Resuscitation & Critical Care SAQs

Emergency Medicine Fellowship Program

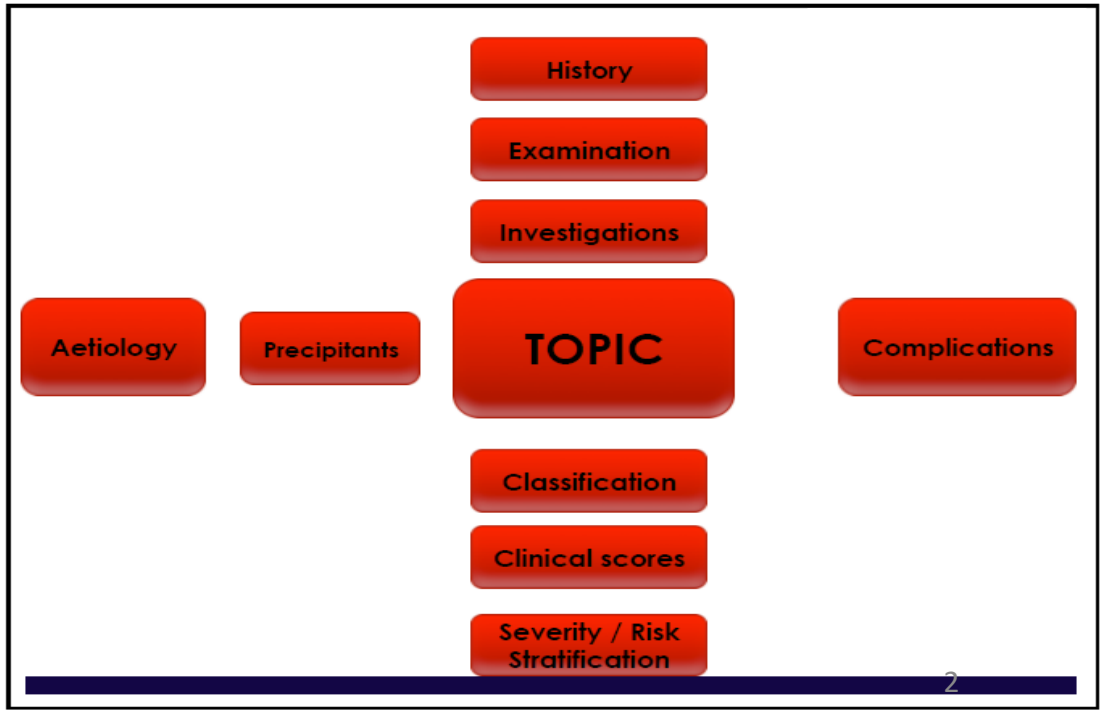
How to use this book:

1) Complete SAQs
- < 3 months until exam: Exam conditions – focus on clear answers ‘to time’
- 3-6 months until exam: Transition towards exam conditions
- > 6 months until exam: Open book is ok, ‘focus on good answers and developing knowledge acquisition

2) Read and study around SAQ
- Use each SAQ as motivation to study around the individual topic
- Think about the different ways the topic could come up in the SAQ exam (use the topic structure provided by APEM course)

3) Write SAQs to further develop this program
- Review syllabus of medical expertise
- Create SAQs relating to topics not covered in this book, please format to be in exam-format, include answers
- This will help further develop this program as well as help you think like an examiner
- Return to ben.shepherd86@gmail.com

ALL THE BEST!



1. RESUSCITATION

1.1 Airway
a) Basic airway maintenance techniques P Ex
b) Oxygen delivery systems Eq Ex
c) Bag mask ventilation P Ex
d) Intubation and rapid sequence induction P Ex
e) Alternative/different airway techniques P Ex
i) laryngeal mask
ii) other
f) Needle/surgical cricothyroidotomy P Ex
g) Tracheostomy P H
h) Tracheal suctioning P Ex

1.2 Airway Management
a) Elective intubation P Ex
b) Confirming endotracheal tube position P Ex
c) Laryngeal mask airway P Ex
d) Capnography I Ex
e) Pulse oximetry I Ex
f) Extubation P Ex
g) Ventilators
i) Used in EDs Eq Ex
ii) Other Eq H
h) Non-invasive ventilation Eq Ex

1.3 Life Support
a) Cardiac arrest DIS Ex
b) Basic life support P Ex
c) ACLS drugs and algorithms M Ex
d) Defibrillation P Ex
e) Special arrest situations
i) Paediatric M Ex
ii) Trauma M Ex
iii) Hypothermia M Ex
iv) Out-of-hospital M Ex

1.4 Vital sign measurement
a) Clinical vital signs (BP, pulse, RR, temp) I Ex
b) Non-invasive electronic monitoring I/P Ex
c) Invasive monitoring P H

1.5 Shock
a) Intravenous fluid composition and therapy M Ex
i) High volume intravenous infusion techniques P Ex
ii) Autotransfusion P G
b) Peripheral venous access P Ex
i) Accessing indwelling vascular devices P Ex
ii) Vascular access techniques in infants & children P Ex
c) Central venous access
i) Subclavian P Ex
ii) Internal jugular P Ex
iii) Femoral P Ex
iv) Cubital P Ex
d) Central venous pressure measurement I Ex
e) Alternative venous access
i) Intraosseus P Ex
ii) Peripheral venous cutdown P H
f) Inotropes D Ex
g) Pressors D Ex
h) Arterial puncture and cannulation P Ex
i) Endotracheal drug delivery M Ex
j) MAST suit P G

COLUMN "LO" – CATEGORIES OF LEARNING OBJECTIVES

DIS	Diseases/Injuries/Symptoms	D	Pharmacological & toxicological agents		
E	Physical Examination	P	Procedures	S	Systems
I	Investigations	Eq	Equipment	NCI	Non-clinical/clinical interface
M	Medical Interventions	T	Theories		

COLUMN "LP" – LEVELS OF PRACTICE

Ex	Expert
H	High
G	General

1.6 Coma
a) Care of the comatose patient M/I Ex
b) Brain death DIS H

1.7 Age-specific differences
Be able to describe the anatomical and physiological differences that might affect resuscitation in the following groups
a) Neonatal T Ex
b) Infant T Ex
c) Paediatric T Ex
d) Elderly T Ex

2. ANAESTHETICS

2.1 General Anaesthetic Techniques
a) Intravenous induction and maintenance agents D Ex
b) Muscle relaxants D Ex
i) Depolarising
ii) Non-depolarising
c) Inhalational anaesthetic agents (including nitrous oxide) D H
d) Drugs for conscious sedation D Ex

2.2 Local Anaesthetic Techniques
a) Local anaesthetic pharmacology and toxicity D Ex
b) Regional nerve blocks P H
i) Digital
ii) Wrist
iii) Brachial plexus
iv) Femoral
v) Facial
vi) Foot
c) Intravenous regional anaesthesia P Ex
d) Local anaesthetic adjuncts and alternatives D H

2.3 Pain Management
a) Acute pain management M/I Ex
i) Drugs
ii) Methods of delivery
iii) Adjucts
b) Chronic pain management T G
c) Pain scores T Ex

2.4 Procedural Analgesia and Sedation P Ex

Resuscitation

A 35 year old man is flown in by air ambulance after being found unconscious in a remote area of bushland in winter. He is in asystole and the ambulance officers are currently performing CPR. His temperature is 28.6° C.

a) Please outline in table form the current advanced life support algorithm for asystolic arrest? (6 marks)

b) What are the major modifications to this algorithm in the case of significant (environmental) hypothermia? (4 marks)

You are working in a regional hospital ED. You receive a call from ambulance that a 4 year-old boy is *en route* after an apparent near-drowning accident in a family swimming pool. CPR is in progress, with bag, valve, mask airway support. Estimated time of arrival is 10 mins.

i) List six (6) specific pieces of equipment that you would prepare for this patient. (6 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

On arrival, the patient is in PEA with a ventricular rate of 50 bpm. The family wish to come in to resus with the child.

ii) List three (3) advantages to this family's presence during the resuscitation. (3 marks)

1. _____

2. _____

3. _____

iii) List three (3) disadvantages to this family's presence during the resuscitation. (3 marks)

1. _____

2. _____

3. _____

The patient arrives and is successfully intubated. Return of Spontaneous Circulation is achieved.

iv) List the ventilator settings that you would commence. (5 marks)

Mode (1 mark)	
Tidal volume (1 mark)	
Respiratory rate (1 mark)	
I:E (1 mark)	
PEEP (1 mark)	

v) Other than adjusting the ventilation settings above, list four (4) specific treatment steps to optimise pulmonary recovery. (4 marks)

1. _____

2. _____

3. _____

4. _____

A 61 year old man presents post VF arrest. He received 1 DCR prehospital. No medications have been given prehospital.

