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**University Hospital, Geelong  
Emergency Medicine  
Trial Fellowship Exam  
Short Answer Questions (SAQ)  
Week 9**

**DIRECTIONS TO CANDIDATE**

1. Answer each question in the space provided in this question paper.
2. Do not write your name on this question paper.
3. Enter your examination number in the space below.
4. Cross out any errors completely.
5. Do not begin the exam until instructed to do so.
6. Do not take examination paper or materials from this room.
7. The booklet binder may be removed during the exam.

**QUESTION & ANSWER  
BOOKLET**

**Question 1 (18 marks)**

A 29 year old man is involved in high speed MCA. On primary and secondary survey his injuries appear to be restricted to the thorax and abdomen.

**A Chest X-ray is taken on arrival- refer to the props booklet- - page 1.**

a. State three (3) abnormal findings shown in this Chest X-ray. (3 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

His blood pressure on arrival is 70/30. He has received no pre-hospital treatment.

b. State three (3) LIKELY causes for his low blood pressure. (3 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

**Question 1 (continued)**

- c. State three (3) key principles for the application of massive transfusion in general. (3 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

**Question 1 (continued)**

- d. Complete this table, stating the aims for these parameters in massive transfusion. (9 marks)

<b>Parameter</b>	<b>Aim (9 marks)</b>
<b>Temperature</b> (1 mark)	
<b>pH</b> (1 mark)	
<b>Base excess</b> (1 mark)	
<b>Lactate</b> (1 mark)	
<b>Ionised calcium</b> (1 mark)	
<b>Haemoglobin</b> (1 mark)	
<b>Platelets</b> (1 mark)	
<b>PT/APPT</b> (1 mark)	
<b>Fibrinogen</b> (1 mark)	

**Question 2 (18 marks)**

A 25 year old requires intubation following a drug overdose.

- a. Demonstrate your failed intubation algorithm. (18 marks)

**Question 3 (12 marks)**

A 23 year old man presents with a generalised tonic, clonic seizure.

- a. Define status epilepticus. (2 marks)

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- b. Other than Idiopathic epilepsy/ pre-existing seizure disorder, list four (4) MOST LIKELY causes for his seizure. (4 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

### Question 3 (continued)

You have IV access.

- c. Assuming the seizure continues, despite your treatment, list the agents and dose that you would administer at the specific time frames stated in the table below. (6 marks)

<b>Time since onset of seizure</b>	<b>Agents to be administered (include doses) (6 marks)</b>
<b>0 min (2 marks)</b>	
<b>5 min (1 mark)</b>	
<b>10 min (2 marks)</b>	
<b>20 minute (1 mark)</b>	

**Question 4 (12 marks)**

A 2 year old boy presents with suspected Kawasaki disease.

a. List the six (6) criteria for the diagnosis of Kawasaki disease. (6 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_
5. \_\_\_\_\_
6. \_\_\_\_\_



**Question 4 (continued)**

- b. List four (4) blood tests that support the diagnosis of Kawasaki syndrome. State the expected abnormality. (4 marks)

	<b>Blood test</b>	<b>Expected abnormality</b>
1.		
2.		
3.		
4.		

- c. List two (2) specific treatments recommended in the treatment of a patient with suspected Kawasaki syndrome. (2 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_

**Question 5 (12 marks)**

A 54 year old man presents with 1 hour of central chest pain.

**An ECG is taken on arrival, with 3 additional right-sided praecordial leads- refer to the props booklet- page 2.**

a. State three (3) abnormalities shown on this ECG. (3 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

b. State three (3) SIGNIFICANT implications of these findings. (3 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

**Question 5 (continued)**

Prior to being given any of medication, his blood pressure is noted to be 70/30 mmHg with the same rate and rhythm as shown in the ECG.

- c. Assuming that the blood pressure does not improve, list three (3) specific treatments for his blood pressure. List one (1) justification for each choice. (6 marks)

	<b>Specific treatment (3 marks)</b>	<b>Justification (3 marks)</b>
1.		
2.		
3.		

**Question 6 (12 marks)**

A 4 year old boy presents to the emergency department 1 hour after falling from a playground slide.

On examination:

GCS 12 (E3, V3, M6)

**A CT brain in taken- refer to the props booklet- page 3.**

a. State four (4) abnormalities shown in this CT slice. (4 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**Question 6 (continued)**

The nearest Neurosurgical facility is 20 minutes away by road ambulance.

b. State four (4) pros for endotracheal intubation prior to transfer. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

c. State four (4) cons for endotracheal intubation prior to transfer. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Question 7 (12 marks)**

A 35 year old man presents following stated Gamma-hydroxybutyric acid (GHB) use.

a. List four (4) expected clinical manifestations of GHB toxicity. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

Prior to IV access, the patient becomes combative and states his intention to leave.

b. List four (4) KEY principles in the process of the application of physical restraint. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

**Question 7 (continued)**

The patient is adequately physically restrained. You have not achieved IV access. The patient will require chemical sedation for agitation.

- c. State four (4) KEY steps in your approach to chemical sedation of this patient. (4 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

3. \_\_\_\_\_

4. \_\_\_\_\_

**Question 8 (12 marks)**

a. List four (4) ultrasound features of a normal appendix. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_

b. List four (4) ultrasound features of appendiceal inflammation. (4 marks)

1. \_\_\_\_\_
2. \_\_\_\_\_
3. \_\_\_\_\_
4. \_\_\_\_\_



**Question 8 (continued)**

c. State two (2) KEY pros of CT abdomen in the diagnostic process of suspected appendicitis. (2 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

d. State two (2) KEY cons of CT abdomen in the diagnostic process of suspected appendicitis. (2 marks)

1. \_\_\_\_\_

2. \_\_\_\_\_

**Question 9 (12 marks)**

A 77 year old man presents to your emergency department feeling generally unwell for several days.

