The Hong Kong College of Anaesthesiologists

Intermediate Fellowship Examination

Written Paper in Pharmacology

27 February 2026 (Friday)

14:00 - 16:00 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. **Describe the pharmacokinetics of remifentanil and fentanyl with reference to context-sensitive half-time (60%). Explain the clinical significance of these differences in the perioperative setting (40%).**

2. **Compare and contrast the mechanism of action and pharmacokinetics of rocuronium and succinylcholine for rapid sequence induction (80%). List the factors that affect your choice of drug in this situation (20%).**

3. **Define minimum alveolar concentration (MAC). List FOUR factors that decrease MAC (30%).**

   With the help of graph(s), explain how blood:gas partition coefficient and cardiac output influence the rate of onset of action from volatile anaesthetic agents (70%).

4. **Describe the mechanisms of adverse drug effects (30%).**

   Give TWO examples of Type A (dose-dependent) adverse drug reactions and TWO examples of Type B (idiosyncratic) adverse drug reactions relevant to anaesthetic practice, explaining their underlying mechanisms (70%).

5. **Explain the law of mass action and describe affinity and dissociation constants (30%).**

   Using dose-response curves, illustrate the differences between full agonist, partial agonist, competitive antagonist, and inverse agonist (70%).

6. **Describe the comparative pharmacology of bupivacaine and lignocaine (60%). Discuss the clinical implications of their differences with respect to local anaesthetic systemic toxicity (40%).**

7. **Compare and contrast the pharmacology of sodium nitroprusside and glycerol trinitrate.**

8. **Define clearance, half-life, and bioavailability (40%).**

   Explain how hepatic extraction ratio affects first-pass metabolism and oral bioavailability (60%).

9. **Outline the mechanisms of action of sodium-glucose co-transporter 2 (SGLT-2) receptor inhibitor (40%). Describe the mechanisms where SGLT-2 blockers may induce perioperative euglycemic diabetic ketoacidosis (60%).**

10. **Compare the pharmacodynamics of dexmedetomidine and midazolam for applications in procedural sedation.**

11. **Compare and contrast Salbutamol and Ipratropium bromide in management of acute asthmatic attack.**

12. **A clinical trial is designed to compare two anaesthetic techniques for postoperative pain management. Define the following statistical terms and explain how each may influence the design, conduct or interpretation of the trial:**

    a) **Type 1 error and Type II error (25%)**
    b) **Power of a study (15%)**
    c) **p-value and statistical significance (25%)**
    d) **95% confidence interval and its clinical interpretation (35%)**

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