His observations on arrival:

BP	130/60	mmHg
RR	24	/min
Temp	36.5	°C
GCS	15	

An ECG is taken and shown in PROPS booklet ; page 11 .

a) State three (3) abnormal findings shown in this ECG. (3 marks)

1. _____

2. _____

3. _____

b) List four (4) possible explanations for these ECG findings. (4 marks)

1. _____

2. _____

3. _____

4. _____

c) State your preferred definitive treatment for this patient. (2 marks)

_____

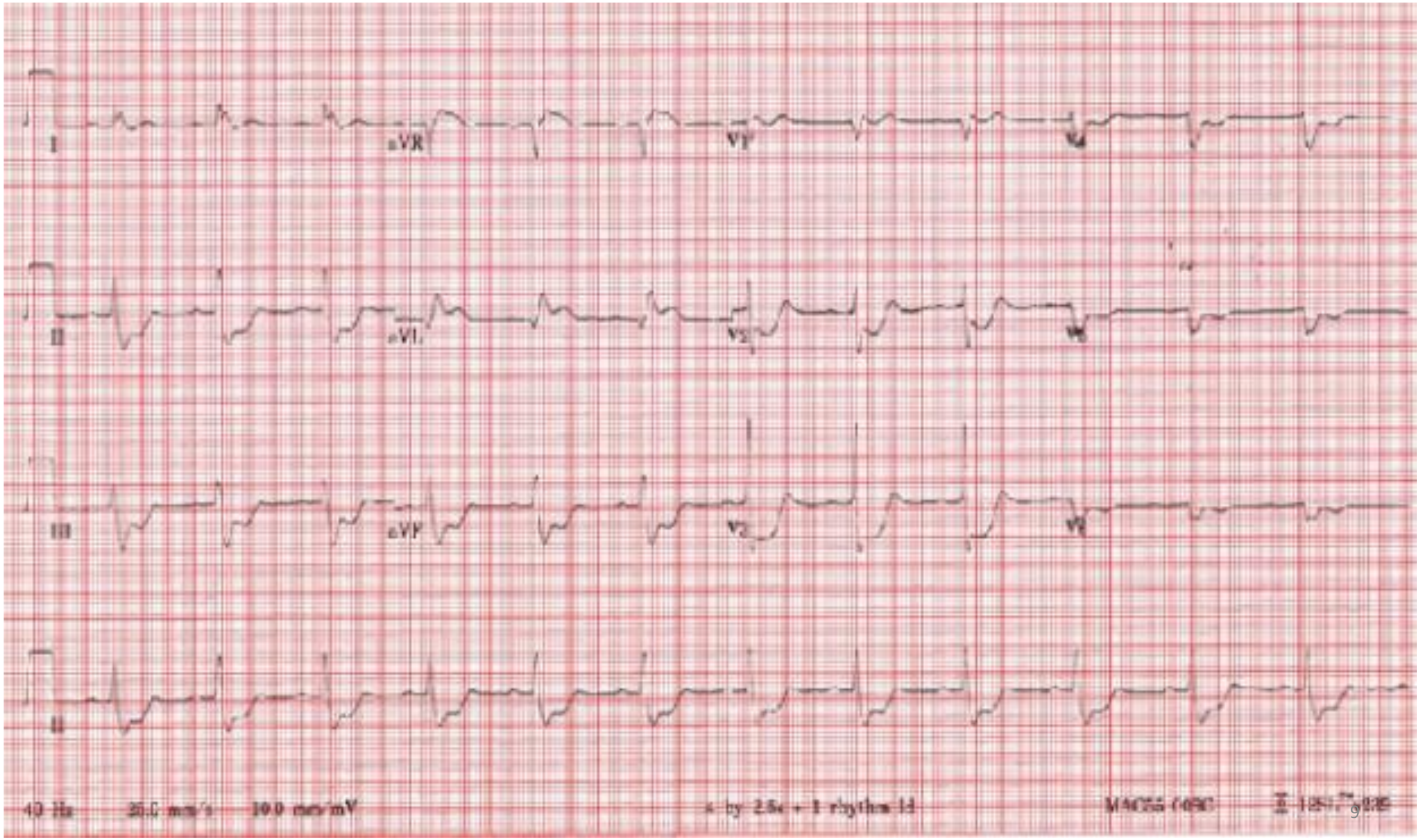
_____

d) Provide three (3) statements of justification for this choice. (3 marks)

1. _____

2. _____

3. _____


I
aVR
V1
II
aVL
V2
III
aVF
V3
II
40 Hz
25.0 mm/s
10.0 mm/mV

You receive ambulance pre-notification of a patient in cardiac arrest. The patient is a 45 year old female with unknown past history. She complained of chest pain prior to collapse nearby to the hospital. She is currently in VF arrest with ACLS in progress. Estimated time of arrival is 5 minutes.

a) Other than duration of ACLS, state six (6) key pieces of information that should be obtained in ambulance handover. (6 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

The patient arrives. ACLS was performed for a total of 12 minutes. She is currently in slow AF at a heart rate of 40 /min with spontaneous circulation. An adrenaline infusion is running.

b) Should this patient be transferred urgently for primary coronary intervention ? (1 mark)

_____

c) Justify your decision. State three (3) points in your answer. (3 marks)

1. _____

2. _____

3. _____

Prior to your decision, the patient deteriorates to ventricular fibrillation.

d) State four (4) benefits of cardiac ultrasound in the ongoing management of this patient. (4 marks)

1. _____

2. _____

3. _____

4. _____

Despite ongoing standard ACLS management, ventricular fibrillation persists for a further 20 minutes without return of spontaneous circulation.

e) List four (4) circumstances under which prolonged CPR may be warranted for this patient.(4 mark)

1. _____

2. _____

3. _____

4. _____

Ambulance officers are bringing a 5-month old baby to your ED, in cardiac arrest. You have a few minutes to prepare your drugs and equipment.

i. Complete the table below (10 marks)

	Formula/calculation	Answer
Estimated weight		
ETT size		
DC shock joules		
Adrenaline dose		
10% glucose dose		

ii. Complete the table below identifying the recommended compression:ventilation ratio for each group (3 marks)

Group	Ratio
Neonatal	
Paediatric	
Adult	

iii. Briefly explain the rationale for different compression ratios in these populations (2 marks)

iv. Briefly explain why the ratio recommended for lay provider BLS is constant across age groups (1 mark)

