



## COLLEGE OF INTENSIVE CARE MEDICINE OF AUSTRALIA AND NEW ZEALAND

### FIRST PART EXAMINATION

#### MOCK EXAM

*This Mock Examination is prepared to provide candidates, tutors and their Supervisors of Training with information about the way the Examiners will assess the performance of candidates in the Examination. Example questions provided are to be used as a guide only as to what may be expected. Candidates should discuss the exam with their tutors so that they may prepare appropriately for future examinations. It should be read in conjunction with the Notes to Candidates document.*

#### WRITTEN EXAM

#### GLOSSARY OF TERMS

- |                     |  |
|---------------------|--|
| • <b>Calculate</b>  | Work out or estimate using mathematical principles |
| • <b>Classify</b>   | Divide into categories; organise, arrange          |
| • <b>Compare</b>    | Examine similarities and differences               |
| • <b>Define</b>     | Give the precise meaning                           |
| • <b>Describe</b>   | Give a detailed account of                         |
| • <b>Explain</b>    | Make plain, interpret, and account for             |
| • <b>Interpret</b>  | Explain the meaning or significance                |
| • <b>Outline</b>    | Provide a summary of the important points          |
| • <b>Relate</b>     | Show a connection between                          |
| • <b>Understand</b> | Appreciate the details of; comprehend              |



**COLLEGE OF INTENSIVE CARE MEDICINE  
OF AUSTRALIA AND NEW ZEALAND**

**FIRST PART EXAMINATION**

**MOCK EXAM**

**SHORT ANSWER QUESTIONS**

**MORNING PAPER**

- (A) Start each answer on a **new page** and indicate the **question number**. It is not necessary to rewrite the question in your answer book.
- (B) You should aim to allocate **ten minutes** to answer each SAQ.
- (C) The questions are worth **equal** marks.
- (D) Short Answer Questions with more than one part have the **proportion of marks** indicated for each part.
- (E) Record your **candidate number** and each **question number** on the cover of each book and hand in all answer books.

***Please answer Questions 1 and 2 in the blue answer booklet***

1. Describe the anatomy of the left subclavian vein.
2. Classify bacteria according to the gram stain system and the shape of the bacteria, and give two examples for each group (40% marks). Explain the mechanisms of bacterial antibiotic and give examples where available (60% marks).

***Please answer Questions 3 and 4 in the blue answer booklet***

3. Explain the role of the baroreceptors in control of blood pressure.
4. Compare and contrast the anatomy of the upper airway in a neonate, a paediatric patient and an adult.

***Please answer Questions 5 and 6 in the blue answer booklet***

5. Describe the pharmacology of adenosine and its potential uses in critical care.
6. Outline the pharmacology of syntocinon.

***Please answer Questions 7 and 8 in the blue answer booklet***

7. Explain the difference between zero and first order kinetics. Give examples relevant to intensive care.
8. Describe how surface tension affects lung mechanics.

***Please answer Questions 9 and 10 in the blue answer booklet***

9. Describe the hepatic blood flow. Explain how you would measure hepatic blood flow.
10. Outline the principles of antimicrobial resistance and the factors that influence this.

***Please answer Questions 11 and 12 in the blue answer booklet***

11. Define the therapeutic index and its significance. Give examples from drugs used in intensive care.
  
12. Explain the concept of renal clearance and how this is measured.

CANDIDATE NUMBER: \_\_\_\_\_

**MOCK EXAM**  
**SHORT FACT QUESTIONS**  
**MORNING PAPER**

**NOTICE**

- (A) Please write the answers **ON this paper**.
- (B) You should aim to allow **30 minutes** to answer the Short Fact Questions.
- (C) At the end of the exam hand this question paper in to the **Invigilator**.

**Short Fact Questions**

Fill in the blanks in the following sentences with the appropriate word or words.

**For example:**

Midazolam has pH dependent imidazole ring opening.  
When the pH value is less than 4 the ring remains open  
This maintains the water solubility of the drug.