His observations are:

HR	36	bpm
BP	120/80	mmHg supine

**Blood test are taken soon after arrival- refer to the props booklet- page 4**

- a. List four (4) calculations to help you to interpret these results. (4 marks)

Derived value 1: \_\_\_\_\_

\_\_\_\_\_

Derived value 2: \_\_\_\_\_

\_\_\_\_\_

Derived value 3: \_\_\_\_\_

\_\_\_\_\_

Derived value 4: \_\_\_\_\_

\_\_\_\_\_

**Question 9 (continued)**

- b. Using the scenario and the derived values, list the primary acid/base abnormality/s. (2 marks)

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- c. Using the scenario and the derived values, define the secondary acid/base abnormality/s. (1 mark)

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- d. List one (1) LIKELY unifying explanation for these results. (1 mark)

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- e. List two (2) KEY treatments that you would institute in the emergency Department in the first 1 hour. Provide one (1) justification for each choice. (4 marks)

	<b>Treatment (2 marks)</b>	<b>Justification (2 marks)</b>
1.		
2.		

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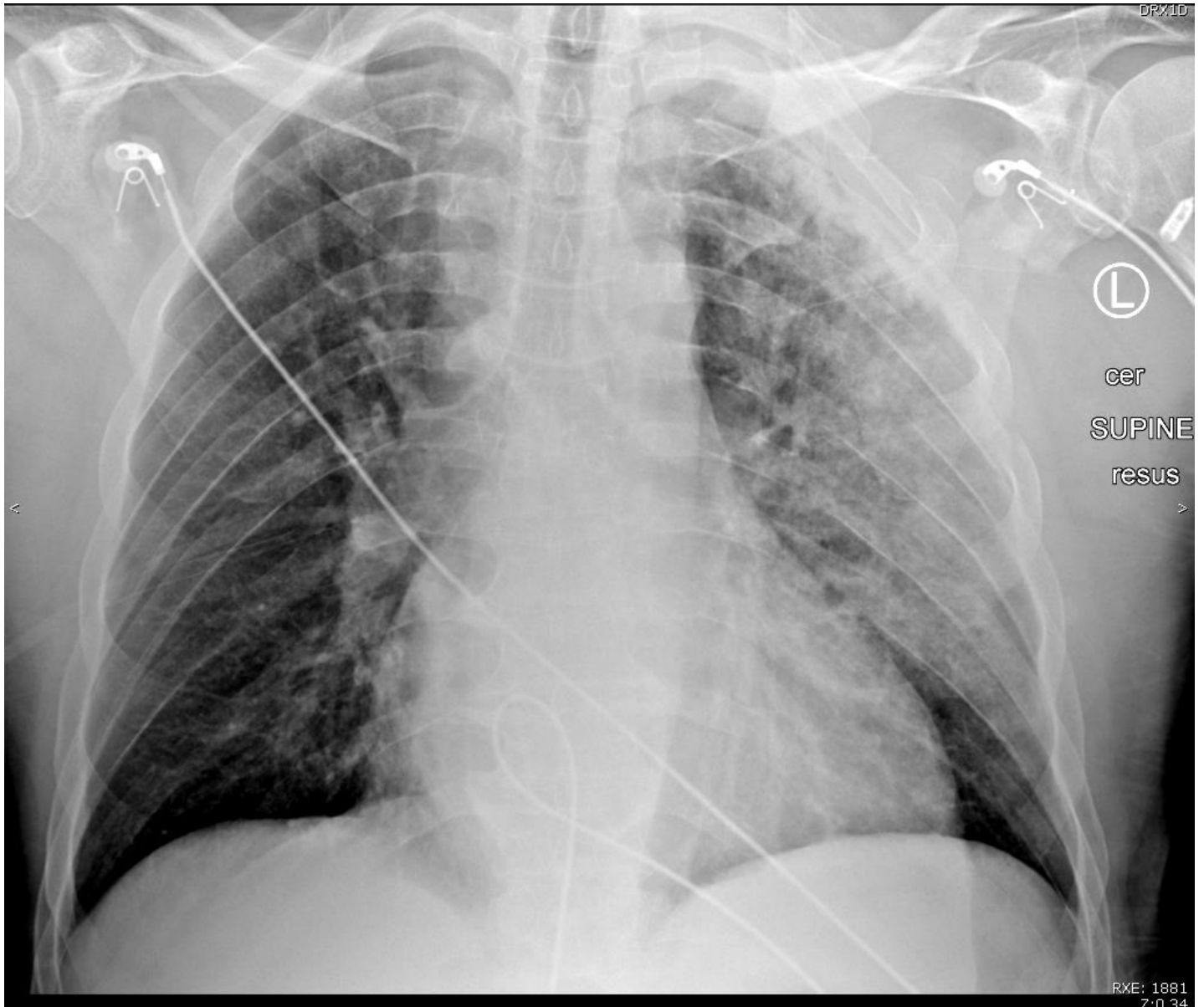
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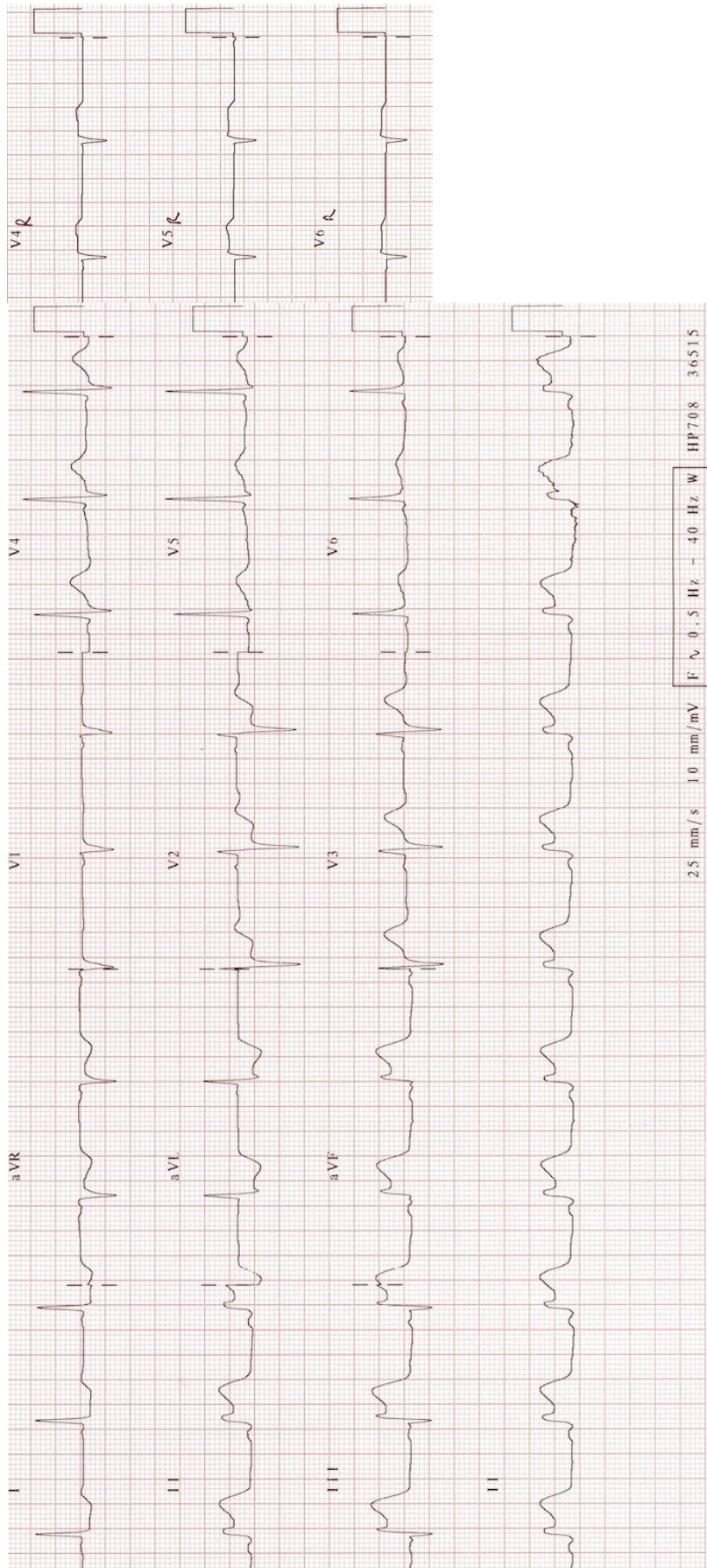
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**PROP BOOKLET**