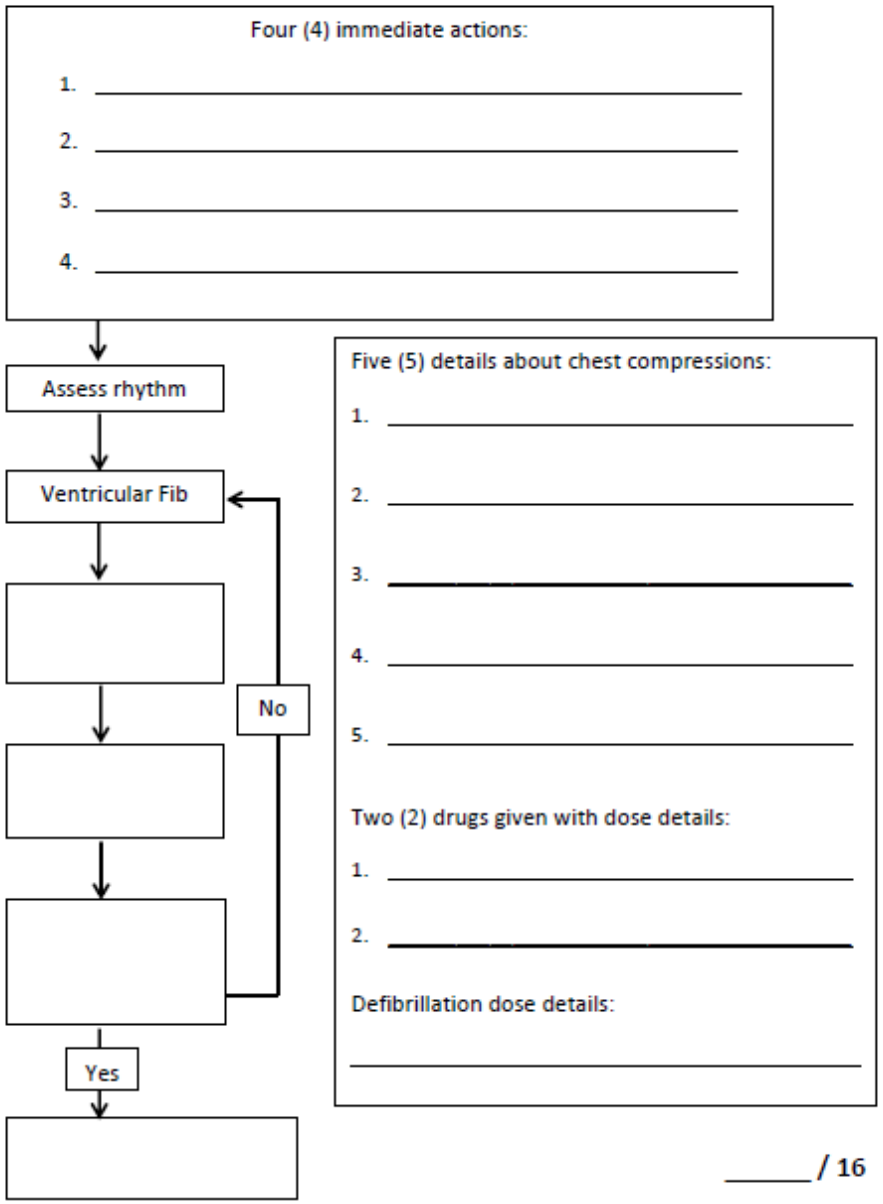
v. The child regains spontaneous circulation but is agitated and requires a rapid sequence induction. Please list the drugs you will choose, including doses (6 marks)

Drug	Dose/kg	Dose

vi. Increasingly cuffed endotracheal tubes are used in paediatric intubations. Briefly explain why, historically, uncuffed tubes were preferred (2 marks)

A 42 year old man has a witnessed collapse whilst sitting in the waiting room. Witnesses say he clutched his chest and then collapsed. You arrive with the emergency department resuscitation team. He is apnoeic and pulseless. The patient has been moved to the resuscitation room.

i. Complete the VF algorithm below, provide details in the relevant boxes.



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ii. If the patient has Return of Spontaneous Circulation (ROSC), is haemodynamically stable but is still unconscious (GCS 3), what are two (2) key issues to be addressed prior to the patient leaving the emergency department? Include two (2) examples of how to do this in each issue.

	Key issue	Examples of how this is achieved
1		1.
		2.
2		1.
		2.

_____ / 6

iii. List four (4) tasks to complete after the patient has left the emergency department.

1. _____
2. _____
3. _____
4. _____

_____ / 4

You receive a Priority One call from the ambulance service. A 6 month old baby has been found unresponsive by his mother. CPR is in progress.

a. Calculate the child's weight and show the formula used (2 Marks)

b. Complete the following table (4 marks)

	Dose calculation - show unit/kg	Dose to be given - show units
Adrenaline		
Cardioversion - unsynchronised		
Fluid bolus (0.9% Saline)		
Dextrose (10%)		

c. The resuscitation of the child was unsuccessful. List your 4 management priorities following this incident. (4 Marks)

1.

2.

3.

4.

With respect to the 2016 Update in resuscitation guidelines of the Australian and New Zealand Committee on Resuscitation:

a) State four (4) new recommendations for Paediatric Life Support. (4 marks)

1. _____

_____

2. _____

_____

3. _____

_____

4. _____

_____

b) State seven (7) new recommendations for Adult Life Support (each must be different to those stated in "18a". (7 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

7. _____

c) List three (3) recommended medications for use in a patient suffering from Crush syndrome and cardiac arrest. Include initial doses for each drug. (3 marks)

1. _____

2. _____

3. _____

An intubated 2 year old child in respiratory failure from severe pneumonitis is waiting transfer to the paediatric ICU. He is ventilated in a pressure control mode.

After a period of relative stability the child becomes acutely hypoxic with elevated airway pressures.

a) List five (5) potential causes for this deterioration: (5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

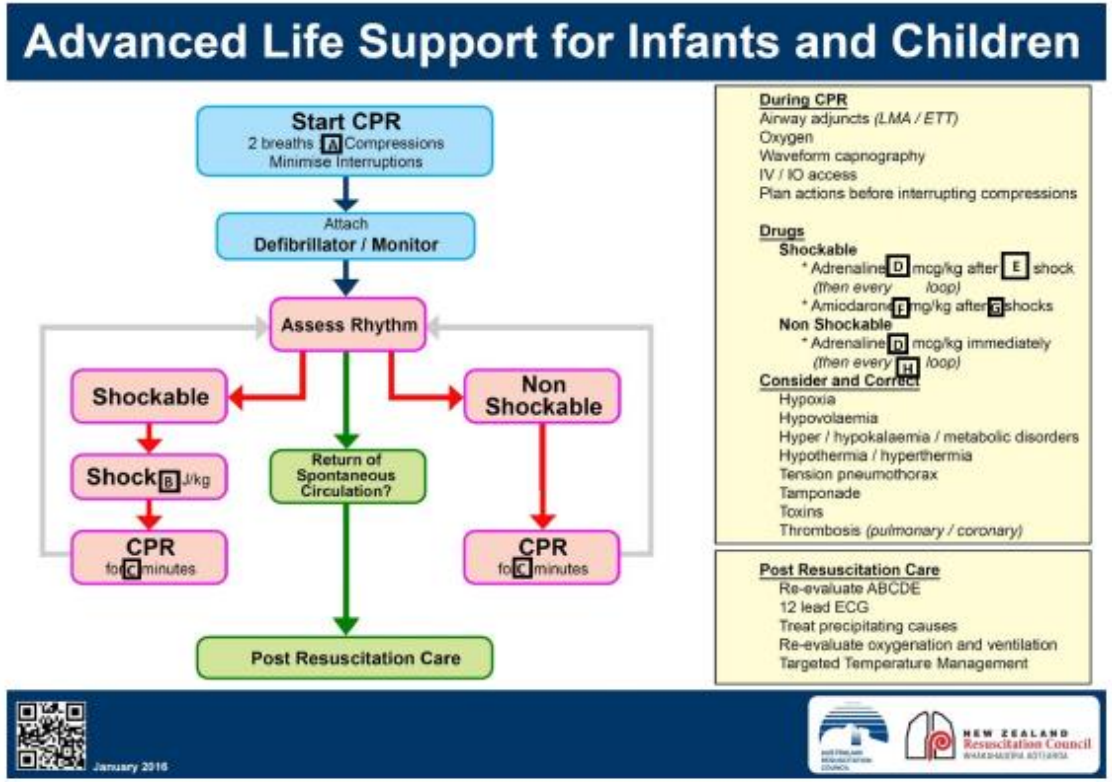
b) State your three (3) most immediate management priorities: (3 marks)

1. _____

2. _____

3. _____

c) The child has a PEA arrest and you commence cardiopulmonary resuscitation. Fill in the missing information (boxes A-H) on the Infant and Children ALS flowchart below: (8 marks)



A)_____ B)_____

C)_____ D)_____

E)_____ F)_____

G)_____ H)_____

A 4 year old boy with a history of congenital heart disease, is brought to your Emergency Department after suffering a VF arrest. A number of DC shocks were unsuccessful and he remains in VF with CPR occurring. The ambulance crew have intubated at the scene, but were unable to obtain IV access.

a). List 3 medications which can be administered via the endotracheal route and the dose for each. (3 marks)

_____

_____

_____

b). Outline the steps for gaining intraosseous access in a paediatric patient in an arrest scenario (4 marks)

_____

_____

_____

_____

3. List 3 possible complications of intraosseous puncture ? (3 marks)

_____

_____

_____

_____

A 55-year-old male presents after an out of hospital cardiac arrest. He had a 7 minute downtime with effective bystander CPR prior to the arrival of the paramedics. The patient is being hand-bagged via facemask.

