factors that will affect pulmonary vascular resistance (70%).**
3. **Outline the characteristics of renal blood flow (20%). Describe how renal blood flow is regulated (80%).**
4. **Describe the source of energy production in skeletal muscles according to the duration of exercise. Please include the substrates used, as well as the metabolic processes involved.**
5. **Explain the physiological changes that happen for a young and healthy person after running a Marathon for 1 hour.**
6. **Outline the hematological changes at term pregnancy (60%) and their anaesthetic implications (40%).**
7. **What are the mechanisms preventing blood clotting within normal intact blood vessels?**
8. **How is the release of Antidiuretic Hormone (ADH) regulated (60%)? What is the pathophysiology of syndrome of inappropriate antidiuretic hormone secretion (40%)?**
9. **Define intracranial pressure and explain the Monroe Kellie hypothesis (50%). Define the Cushing's triad and briefly outline its underlying physiological basis (50%).**
10. **Define the terms primary hyperalgesia, secondary hyperalgesia and allodynia (40%). Explain the underlying neural mechanisms that lead to these phenomena (60%).**

- 11. Describe the cardiovascular changes that occur during robotic-assisted laparoscopic pelvic surgery.**
- 12. Define Function Residual Capacity (FRC) and outline the factors affecting it (50%). What are the physiological consequences if FRC is reduced by one Liter in an average adult (50%)?**

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