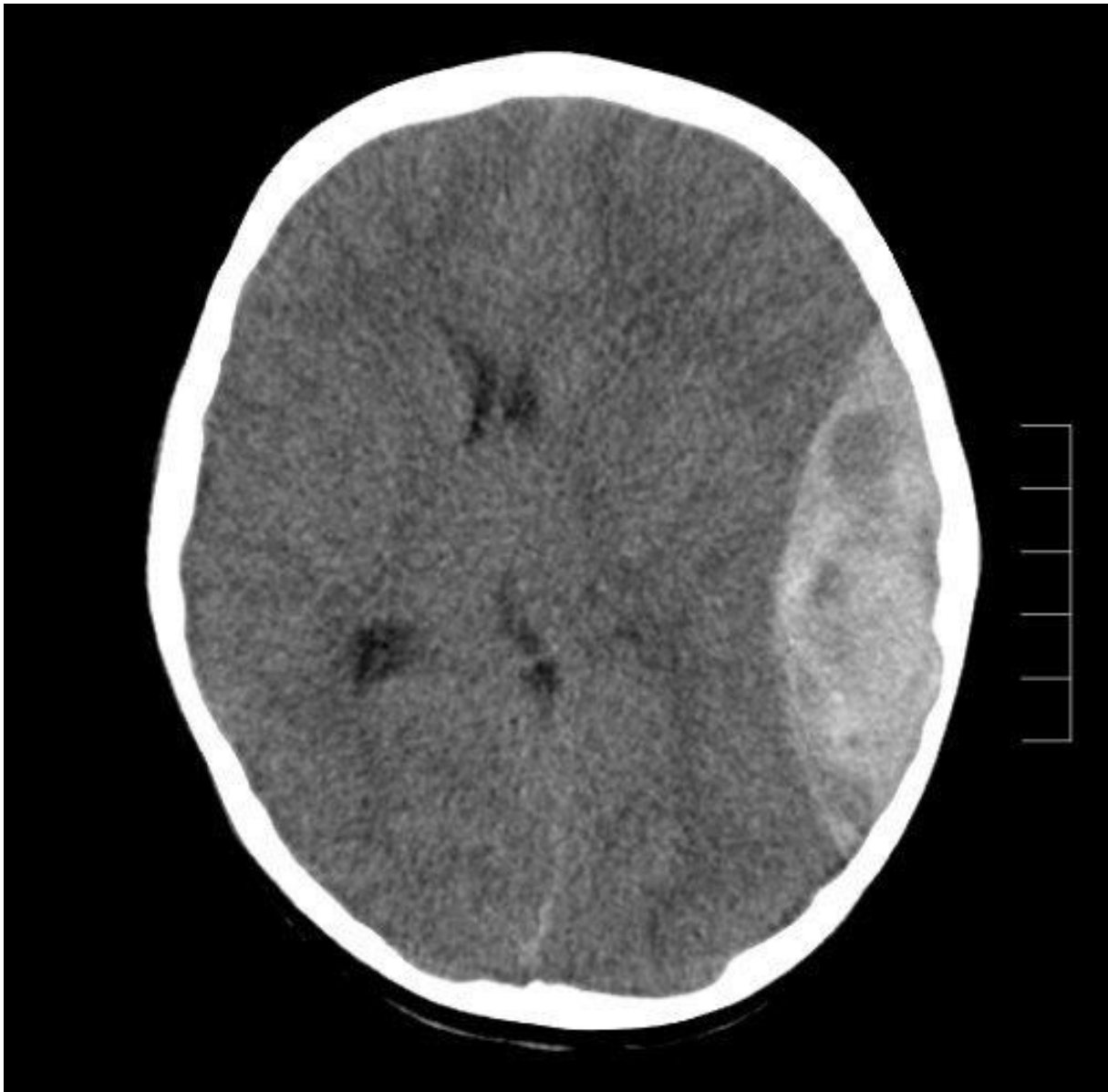
**Question 1**



Question 5



**Question 6**





## Question 9

			Reference Range
F <sub>i</sub> O <sub>2</sub>	0.3		
pH	7.19		(7.35-7.45)
pCO <sub>2</sub>	30	mmHg	(35-45)
pO <sub>2</sub>	119	mmHg	(80-95)
Bicarbonate	14	mmol/L	(22-28)
Base excess	-15		(-3 - +3)
O <sub>2</sub> saturation	97	%	(> 95)
Na <sup>+</sup>	132	mmol/L	(134-146)
K <sup>+</sup>	6.9	mmol/L	(3.4-5)
Cl <sup>-</sup>	98	mmol/L	(98-106)
Urea	49.4	mmol/L	(3-8)
Creatinine	1.05	mmol/L	(0.06 – 0.12)
Glucose	6.1	mmol/L	(3.5-5.5)
Digoxin	5.9	nmol/L	(0.6 – 1)

"List" = 1-3 words

"State" = short statement/ phrase/ clause

UNIVERSITY HOSPITAL, GEELONG  
FELLOWSHIP WRITTEN EXAMINATION

WEEK 9– TRIAL SHORT ANSWER QUESTIONS Suggested answers

PLEASE LET TOM KNOW OF ANY ERRORS/ OTHER OPTIONS FOR ANSWERS

Please do not simply change this document - it is not the master copy !

Question 1 (18 marks)

A 29 year old is involved in high speed MCA. On primary and secondary survey his injuries appear to be restricted to the thorax and abdomen.

- a. State three (3) abnormal findings shown in this CXR. (3 marks)
- # L mid clavicle
  - # L scapula body
  - # L ribs 1-4
  - LUL opacification (*likely contusion – "contusion is not a finding it is an interpretation"*)
  - Widened mediastinum

His BP on arrival is 70/30. He has received no prehospital treatment.

- b. List three (3) LIKELY causes for his low blood pressure.(4 marks)

Any of:

- Massive haemothorax
- Aortic dissection (*rupture less likely as pt would be dead*)
- Pericardial tamponade
- Intraabdominal injury- ruptured spleen/ kidneys/liver/ bowel
- Massive blood loss from external bleeding
- Pelvic #

(*Not tension PTX as says BP on arrival, therefore before this xray has been taken. Could have developed since XR, but other answers better*)



- c. State three (4) KEY principles for the application of massive transfusion. (3 marks)

- **Recognition** of blood loss **early**
- Better to **stop** bleeding than replace losses with blood/ arrest bleeding with early surgical or radiological Rx
- **Blood products** should be **used early** in severe haemorrhage
- **Maintenance** of tissue perfusion/ oxygenation by restoration of blood volume & Hb
- **Judicious** use of blood component therapy to correct coagulopathy

- d. Complete this table demonstrating the aims for parameters in massive transfusion. (9 marks)

Parameter	Aim
Temperature	> 35°C
pH	> 7.2
Base excess	< - 6
Lactate	< 1.5- 4 (different recommended text sources)
Ionised calcium	> 1.1
Haemoglobin	Should not be used alone as a trigger and specific level cannot be defined
Platelets	≥ 50
PT/APPT	≤ 1.5
Fibrinogen	≥1

From [www.transfusion.com.au](http://www.transfusion.com.au)

Additional Qs:

1-Define "massive transfusion". (2 marks)

- adult- replacement of > 100% blood volume (3 units) in 24 hours or >50% of blood volume in 4 hours (6 units)
- child = replacement > 40ml/kg (blood vol > 1mth old 80ml/kg)

2- State the frequency that these blood tests should be repeated in the setting of massive transfusion. (1 mark)

- 30-60 minutely

**Question 2 (18 marks)**

A 25year old requires intubation following a drug overdose.

a. Demonstrate your failed intubation algorithm.