See image on page 11 in separate book

Below is the ambulance arrest summary:

Time since ALS start	Rhythm	Action/Drugs
0 minutes	VF	200J shock/CPR IV access
2 minutes	VF	200J shock/CPR 1mg adrenaline 1:10000

The patient arrives at the 3rd minute of the arrest cycle.

1. Fill in the table below for the timing of the next 2 rhythm checks and treatment in that cycle based on the rhythms found. (2 marks)

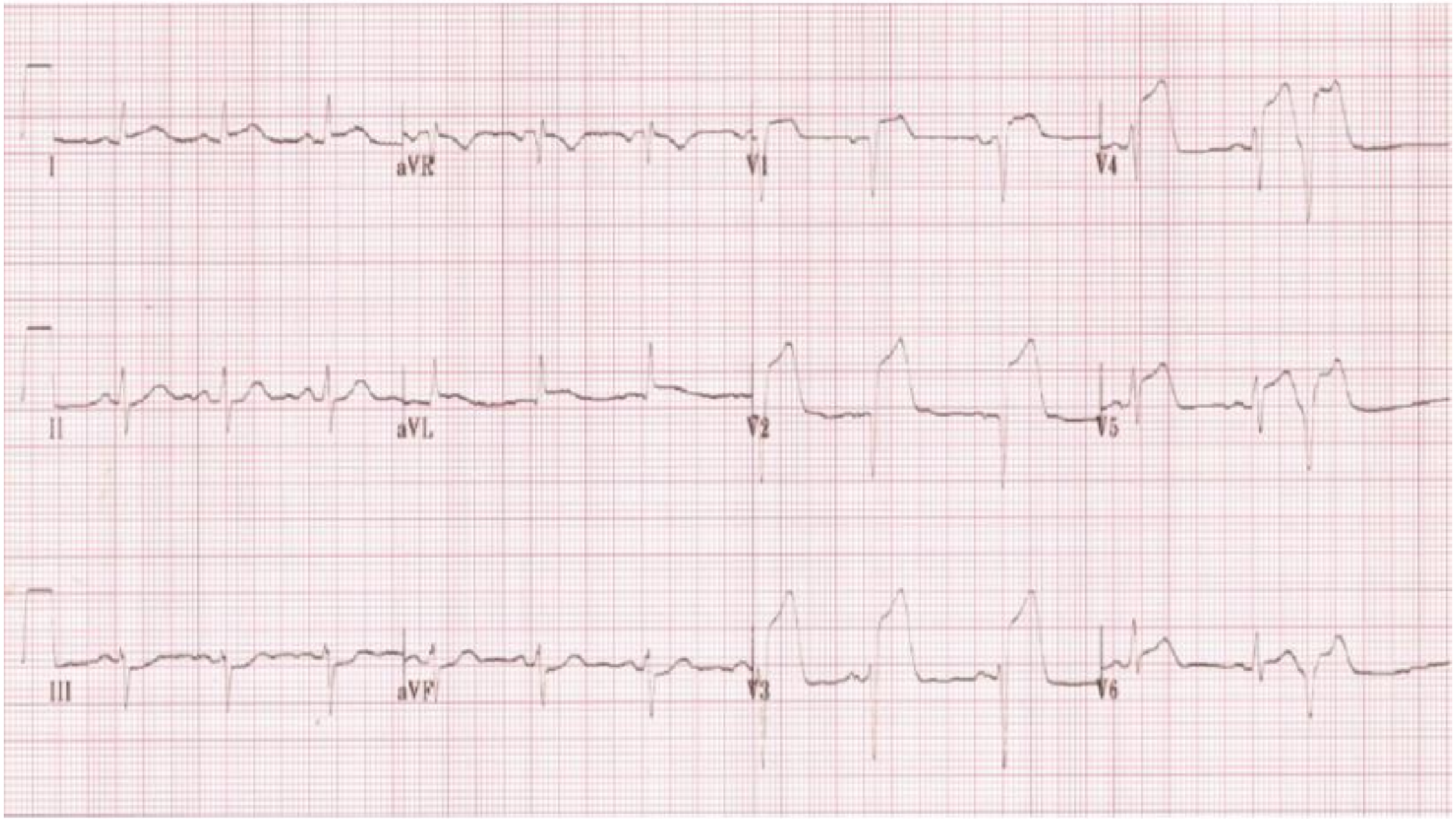
Time since ALS start	Rhythm	Action/Drugs
	VF	
	VF	

ROSC is achieved after 8 minutes.

2. Describe 4 abnormalities in this ECG. (2 marks)

3. What phenomenon indicates that this patient is at high risk of arrhythmias? (1 mark)

4. List 4 management priorities now that the patient has ROSC. (4 marks)


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6

A 25 year old man is brought to your emergency department following a work place injury. He was cleaning equipment with a high pressure hose that snapped, striking him in the throat. He is seated upright on the ambulance stretcher, drooling and not talking. On examination he has a soft but audible stridor. His observations are all within the normal range.

1. List five (5) pieces of equipment you would like available for immediate management of his airway.

2. Describe pros and cons for three (3) different options for securing his airway.

Airway intervention	Pros	Cons

3. Describe five (5) steps in your preferred first option for securing his airway. Include drugs and doses.

You have just intubated a 24 year old man for airway protection, after his ingestion of a significant overdose of benzodiazepines. His vital signs are normal, and he has no significant past medical history or known allergies.

i. List six (6) methods that may be used to confirm correct endotracheal tube position.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

The capnography trace suddenly falls to a flat line with a reading of zero.

ii. Outline four (4) possible explanations for this and the corrective action(s) you would take in response to each.

	Explanation	Corrective Action(s)
1		
2		
3		
4		

You are the consultant in an emergency department in a regional hospital with off site anaesthetics back up (30 minutes away).
You receive a phone call about the arrival of a morbidly obese patient within 10 minutes with respiratory distress. The paramedic anticipates that patient will need to be intubated.

a) List four (4) anatomical changes with obesity which work against successful airway management. (4 marks)

1. _____

2. _____

3. _____

4. _____

b) List six (6) steps that you would take to prepare for patient's arrival. (6 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

c) A few minutes later, ambulance brings a 130 kg man (BMI = 40), write down three (3) of your preferred medications for induction of anaesthesia. State the dose you would use for each choice (assume normal BP and HR). (6 marks)

	Medication	dose
1		
2		
3		

A 55 year old woman with PMH of hypertension, presents with features suggestive of severe community acquired pneumonia to your tertiary emergency department. She is 70 Kg ,Her vitals :

HR	130	bpm
BP	90/45	mmHg
Sats	87%	on 15 L O2 hudson mask
RR	50	/ min
Temp	37.6	°C

You decide that urgent intubation is required. IV antibiotics and 1 Litre Normal Saline are given with no change to her observation.
a) List you medication regime for RSI (including dosage) and state one (1) justification for this regime. (9 marks)

	Medication	Dosage	Justification
1			
2			
3			

On first attempt at intubation, you achieve a grade 4 view of the vocal cords.
b) state two (2) things you will do to **optimise this view** before attempting to intubate. (2 marks)

1. _____

2. _____

After optimising your view the best you can get is a grade 3 view.
c) state two (2) options you might utilise to optimise your chance of successful intubation on this attempt? (2 marks)

1. _____

2. _____

After you attempt intubation, the patient becomes hypoxic and you are concerned the ETT might be in the oesophagus.
d) State Four (4) methods to identify the correct ETT position in this patient? (4 marks)

1. _____

2. _____

3. _____

4. _____

You are managing a 45 year old male who requires endotracheal intubation and you assess the patient to have a difficult airway.

a) List four (4) SPECIFIC circumstances that would lead you to choose awake, fibreoptic guided intubation as your first intubation method of choice. (4 marks)

1. _____

2. _____

3. _____

4. _____

b) List four (4) patient factors that would allow you to choose awake, fibre-optic intubation. (4 marks)

1. _____

2. _____

3. _____

4. _____

Following your assessment you decide to progress with rapid sequence induction. You are unable to pass an endotracheal tube and progress to place a laryngeal mask airway.

c) State three (3) advantages of placement of a laryngeal mask airway as compared to ongoing bag, mask ventilation. (3 marks)

1. _____

2. _____

3. _____

d) State three (3) disadvantages of placement of a laryngeal mask airway as compared to an endotracheal tube. (3 marks)

1. _____

2. _____

3. _____

e) List four (4) clinical findings that would make you suspect malignant hyperthermia. (4 marks)

1. _____

2. _____

3. _____

4. _____

A 62 year old male is brought to ED by ambulance after falling 4 metres from a ladder, sustaining a head injury. Primary survey is unremarkable apart from a significant head injury. There is an obvious swelling to the left side of his face and it is difficult to open his left eye.