**Short Fact Questions: Write the answers ON this paper.**

1. The normal total volume of CSF inside the ventricles and subarachnoid space is about \_\_\_\_\_ mL and the rate of CSF production is about \_\_\_\_\_ mL per day. The reabsorption of CSF will \_\_\_\_\_ as CSF pressure increases.
2. To be effective as a single daily dose, the dose of drugs with a short half must produce a plasma concentration that is much \_\_\_\_\_ than the \_\_\_\_\_ of the drug, and have a \_\_\_\_\_ ED50.
3. The three main determinants of respiratory rate in a normal adult are \_\_\_\_\_, \_\_\_\_\_, and \_\_\_\_\_.
4. Midazolam has pH dependent imidazole ring opening. When the pH value is less than \_\_\_\_\_ the ring remains \_\_\_\_\_. This maintains the water solubility of the drug.
5. A patient who is stable on warfarin (INR 3.0) has recently been started on amiodarone. The resultant INR would be \_\_\_\_\_ compared to above and the mechanism of this interaction is \_\_\_\_\_.
6. For effective sublingual administration, drugs should be \_\_\_\_\_ and \_\_\_\_\_.
7. Suzamethonium is associated with life threatening \_\_\_\_\_ in patients with \_\_\_\_\_. This adverse effect is NOT prevented by pretreatment with a non-depolarising neuro muscular blocking drug.
8. The following characteristics describe the drug \_\_\_\_\_: Intravenously administered beta blocker, cardioselective, no partial agonist activity, dose modification not required in renal or hepatic disease.
9. Stimulation of the high pressure baroreceptors leads to vasodilation and bradycardia. Stimulation of the low pressure receptors in the atria leads to \_\_\_\_\_ and \_\_\_\_\_.
10. An ECG showing ST segment elevation in leads II, III and aVF reflects ischaemia involving the \_\_\_\_\_ coronary artery and the \_\_\_\_\_ wall of the left ventricle.

CANDIDATE NUMBER: \_\_\_\_\_

**Rank Questions**

In the following 5 questions please rank the options as required.

**For example:**

In a normal person rank the following from the lowest to the highest PCO<sub>2</sub> mmHg

- |   |                                      |
|---|--------------------------------------|
| 4 | Mixed venous PCO <sub>2</sub> , mmHg |
| 2 | End tidal PCO <sub>2</sub> , mmHg    |
| 1 | Inspired PCO <sub>2</sub> , mmHg     |
| 3 | Arterial PCO <sub>2</sub> , mmHg     |

11. Rank the following drugs in from SHORTEST to LONGEST context sensitive half time.

- \_\_\_\_\_ Midazolam
- \_\_\_\_\_ Morphine
- \_\_\_\_\_ Propofol
- \_\_\_\_\_ Remifentanyl

12. Rank the following from LOWEST to HIGHEST O<sub>2</sub> saturation

- \_\_\_\_\_ Coronary sinus
- \_\_\_\_\_ Internal jugular vein
- \_\_\_\_\_ Right atrium
- \_\_\_\_\_ Pulmonary artery

13. Rank the following from the HIGHEST to the LOWEST osmolality.

\_\_\_\_\_ Proximal convoluted tubule

\_\_\_\_\_ Distal convoluted tubule

\_\_\_\_\_ Tip of loop Henle

\_\_\_\_\_ Distal collecting duct

14. Rank the following from the HIGHEST to the LOWEST  $PCO_2$

\_\_\_\_\_ Mixed venous  $PCO_2$

\_\_\_\_\_ End tidal  $PCO_2$

\_\_\_\_\_ Arterial  $PCO_2$

\_\_\_\_\_ Expired  $PCO_2$

15. At equipotent doses rank the following drugs in order from the drug producing the GREATEST increase in blood pressure to the LEAST

\_\_\_\_\_ Isoprenaline

\_\_\_\_\_ Noradrenaline

\_\_\_\_\_ Adrenaline

\_\_\_\_\_ Salbutamol



CANDIDATE NUMBER: \_\_\_\_\_

**Match Questions**

In the following 5 questions please match the item in list A with the one most appropriate statement in list B. Please write your answer in the first column.