**Initial fail**

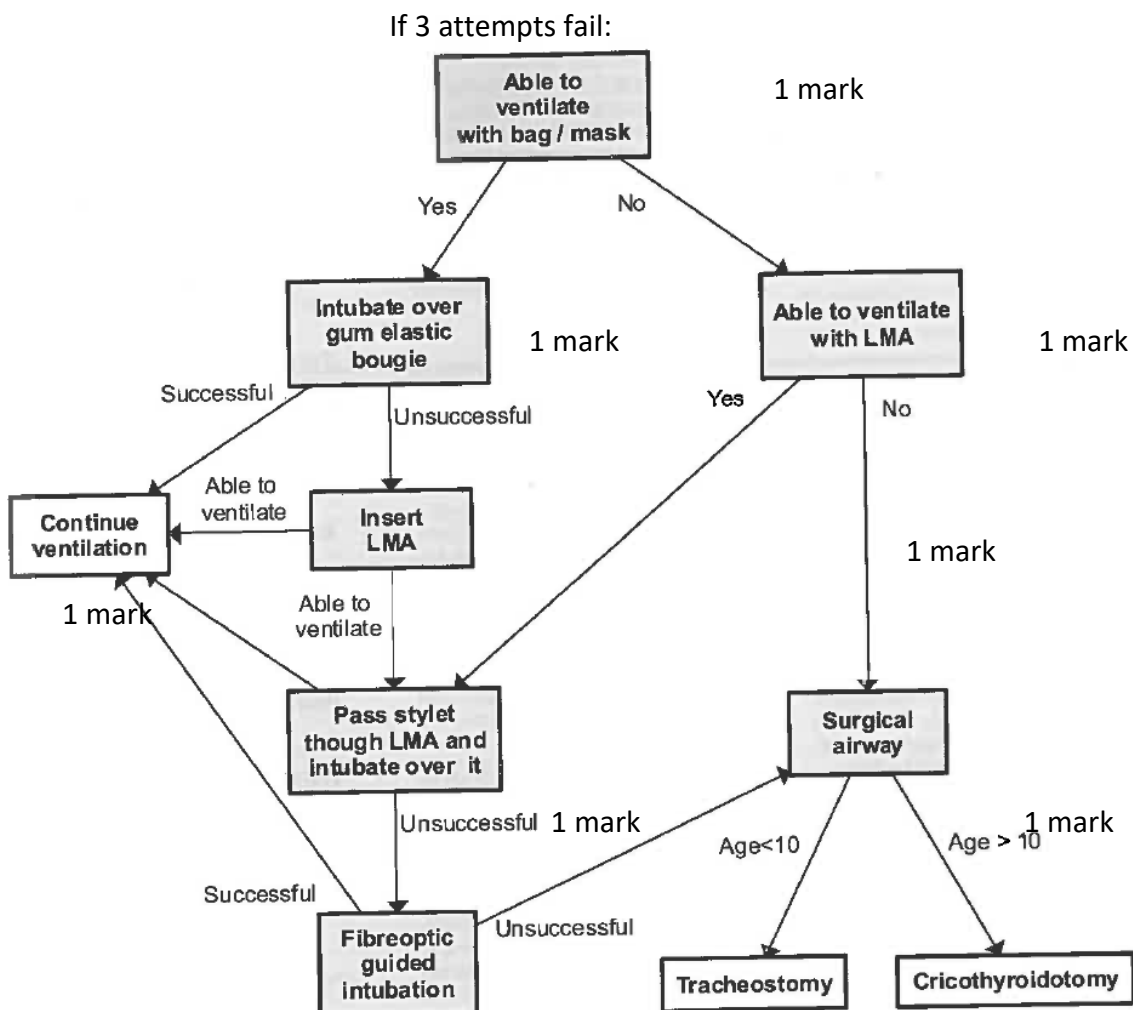
Call for help -1 mark

BVM ventilation + airway adjuncts - (OPA, NPA) -1 mark

Prior to 2<sup>nd</sup> attempt – 7 marks

- Check- position- neck flexion, head extension
- Utilise CMAC
- Laryngeal technique
- Alternative blade choice
- External laryngeal manipulation
- Review sedation
- Review muscle relaxation

Maximum 3(4) attempts - 1 mark



1 mark

1 mark

Additional Q:

List four (4) KEY checks that you would perform in the 10 minutes after establishing appropriate position of an Endotracheal Tube with ETCO<sub>2</sub> monitoring. (4 marks)

- **Tube secured**
- **Depth of tube**
- **ETT / NGT position on CXR**
- **Blood pressure**
- **ECG rhythm/ rate change**
- **Oxygenation- sats**
- **Ventilation**
  - ventilator- appropriate ETCO<sub>2</sub> waveform
  - PIPS
- **Sedation appropriate**
- **NGT insitu**
- **Temperature- sudden increase suggests malignant hyperthermia**
- **Anaphylaxis**
- **ABG**

### Question 3 (12 marks)

A 23 year old man presents with a generalised tonic, clonic seizure.

- a. Define of status epilepticus. (2 marks)
- **Continuous seizure > 30 min**
  - Or**
  - **Multiple seizures without return to normal mentation between seizures**  
*(there is some International push to change the diagnosis to a shorter time frame to reflect the urgency of management)*
- b. Other than Idiopathic epilepsy/ pre-existing seizure disorder, list four (4) MOST LIKELY causes for his seizure. (4 marks)
- a. **1° brain**
    - **head trauma/ SAH**
    - **CNS infection**
    - **cerebrovascular events**
    - **SOL/ brain tumour**
  - b. **metabolic- ↓ Na<sup>+</sup>, ↓ glucose**
  - c. **drug withdrawal- alcohol/ benzos**
  - d. **drug use**
  - e. **toxins/ overdose**
  - f. **pregnancy- eclampsia**
  - g. **sleep deprivation**

You have IV access.

- c. Assuming the seizure continues, despite your treatment, list the agents and dose that you would administer at the specific time frames stated in the table below. (6 marks)

Time since onset of seizure	Agents to be administered (include doses) (6 marks)
0 min	Dextrose 50ml 50% if low BSL Diazepam 5- 10 mg IV or clonazepam 1mg or midaz 5-10mg
5 min	Repeat Bz same dose
10 min	Repeat Bz same dose Load with phenytoin 15mg/kg to maximum 1g over 1 hour
20 minute	Propofol 2-3 mg/kg or thiopentone 2-5 mg/kg

Click on the image below to view the entire PDF (& print/save if necessary)



## Question 4 (12 marks)

A 2 year old boy presents with suspected Kawasaki disease.