Observations are:

HR 100, BP 100/60, SaO2 99% RA, RR 16, GCS 6

i. You elect to undertake an RSI to secure his airway prior to imaging. Complete the tables below:

   a) List 2 possible sedative drugs and doses you could use to facilitate RSI (4 marks)

   b) List one potential positive and one potential negative aspect of each drug's pharmacodynamics in this patient (4 marks)

Drug		
Dose		
Positive pharmacodynamics specific to head injured patient		
Negative pharmacodynamics specific to head injured patient		

ii. List 4 positive findings from the 2 axial CT images (4 marks)

2 AXIAL IMAGES OF A CT BRAIN ARE SHOWN IN THE PROPS BOOKLET, PAGE 5 & 6

iii. Neurosurgery review the patient and are keen to take the patient to theatre urgently. A lateral canthotomy is also suggested. List 3 signs in an unconscious patient that would suggest a need for urgent lateral canthotomy (3 marks)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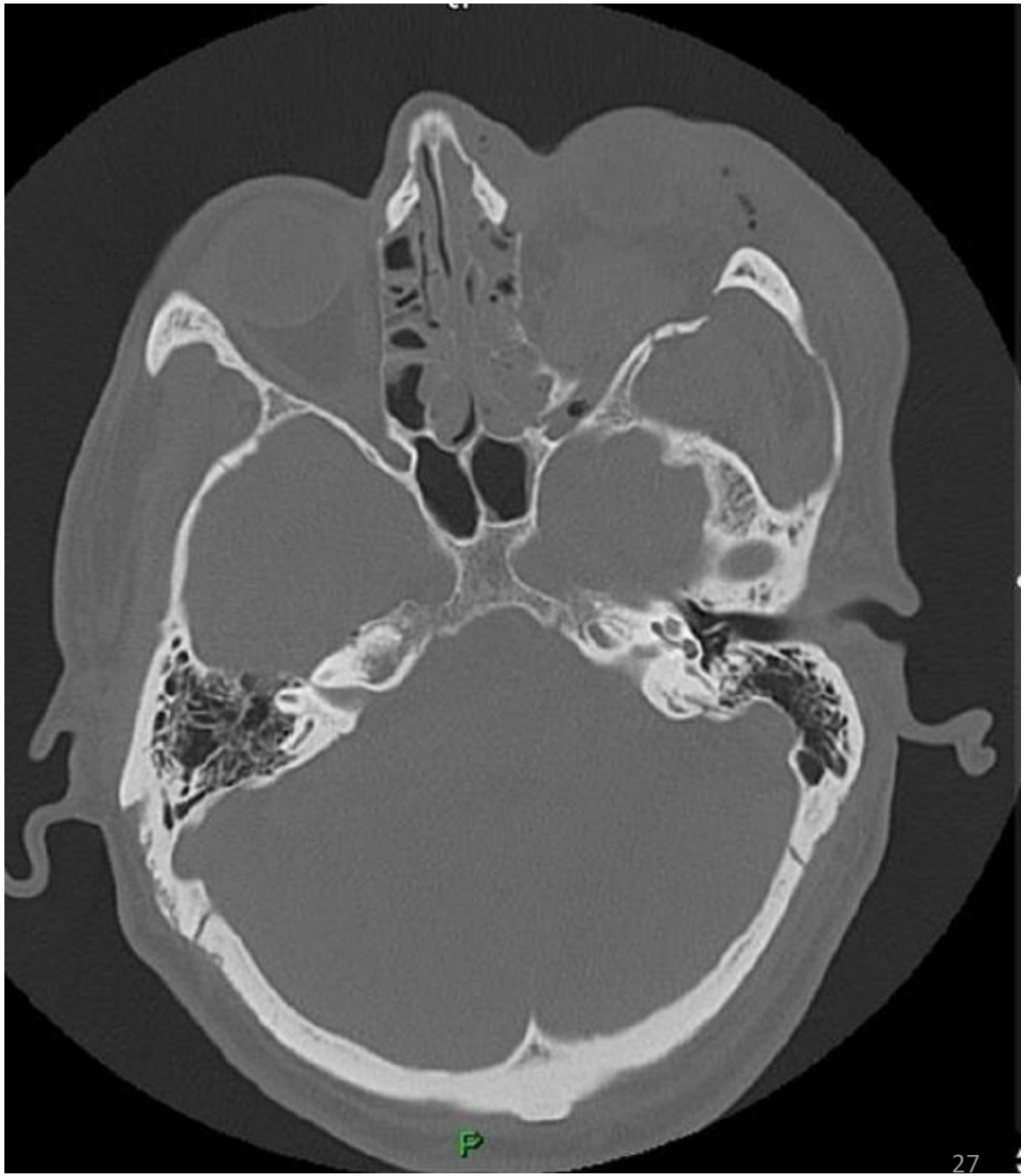
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You have successfully intubated a 48 year old male using rapid sequence induction. The ETT is confirmed to be in the correct place. You are asked for the ventilator settings.

i. List the initial settings for a patient with pneumonia (lung protective strategy) and asthma using the following table.

Settings	Pneumonia	Asthma
Ventilator mode		
Tidal volume		
Resp rate		
P(insp) – if PCV		
PEEP		
FiO_2		
I:E ratio		

ii. Twenty (20) minutes later you are called to the patient because their oxygen saturation has fallen to 85%. What are six (6) immediate actions you will take?

1. _____
2. _____
3. _____
4. _____
5. _____
6. _____

A 78 yr old male presents to your ED complaining of tongue swelling and dysponea.

Vital signs:

P 95
BP 168/79
RR 24

Sats 93% RA
Temp 36.8 °C

a. Describe the clinical image of the patient (3 Marks)

b. List 4 potential causes for this patient's condition (2 Marks)

1.

2.

3.

4.

c. Outline your management of this patient (5 Marks)

Precipitous deterioration can occur around the time of intubation in several specific situations.

i. Explain the pathophysiology of the cardiovascular collapse that can occur at induction of a patient with **severe aortic stenosis** (4 marks)

ii. Cardiovascular collapse can occur at the induction, intubation and ventilation of a patient with **severe metabolic acidosis**. Outline measures you would take to prevent this from occurring (4 marks)

iii. Explain the pathophysiology of the cardiovascular collapse that can occur at induction, intubation and ventilation of a **severe asthmatic** (4 marks)

A 45yo male has become unresponsive a few seconds after receiving 500mcg of IM adrenaline for florid anaphylaxis (hypoxia, hypotension, welting, wheeze and tongue swelling) to snake bite antivenom.

•You elect to intubate using ketamine and suxamethonium (assuming that there are no contraindications).

•Complete the table by entering difficulties that you may anticipate and entering the immediate remedies that you'd institute for these.

Potential difficulty	Remedy
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Follow on: Outline the ventilation strategy that you will employ in this case.

A 21 year old male presents to the ED with severe asthma. He is receiving continuous nebulised salbutamol, bolus corticosteroid and a magnesium infusion. Despite these interventions he is noted to be increasingly drowsy and confused, with HR 150 bpm, sats 86% on 15 L/min o2 via mask, RR 32/minute and temperature 37.9 C.

You decide to intubate this patient.

a) List 3 significant risks associated with intubating this patient (3 marks)

_____
_____
_____
_____

b) List the medications and doses you would use(2 marks)

_____
_____
_____

c) List the specific risks of ventilating this patient, including (3 marks)

_____
_____
_____
_____
_____

d) Given the risks listed above, outline your ventilator settings for this patient with particular attention to how they would differ from those in a nonasthmatic patient (2 marks)

_____
_____
_____
_____
_____
_____

You are about to receive handover for a 25 year old male intubated patient.