**For example:**

Answer	List A	List B	
E	End diastolic volume minus end systolic volume	A	Afterload
D	Left ventricular end diastolic volume	B	Aortic diastolic pressure
C	Pressure at peak ejection	C	Aortic systolic pressure
		D	Preload
		E	Stroke volume
		F	Stroke work

16. Match the drug with the correct chemical structure and activity.

Answer	List A		List B
	Desmopressin	A	Potent antidiuretic and vasoconstrictor effect
	Terlipressin	B	Potent antidiuretic effect, used to treat nephrogenic diabetes insipidus
	Vasopressin	C	Potent antidiuretic effect with minimal vasopressor effect
		D	Potent long-acting antidiuretic and vasoconstrictor effect
		E	Potent vasoconstrictor and causes release of von Willebrands factor
		F	Potent vasoconstrictor and extended duration of action permitting intermittent intravenous injection

17. Match the following haemoglobin types with the correct statement.

Answer	List A	List B	
	Haemoglobin F	A	2,3 DPG binds with the alpha chains of haemoglobin increasing oxygen affinity
	Haemoglobin S	B	Binds oxygen with the same affinity as carboxyhaemoglobin
	Methaemoglobin	C	Has 2 alpha and 2 delta chains
		D	Oxygen carriage is impaired as the Fe <sup>+++</sup> in haemoglobin does not carry oxygen
		E	Reduced binding of 2,3 DPG so increased oxygen affinity
		F	Reduced haemoglobin is less soluble than HbA

18. Match the antibiotic class in List A with the given mechanisms of action in List B.

Answer	List A	List B	
	Aminoglycosides	A	Inhibits bacterial carbohydrate metabolism
	Carbapenems	B	Inhibits DNA gyrase, topoisomerase & nucleic acid synthesis
	Fluoroquinolones	C	Inhibition of cell wall synthesis via penicillin binding protein
		D	Inhibition of folate metabolism
		E	Inhibits protein synthesis, 30S ribosomal sub-unit
		F	Inhibits protein synthesis, 50S ribosomal sub-unit

19. Match the terms in List A, with the one statement in List B that best defines them.

ANSWER	List A	List B	
	Idiosyncratic	A	A desired response of a drug observed within a broad population
	Tachyphylaxis	B	Known but undesired response of a drug observed within a broad population
	Tolerance	C	Physical or psychological dependence on a drug
		D	Responsiveness to a drug diminishes gradually after repeated exposure
		E	Responsiveness to a drug diminishes rapidly after repeated exposure
		F	Unusual response to a drug that is infrequently observed

20. Match the following bacteria to their classification group.

ANSWER	List A	List B	
	Clostridia	A	Acid Fast bacilli
	Haemophilus	B	Gram negative cocci
	Streptococcus pyogenes	C	Gram negative coccobacilli
		D	Gram positive bacilli
		E	Gram positive cocci
		F	Spiral bacteria

## ORAL (VIVA) EXAM

### Introductory Oral Questions

#### Examples include:

- Describe the composition of cerebrospinal fluid.
- Describe drug delivery systems.
- Outline the determinants of Osmotic pressure.
- Outline the adverse effects of Suxamethonium.
- Describe different systems of temperature measurement.
- Describe the differences in the penicillin class of drugs.
- Outline the different types of shock.
- Describe the adverse effects of non-steroidal anti-inflammatory drugs.
- Describe the control of breathing.
- Describe the coronary circulation.
- Outline the pharmacology of sodium bicarbonate.
- Describe the electrolyte composition of gastric secretions.

#### Examples of progression of oral questions

Some oral questions may be solely in physiology or pharmacology and some may cross the disciplines.

##### Example 1:

Interpret an arterial blood gas showing a chronic respiratory acidosis.

Draw a spiograph that would be consistent with these blood gases (chronic obstructive disease).

Describe the mechanism of action of bronchodilating drugs.

##### Example 2:

Describe the anatomy of the subclavian vein.

Draw a venous blood gas you would expect if a sample were taken from this vein.

How would you measure flow in this vein?

#### You may also be expected to:

- Interpret data from a pulmonary artery catheter consistent with cardiogenic shock.
- Calculate the loading and infusions doses for a drug.
- Analyse a drug chart for interactions and describe them.
- Interpret ICU equipment and monitoring (e.g. capnograph traces).