



The Hong Kong College of Anaesthesiologists

Intermediate Fellowship Examination

Written Paper in Physiology

21 July 2023 (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 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.

- (a) Briefly outline the factors that determine cardiac venous return (65%).

(b) Describe the effects of extubation and reinstitution of normal breathing on cardiac preload and afterload (35%).
- Outline the physiological processes through which the kidney handles an acid load (e.g. ingestion of a large amount of salicylates).
- (a) Draw and outline the features of a normal thromboelastogram (70%).

(b) What are the advantages and disadvantages of using thromboelastography over standard laboratory tests for assessing haemostatic function (30%)?
- Explain the changes in pulmonary vascular resistance that occur following initiation of one lung ventilation.
- Describe (i) the production (30%) and (ii) the functional effects (70%) of surfactant on respiratory mechanics.
- A healthy 25-year-old man travels by plane to a city located 4000 metres above sea level (barometric pressure at 57 kPa or 429 mmHg). Describe the physiological changes that will occur in response to this high altitude on the first day.
- Based on the physiological principles of myocardial oxygen supply and demand, explain the haemodynamic goals for providing general anaesthesia in patients with occlusive coronary artery disease.
- (a) Describe the factors that determine the movement of fluids across the capillary membranes in the systemic circulation (60%).

(b) How is this process different in the capillaries of the brain (40%)?

- 9. Outline three functions of the hypothalamus.**
- 10. Describe the functions of the liver with respect to protein metabolism.**
- 11. (a) Outline the physiological effects of parathyroid hormone (50%).
(b) Describe the effects of chronic renal failure on parathyroid hormone secretion (50%).**
- 12. (a) Outline the cardiovascular changes in a healthy pregnant woman at term (60%).
(b) Explain how these changes would pose challenges in a parturient with moderate mitral stenosis (40%).**

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