A trace from the patient is shown in the **PROPS BOOKLET ; PAGE 8**

a) State five (5) pieces of information that can be obtained from this trace. (5 marks)

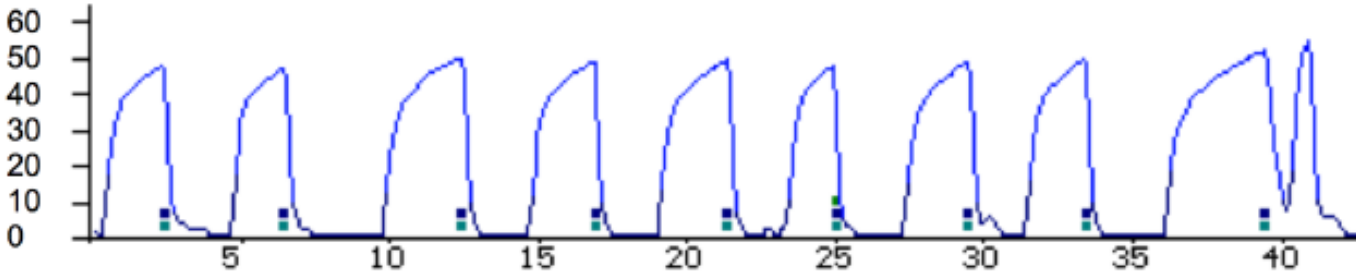
1. _____

2. _____

3. _____

4. _____

5. _____



b) List four (4) likely specific indications for intubation for this patient. (4 marks)

1. _____

2. _____

3. _____

4. _____

c) State four (4) aims of ventilation for this patient. (4 marks)

1. _____

2. _____

3. _____

4. _____

d) State five (5) techniques that you may employ to achieve these aims. (5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

An 80 year old woman from home presents with fever, cough and collapse. She has a history of chronic renal failure, hypertension and congestive cardiac failure.
On arrival her observations are as follows:

Temp	39	oC
HR	80	/min
BP	80/70	mmHg
SaO2	89%	on 6L O2 via Hudson mask
GCS	14	(E4, M6, V4)

i. Complete the following table listing three (3) alternative methods for assessing the fluid status of this patient. For each method state two (2) pros and two (2) cons. (9 marks)

	Method (3 marks)	Pros (3 marks)	Cons (3 marks)
1			
2			
3			

ii. Complete the following table listing three (3) alternative methods for improving oxygenation in this patient. For each method state two (2) pros and two (2) cons.

	Method (3 marks)	Pros (3 marks)	Cons (3 marks)
1			
2			
3			

iii. List four (4) steps in establishing limitations of care for this patient. (4 marks)

1 _____

2 _____

3 _____

4 _____

A 52 year old woman presents to your emergency department with breathlessness for the last 24 hours. She is known to have Chronic Obstructive Airways disease in association with alpha-1 antitrypsin deficiency

i. Complete this table, describing the utility of venous blood gas variables for this patient.

Variable	Utility of variable (8 marks)
pH (2 marks)	
pCO_2 (2 marks)	
pO_2 (2 marks)	
HCO_3^- (2 marks)	

ii. List four (4) indications for Bi-level Positive Airway Pressure for this patient. (4 marks)

1 _____

2 _____

3 _____

4 _____

iii. Complete the table demonstrating your regime for Bi-level Positive Airway Pressure for thi patient. (5 marks)

Variable	Settings (5 marks)
Initial IPAP	
Maximum IPAP	
Initial EPAP	
Maximum EPAP	
Time period to increase from initial settings	

iv. List five (5) indications for intubation in this patient. (5 marks)

1 _____

2 _____

3 _____

4 _____

5 _____

You decide to progress to intubation soon after arrival to the emergency department. The patient has received 10mg Salbutamol via nebuliser only. She weighs 70 kg.
Her observations prior to arrival are:

BP	100/60	mmHg
HR	130	/min
RR	30	/min
Temp	37	°C
GCS	15	

v. Complete the table provided with regards to intubating this patient. (7 marks)

ETT size (1 mark)	
Pretreatment (2 marks)	
Induction agent and dose (2 marks)	
Relaxant agent and dose (2 marks)	

vi. List your initial ventilator settings for this patient. (7 marks)

Ventilator mode (1 mark)	
Tidal volume (1 mark)	
Respiratory rate (1 mark)	
P(insp) - if PCV (1 mark)	
PEEP (1 mark)	
FiO_2 (1 mark)	
I:E ratio (1 mark)	

a) State the two (2) features of Inferior vena cava measurement by Ultrasound that supports a reduced central venous pressure measurement. (2 marks)

1. _____

2. _____

b) State four (4) limitations to the use of inferior vena cava measurement by Ultrasound, in the Emergency Department setting, for the assessment of intravascular volume. (4 marks)

1. _____

2. _____

3. _____

4. _____

c) Other than Inferior vena cava measurement, list four (4) uses for Bedside ECHO in the setting of a cardiac arrest. (4 marks)

1. _____

2. _____

3. _____

4. _____

d) State three (3) arguments for the use of crystalloid in fluid resuscitation for shock. (3 marks)

1. _____

2. _____

3. _____

e)State three (3) arguments for the use of colloid in fluid resuscitation for shock. (3 marks)

1. _____

2. _____

3. _____

f) State five (5) current recommendations for fluid therapy in severe sepsis. (5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

A 65 year old woman presents with a recurrent exacerbation of chronic obstructive airways disease worsening overnight, She is alert but looks tired and Her Vital signs are:

HR 130 bpm ; BP 105/45 mmHg ; Sats 87% on 15 L O2 hudson mask ; RR 50/min ; T 37.6 °C

a) List Four (4) indications and contra-indications for non-invasive ventilation in any patient (8 marks).

	Indications	Contra-indications
1		
2		
3		
4		

an Arterial blood gas has been performed which shows :

pH 7.21
pCO_2 70 mmHg
pO_2 75 mmHg
HCO_3 27 mmol/l
B.E. -1.5
Lactate 1.9 mmol/l

b) What form of NIV would you recommend for this patient? And why? (2 marks)

c. What three (3) initial settings for the above mode of NIV would you choose? and why? (6 marks)

	Setting	Justification
1		
2		
3		

A few minutes after starting NIV, as the x-ray was being taken, she became suddenly unwell with chest pain, increased work of breathing. Her vital signs:
HR 135 bpm ; BP 75/45 mmHg ; Sats 80% on NIV100% FiO_2 ; RR 60/min.
As you resuscitate her the x-ray becomes available and **shown in PROPS booklet; page 14.**

d) What complication of NIV has she suffered? (1 Mark)

e) State four (4) emergent management tasks that should be performed? (4 marks)

1. _____

2. _____

3. _____

4. _____

f) List four (4) other complications can occur with NIV? (4 marks)

1. _____

2. _____

3. _____

4. _____

A 69 year old morbidly obese man has presented to a rural emergency department with two days of worsening dyspnoea.

Vital Signs:	HR	124
	BP	90/54
	RR	36
	Sats	90% on 8l/min Hudson mask
	Temp	38.8C

He has been treated for respiratory sepsis and has had initial resuscitation with 3 litres normal saline and IV Ceftriaxone and Azithromycin, as per local antibiotic guidelines.

The local doctor is requesting retrieval of the patient to a tertiary hospital as the hospital has no HDU facility. You are the retrieval co-ordinator, and the local doctor is seeking advice on how to optimise the patient whilst they wait for the retrieval team.

During the conversation you review the following point of care arterial blood gas (ABG) & vital signs:

pH	7.10	(7.35-7.45)
paO2	59	(80-100)
SaO2	91	
paCO2	60	(35-45)
HCO3	16	(22-27)
BE	-9	
Lactate	6	(<2.0)
HR	119	bpm
BP	89/47	mmHg
RR	38	/min
Sats	91%	on 15L NRM

a) What is the acid-base abnormality? (1 mark)

b) List three (3) key steps in the management you would recommend be instituted in the anticipated 2 hours prior to retrieval team arrival? (3 marks)

1. _____

2. _____

3. _____

When the retrieval registrar arrives at the referring hospital the patient is still receiving oxygen via a non-rebreather mask and their ABG results are similar to those above. The patient is co-operative but does find the face-mask uncomfortable. The patient is to be transported by fixed wing transport (2 hours including transfers).

c) Complete the following table indicating the relative risks and benefits of respiratory support options for this patient. (6 marks)

	Non-rebreather Mask (NRM)	**Non-Invasive Ventilation (NIV)**	**Intubation & Ventilation (IPPV)**
Risk			
Benefit			

A 75 year old man has been resuscitated following an out-of-hospital cardiac arrest. He has been taken to a small regional Emergency Department. He was intubated at scene. His past history is unknown but paramedics have brought a bag of his normal medications: frusemide, spironolactone, digoxin and warfarin.