- a. List the six (6) criteria for the diagnosis of Kawasaki disease. (6 marks)
  - **Fever  $\geq$  5 days + 4 of below criteria:**
    - **polymorphous rash**
    - **bilateral, non purulent conjunctivitis**
    - **cervical LN > 15 mm**
    - **mucous membrane changes**
    - **extremity erythema + oedema**
  
- b. List four (4) blood tests that support the diagnosis of Kawasaki syndrome and state the expected abnormality. (4 marks)

Blood test	Expected abnormality
WCC	Leucocytosis
Platelets	Marked $\uparrow$ in 2 <sup>nd</sup> week
ESR	$\uparrow\uparrow$
CRP	$\uparrow\uparrow$
LFT	$\uparrow$
ASOT	+ve
Anti-DNAase B	+ve

- c. List two (2) specific treatments recommended in the treatment of a patient with suspected Kawasaki syndrome.
  - **Aspirin (5mg/kg OD 6-8 weeks)**
  - **IV Ig (2g/kg over 10hrs)**

### Additional Qs:

List four (4) epidemiological features of Kawasaki disease. (4 marks)

*NB: Most will struggle with this. Learn how to use your clinical knowledge. Review what "epidemiology" means. Def Epidemiology = is the science that studies the patterns, causes, and effects of health and disease conditions in defined populations.*

- **Self limiting vasculitic syndrome**
- **Unknown cause**
- **75% < 5 yrs**
- **$\uparrow$  incidence in Asian/ Africo Caribbean**
- **Male predominance (1.5-2:1)**
- **10x increase risk siblings**
- **Low recurrence rate < 4%**
- **Marked seasonality (Winter/ Spring in Australasia, Summer in Asia)**

List two (2) possible complications of Kawasaki disease. (2 marks)

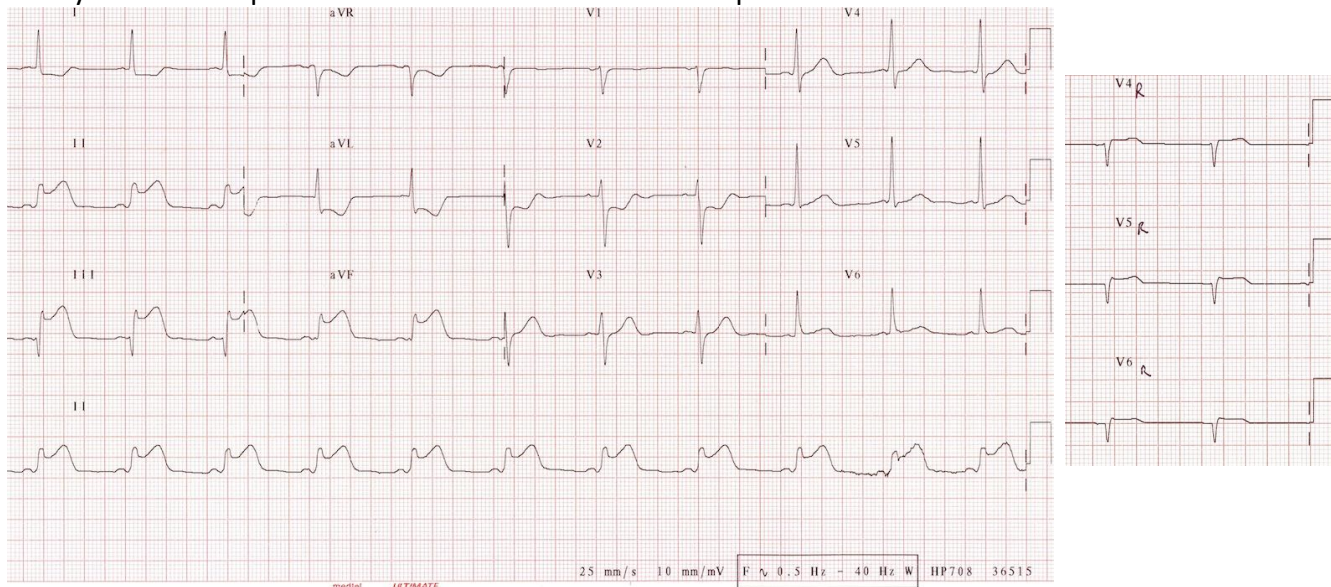
- **Vasculitis Coronary aneurysm, MI, peripheral limb ischaemia, gangrene**
- **Decreased myocardial contractility**
- **Valve regurgitation**

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- **Pericardial effusion**
- **K shock syndrome**
- **Macrophage activation syndrome- DIC, cytopaenias, thrombosis**
- **Sudden death**

### Question 5 (12 marks)

A 54 year old man presents with 1 hour of central chest pain.



- a. State three (3) abnormalities shown on this ECG. (3 marks)
- **STE 4mm II, aVf, 5mm III**
  - **STE 1 mm RV4- 6**
  - **STD 2 mm I, 4 mm aVI, 1mm aVr, 4 mm V2**
- b. State three (3) SIGNIFICANT implications of these findings. (3 marks)
- **Meets criteria for urgent reperfusion Rx**
  - **Right ventricular involvement**
    - **preload problems- anticipate hypotension and treat with fluids**
    - **bradyarrhythmias- anticipate rhythm disturbance**

Prior to being given any medications, his blood pressure is noted to be 70/30 mmHg with the same rate and rhythm as shown in the ECG.

