The Hong Kong College of Anaesthesiologists

Intermediate Fellowship Examination

Written Paper in Pharmacology

1 February 2023 (Wednesday)

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 how peripheral nerve stimulator is used in assessing the depth of neuromuscular blockade WITH NON-DEPOLARISING muscle relaxants (85%) AND patients' feasibility for reversal (15%).**

2. **Outline the pharmacokinetic profile of oral paracetamol (60%). Discuss how other drug(s) can alter its pharmacokinetic profile (40%).**

3. **Describe and Explain SIX opioid effects on the central nervous system.**

4. **Define and describe the term second messenger (50%). Give an example of β1 adrenergic agonist and describe the corresponding second messenger system involved for clinical actions (50%).**

5. **With regard to glyceryl trinitrate (GTN):**

   a) Describe the cellular mechanism of GTN in the management of myocardial ischaemia (30%).

   b) Explain the effects of GTN on cardiovascular system and its effect on myocardial oxygen consumption (30%).

   c) Explain the rationale of administration of GTN as sublingual route (25%).

   d) Describe the changes in therapeutic effect after repeated doses of GTN. Explain the underlying mechanism (15%).

6. **Describe the risk factors for systemic toxicity with Amide local anaesthetic agents.**

7. **Explain the differences of Propofol induction in a 70-year-old man and a 4-year-old child respectively with respect to dosage (33.3%), onset time (33.3%) and duration of action/offset time (33.3%).**

8. **The following statement is made in a scientific journal.**

   "After administration of the new anti-hypertensive drug the systolic blood pressure in group A (n=100) was 110 ± 10 mm Hg (mean ± standard deviation). In the control group B (n=100) the systolic blood pressure was 130 ± 20 mm Hg (mean ± standard deviation)."

   a) Define the terms "mean" and "standard deviation" (detailed equations are not required) (45%).

   b) Assuming both populations are normally distributed, draw a population graph for groups A and B incorporating the statistical data detailed above (55%).

9. **Compare and contrast the Mechanism of Action, Clinical Applications, and Major Side-effects of Loop diuretics and Thiazides-like diuretics.**

10. **Compare and Contrast the Pharmacology of Ondansetron and Metoclopramide. (Exact value of PKa and Vd not required)**

11. **a) Describe the process of production of nitrous oxide (50%).**

    b) Describe and Explain the undesirable effects of nitrous oxide on the cardiovascular and hematological systems (50%).

12. **Describe the mechanism of action of Anticholinesterases (50%). Give FOUR clinical indications (20%). Explain the advantages of using pyridostigmine over neostigmine in treating Myasthenia Gravis (30%).**

- End -