THE PATIENT'S ECG IS SHOWN IN THE PROPS BOOKLET, PAGE 7

i. What are the 3 main findings in this ECG? (3 marks)

_____

_____

_____

ii. List 3 potential causes of the dysrhythmia in this patient (3 marks)

_____

_____

_____

iii. A retrieval team has been dispatched by helicopter with an estimated flight time of 2 hours. For the safe transfer of this patient, list the minimum monitoring modalities required (5 marks)

_____

_____

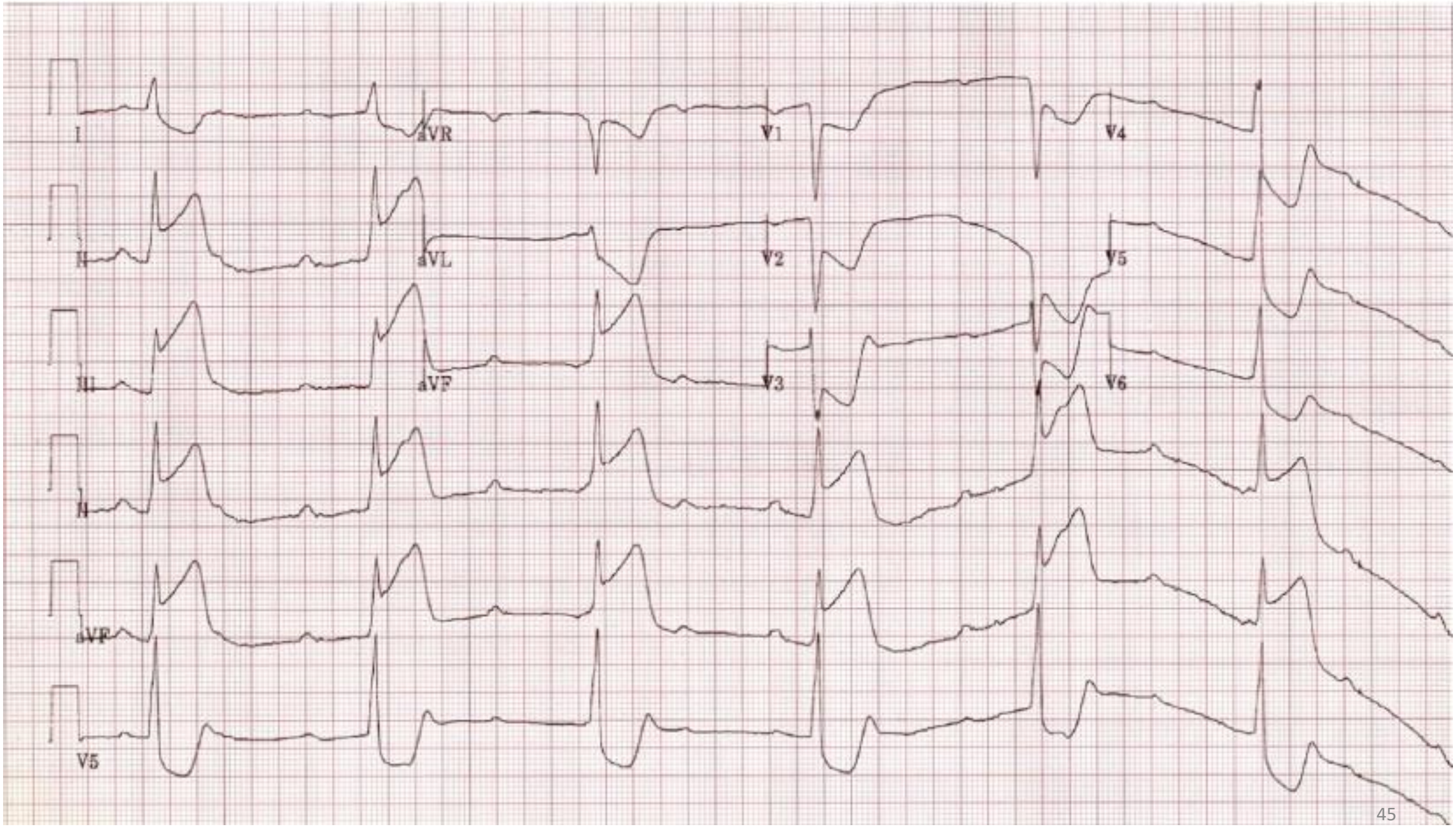
_____

_____

_____

iv. Complete the following table, listing 3 common issues with the helicopter transport environment and their potential effects on patient assessment/management (6 marks)

Issue	Effects


I
aVR
V1
V4
II
aVL
V2
V5
III
aVF
V3
V6
II
aVF
V5

A 60 year old male presents to you Emergency Department complaining of chest pain for the last 2 hours. He has no known medication history and does not take any regular medications.

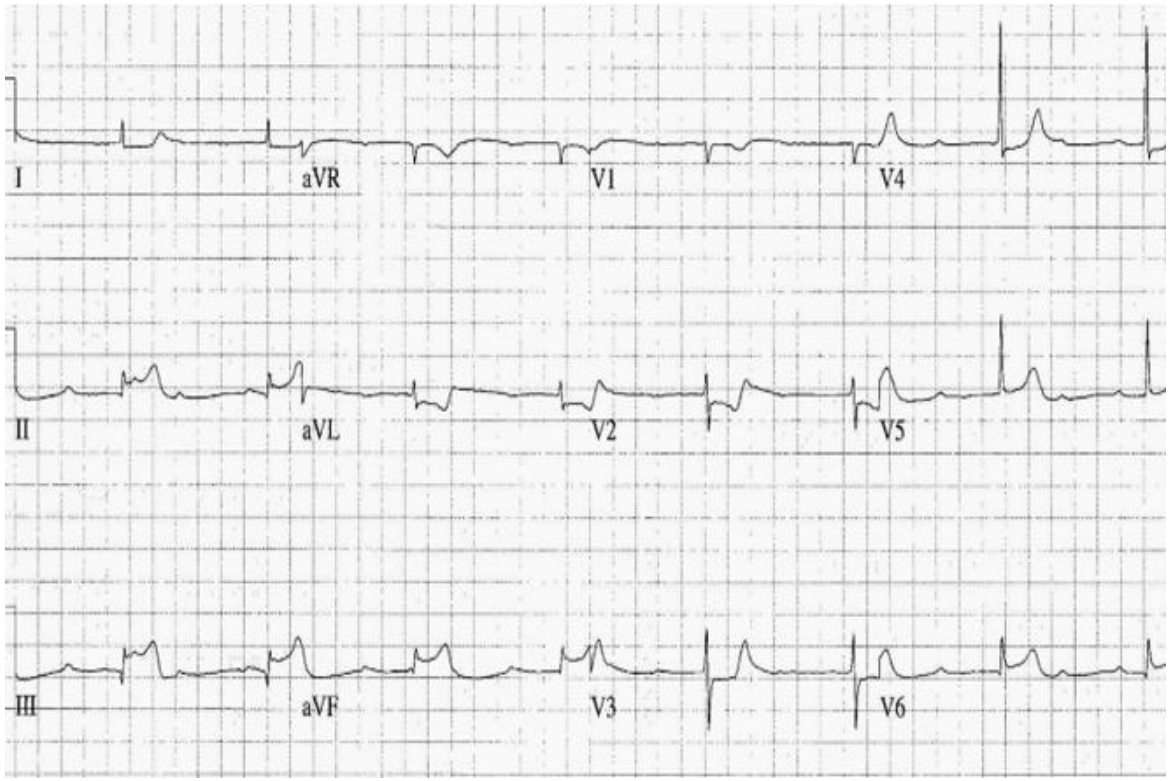
His ECG on arrival is below.

a. What is your interpretation of his ECG ? (3 Marks)

b. The patient's blood pressure is 80mmHg. Outline the key steps in managing his hypotension. (4 Marks)

c. The cardiology team have advised you to commence the patient on a vasoactive agent to improve his blood pressure. List 3 appropriate inotropes / vasopressors and their dosing below. (3 Marks)

	Agent	Dose
1.		
2.		
3.		