- c. Assuming that the blood pressure does not improve, list three (3) specific treatments for his blood pressure. List one (1) justification for each choice. (6 marks)

Specific treatment	Justification
<b>IV Fluid/ Crystalloid</b>	<b>Volume replacement required in RV involvement Increase preload</b>
<b>IV Inotropes/ Adrenaline</b>	<ul style="list-style-type: none"> <li>- <b>Peripheral dose</b></li> <li>- <b>Peripheral VC</b></li> <li>- <b>↑ cardiac output by improving contractility and peripheral vasoconstriction</b></li> </ul>
<b>Urgent Cath Lab</b>	<b>If the above fail, only PTCA +/- balloon pump will be effective</b>

#### Additional Q:

List four (4) medications that you would commence in the emergency department. Provide doses for each medication. (4 marks)

- **Aspirin 300 mg PO**



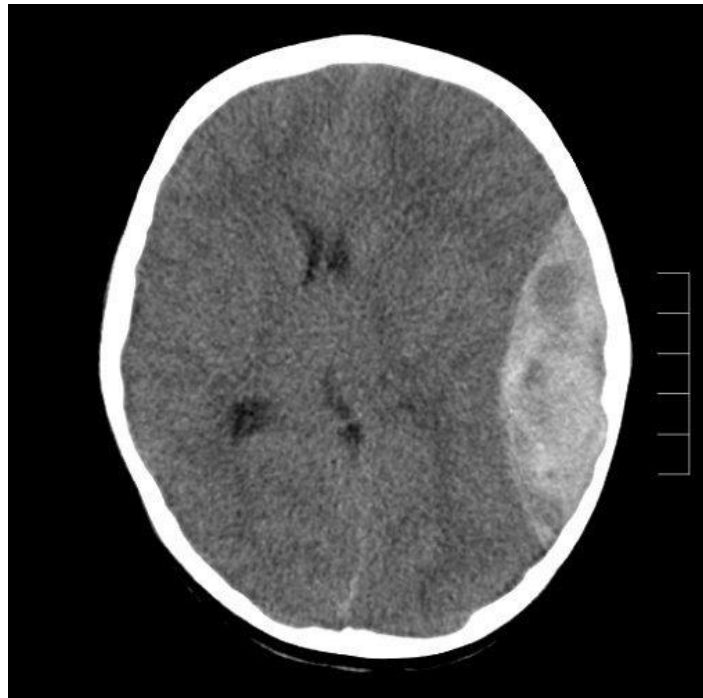
- Ticagrelor 180 mg PO
- IV Heparin 4000-5000 IU then infusion
- IV fentanyl 25 mcg bolus or careful morphine

GTN should be avoided due to possible severe hypotension in RV involvement

### Question 6 (12 marks)

A 4 year old boy presents 1 hour after falling from a playground slide.

On examination GCS 12 (E3, V3, M6)



a. State four (4) abnormalities shown in this CT slice. (4 marks)

- **7x3 cm non homogenous hyperdense collection c/w EDH- REQUIRED**
- **M/L shift**
- **Sulcal effacement**
- **Ventricular effacement**
- **Decrease in G-W matter differentiation**

} signs of ↑ICP  
(interpretation not specifically asked for, but I would put this in)

The nearest Neurosurgical facility is 20 minutes away by road ambulance.

b. State four (4) KEY pros for endotracheal intubation prior to transfer. (4 marks)

- **Definitive airway- avoid airway embarrassment en route/ aspiration**
- **Optimise oxygenation**
- **Optimise ventilation (ie avoid hypercapnia)**
- **Sedation will ↓ agitation ∴ avoid ↑ICP**
- **Paralysis should ↓ agitation ∴ avoid ↑ICP**
- **Facilitate rapid transfer to OT & surgery**
- **Ability to hyperventilate if necessary**

c. State four (4) KEY cons for endotracheal intubation prior to transfer. (4 marks)

- **Likely to/ will delay transfer**
- **Unable to monitor GCS and ∴ monitor for deterioration**
- **Haemodynamics may deteriorate with sedation/ ventilation**

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- **Oxygenation may deteriorate with sedation/ ventilation**
- **ICP may deteriorate with sedation/ ventilation**
- **Extubation risk- both accidental and with planned extubation**

## Question 7 (12 marks)

A 35 year old man presents following stated Gamma-hydroxybutyric acid (GHB) use.

a. List four (4) expected clinical manifestations of GHB toxicity. (4 marks)

- **Agitation- may be periodic/ combatitiveness**
- **Myoclonus/ seizures**
- **Resp depression/ apnoea**
- **Depressed GCS/ lability in GCS/ coma**
- **Bradycardia**
- **Hypotension**
- **Nausea and vomiting- aspiration**
- **Hypothermia**

Prior to IV access, the patient becomes combative and states his intention to leave.

b. List four (4) KEY principles in the process of the application of physical restraint. (4 marks)

- **Pt autonomy vs duty of care**
- **Pt must remain in dept. until assessment completed-**
- **Verbal de-escalation must have been attempted and failed**
  - **Involve family/ friend if possible**
- **Offer of oral chemical restraint offered and failed**
- **Staff and patient safety paramount**
- **Adequate trained staff should be present- security**
- **Least restrictive restraint that can be used to detain pt should be used**
  - **In most cases this is 5 point restraint**
- **Must document decision and reasoning**

c. State four (4) KEY steps in your approach to chemical sedation of this patient. (4 marks)

- **Offer oral- Olanzapine wafer 10mg**
- **Acknowledge any haemodynamic/ conscious state change REQUIRED**
  - **Titrate down any IM/ IV medication given GHB on board**
- **IM (a single acceptable option is ok)**
  - **midazolam 5- 7.5mg IM +/- Ziprasadone 5mg or**
  - **lorazepam 2mg or**
  - **olanzapine 5-10mg**
- **Establish IV access**
  - **Titrate IV midazolam 2mg aliquots**
- **Head up/ nurse at 30- 60 degrees**
- **Monitor- full non invasive (cardiac rhythm, RR, O2 sats, BP)**
- **Document decision process**

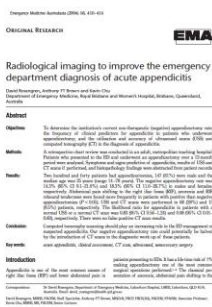
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Week 9

## Question 8 (12 marks)

- a. List four (4) ultrasound features of a normal appendix. (4 marks)
- **Blind ended**
  - **Aperistaltic**
  - **Arises from the base of the caecum**
  - **Usually ovoid in shape**
  - **Gut wall layers identify it as part of the bowel**
  - **Diameter < 6 mm**
  - **Compressible**
- b. List six (6) ultrasound features of appendiceal inflammation. (6 marks)
- **Non compressible**
  - **Rounder in shape**
  - **Transverse diameter > 6 mm (> 10 suggests carcinoid)**
  - **Loss of bowel wall layers in gangrenous change**
  - **Appendicolith- if visualised highly specific**
  - **Indirect features**
    - **Free fluid adjacent to appx**
    - **“creeping fat”**
    - **Regional lymphadenopathy**
- c. State two (2) KEY pros of CT abdomen in the diagnostic process of suspected appendicitis. (2 marks)
- Nb: At least one of each option must relate to diagnostic utility.  
Not “cheap, available, low radiation”*
- **High sensitivity and specificity**
  - **If -ve may avoid -ve laparotomy/laparoscopy**
  - **Alternative Dx eg Colitis**
    - **Visualises retroperitoneum**
  - **Guides surgical intervention**
- d. State two (2) KEY cons of CT abdomen in the diagnostic process of suspected appendicitis. (2 marks)
- **Radiation dose**
  - **Delay in surgical intervention**
  - **Long time from department**
  - **Requires specialist interpretation**
- (NB : Oral/IV contrast is not required to Dx Appx)*

Click on the image below to view the entire PDF (& print/save if necessary)



University Hospital, Geelong- Fellowship Exam Short Answer Questions  
Week 9

## Question 9 (12 marks)

A 77 year old man presents to your emergency department feeling generally unwell for several days. His observations are: BP 120/80 mmHg supine HR 36/min.

			Reference Range
F <sub>o</sub> O <sub>2</sub>	0.3		
pH	7.19		(7.35-7.45)
pCO <sub>2</sub>	30	mmHg	(35-45)
pO <sub>2</sub>	119	mmHg	(80-95)
Bicarbonate	14	mmol/L	(22-28)
Base excess	-15		(-3 - +3)
O <sub>2</sub> saturation	97	%	(> 95)
Na <sup>+</sup>	132	mmol/L	(134-146)
K <sup>+</sup>	6.9	mmol/L	(3.4-5)
Cl <sup>-</sup>	98	mmol/L	(98-106)
Urea	49.4	mmol/L	(3-8)
Creatinine	1.05	mmol/L	(0.06 - 0.12)
Glucose	6.1	mmol/L	(3.5-5.5)
Digoxin	5.9	nmol/L	(0.6 - 1)

a. Provide four (4) calculations to help you to interpret these results. (4 marks)

Derived values:

- **Anion Gap- 20**
- **Delta ratio** =  $\Delta \text{Anion gap} / \Delta [\text{HCO}_3^-]$  or  $\uparrow \text{anion gap} / \downarrow [\text{HCO}_3^-]$   
 =  $\frac{\text{Measured anion gap} - \text{Normal anion gap}}{\text{Normal } [\text{HCO}_3^-] - \text{Measured } [\text{HCO}_3^-]}$  =  $\frac{(AG - 12)}{(24 - [\text{HCO}_3^-])}$   
 =  $\frac{20 - 12}{24 - 14} = \frac{8}{10}$  (HAGMA & NAGMA)

Delta ratio	Assessment Guidelines
< 0.4	Hyperchloremic normal anion gap acidosis
< 1	High AG & normal AG acidosis
1 to 2	Pure Anion Gap Acidosis Lactic acidosis: average value 1.6 DKA more likely to have a ratio closer to 1 due to urine ketone loss
> 2	High AG acidosis and a concurrent metabolic alkalosis or a pre-existing compensated respiratory acidosis

- **Expected CO<sub>2</sub> 29- adequate compensation**
  - **A-a gradient- 154 (expected 23)**
  - **K corrected to pH = 6**
- b. Using the scenario and the derived values, define the primary acid/base abnormality/s. (2 marks)
- **Severe HAGMA**
- c. Using the scenario and the derived values, define the secondary acid/base abnormality/s. (2 marks)
- **Respiratory alkalosis**
  - **NAGMA**
- d. List one (1) LIKELY unifying explanation for these results. (1 mark)
- **Renal failure leading to digoxin toxicity and  $\uparrow K^+$**
  - **Digoxin toxicity adding to  $\uparrow K^+$**
- e. List two (2) specific treatments that you would institute in the emergency Department in the first 1 hour. Provide one (1) justification for each choice. (4 marks)

Treatment (2 marks)	Justification (2 marks)
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University Hospital, Geelong- Fellowship Exam Short Answer Questions  
Week 9

<b>Digibind 10 ampoules as HD unstable 30 minutely</b>	<b>Antidote to reverse life threatening digoxin toxicity with bradycardia and hyperkalaemia</b>
<b>IV NaHCO<sub>3</sub> or insulin/dextrose</b>	<b>Rx hyperkalaemia</b>

*NB: Dialysis will not be available in the first 1 hour  
Calcium is contraindicated in Digoxin toxicity and is a fatal error*