A 72 year old diabetic female is brought to your Emergency Department by ambulance. She complains of feel generally unwell for the last 2 days with abdominal pain, cough and fevers.

Vitals signs:		
	Pulse	121
	BP	89/58
	RR	28
	Sats	89% Room Air
	Temp	39.8 °C

a. List the key steps in this patients management ? (3 Marks)

_____

_____

_____

_____

b. List your resuscitation goals for the first 6 hours ? (4 Marks)

_____

_____

_____

_____

c. The patient requires inotropic haemodynamic support. Which inotrope should be used ? (1 Mark)

_____

d. The patient is intubated for respiratory failure. List the four key components of your ventilation strategy ? (2 Marks)

_____

_____

_____

_____

A 40 year old man is brought to your tertiary ED after being found unconscious in a police watch house cell. It appears he hanged himself with a belt, tied to a ceiling beam. Ambulance personnel report the following at handover:

GCS 5
Temp 37 deg C
P 110, BP 180/90
RR 16, spontaneous respirations, with stridor

i. Outline 4 key issues in the immediate management of this patient (4 marks)

ii. List 4 prognostic indicators for this patient's outcome (4 marks)

iii. The patient is successfully intubated and ventilated, but develops high airway pressures a short time later. List 5 possible causes (5 marks)

A 60-year-old man with a past history of type 2 diabetes presents after being found on the floor by his elderly mother. He has recently been unwell with vomiting for the last 3 weeks.

His vital signs are:

BP 65/30
GCS 13
Pulse 120 regular
Oxygen saturations 100% on 15 L NRM.

See arterial blood gas on page 28 in separate book

1. Interpret the abnormalities in the above results. (4 marks)

2. How would you initially manage these abnormalities? (3 marks)

Arterial Blood pH POCT	L 6.865
Arterial Blood pO2 POCT	H 417.0 mmHg
Arterial Blood pCO2 POCT	L 18.7 mmHg
Arterial Blood O2 Saturation POCT	99.2 %
Arterial Blood HCO3 POCT	L 3.2 mmol/L
erial Blood Base Excess POCT	L -27.2 mmol/L
Arterial Blood Oxyhaemoglobin POCT	97.2 %
Arterial Blood Inspired Oxygen POCT	100 %
Arterial Blood Haemoglobin POCT	L 124 g/L
Arterial Blood Reduced Haemoglobin POCT	0.8 %
Arterial Blood Methaemoglobin POCT	H 0.9 %
Arterial Blood Carboxyhaemoglobin POCT	1.1 %
Arterial Blood Creatinine POCT	H 246 umol/L
Arterial Blood Sodium POCT	142 mmol/L
Arterial Blood Potassium POCT	4.6 mmol/L
Arterial Blood Chloride POCT	107 mmol/L
Arterial Blood Calcium Ionised POCT	1.30 mmol/L
Arterial Blood Glucose POCT	H 31.0 mmol/L
Arterial Blood Lactate POCT	L 1.7 mmol/L

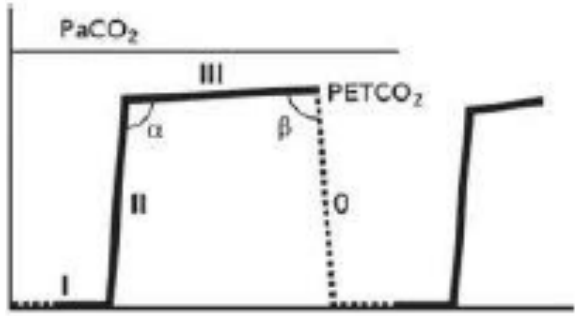
The patient's GCS deteriorates to 5 and he begins vomiting.

3. What is your plan with regards to intubating this patient, and what ventilation strategy would you employ? (5 marks)

i. Describe how a pulse oximeter works (4 marks)

ii. List three sources of error (with brief explanation) in pulse oximetry readings (6 marks)

Explain what is happening during Phase III of a normal capnogram (1 mark)



iv. Write brief notes on three ways in which waveform capnography is useful in cardiac arrest (3 marks)

A 48 year old female presents to the Emergency department with facial swelling .

1. List Three (3) causes of angioedema without urticaria (other than ACE I/ARB related angioedema) (3 marks)

1. _____

2. _____

3. _____

2. How is angioedema differentiated from allergy / anaphylaxis? (1 mark)

_____

_____

_____

3. List three (3) mechanisms of angioedema? (3 marks)

1. _____

2. _____

3. _____

4. List Two (2) important systemic complications of angioedema (2 marks)

1. _____

2. _____

5 . List five (5) management option for ACE inhibitor mediated angioedema . (5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. What are the chances of any patient on an ACE inhibitor or ARB developing angioedema ? (1 mark)

_____

_____

At 8pm a 3 year old boy is brought to your ED. He has known anaphylaxis to strawberry and has drunk strawberry cordial 30 minutes ago. He has swollen eyes and face and has vomited continuously since arrival. Heart rate is 140 bpm.

i. List your immediate actions (5 marks)

ii. The patient requires 2 doses of adrenaline and is subsequently asymptomatic within 30 minutes of arrival. Outline the next steps in the child's management and disposition. (5 marks)

iii. You decide to develop a guideline for adrenaline use in anaphylaxis. List 6 points in developing such a guideline. (6 marks)

A 78 yr old male presents to your ED complaining of tongue swelling and dysponea.

Vital signs:

P 95
BP 168/79
RR 24

Sats 93% RA
Temp 36.8 °C

a. Describe the clinical image of the patient (3 Marks)

b. List 4 potential causes for this patient's condition (2 Marks)

1.

2.

3.

4.

c. Outline your management of this patient (5 Marks)

A diabetic patient arrives to the ED and requires fluid resuscitation. He has bilateral below knee amputations. Several attempts to establish IV access failed. You decide to go with the IO route

1. List 3 alternative anatomical sites that are available for intraosseous access? (3 marks)

2. What is the clinical indication for intraosseous access? (1 mark)

3. List 4 contraindications for IO insertion (2 marks)

4. List the 4 main complications associated with intraosseous use? (2 marks)

5. List 4 diagnostic studies that can be obtained via intraosseous access that accurately equates to iv collection (2 marks)

Anaesthetics

A 75 year old woman presents to the Emergency Department following a fall in her back yard. Her only injury is a distal radius fracture that requires reduction.

i. List five (5) contraindications to a Biers block?

1 _____

2 _____

3 _____

4 _____

5 _____

ii. What drug and dose would you use for the block?

Drug	Dose

iii. Describe nine (9) steps in performing a Biers block.

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

8 _____

9 _____

i. A 2 year old girl presents with a bead up her right nostril. Complete the following table regarding ketamine dosing for procedural sedation. (8 marks)

Route of Administration	**IM** (4 marks)	**IV** (4 marks)
Advantage		
Clinical onset		
Effective sedation		
Average time to discharge		

ii. List seven (7) contraindications for the use of ketamine. (7 marks)

1 _____

2 _____

3 _____

4 _____

5 _____

6 _____

7 _____

iii. List five (5) steps in order for the treatment of laryngospasm in the setting of ketamine sedation. (5 marks)

1 _____

2 _____

3 _____

4 _____

5 _____

iv. State 2 rationale for fasting prior to ketamine sedation, and 2 rationale for proceeding without fasting. (4 marks)

1 _____

2 _____

_____

1 _____

2 _____

You are performing procedural sedation for a 3 year-old boy who is having a foreign body removed from his ear by a junior registrar. He is previously well, adequately fasted, and has no significant past history.
Two minutes after administering IV ketamine, he develops laryngospasm.

(1) List four (4) clinical features of laryngospasm (4 marks)

1. _____

2. _____

3. _____

4. _____

(2) List six (6) initial treatment steps in sequential order. (6 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

6. _____

(3) List five (5) differences between adult and paediatric airways.(5 marks)

1. _____

2. _____

3. _____

4. _____

5. _____

A 4 year old boy is brought to your Emergency Department having sustained a 4 cm eyebrow laceration following a fall at a playground. He is accompanied by his mother.

You plan to suture the wound under procedural sedation using ketamine.

a. List 8 contraindications to ketamine use in this setting (4 Marks)

_____

_____

_____

_____

_____

_____

_____

_____

b. List 4 potential side effects/complications associated with ketamine use in this setting (2 Marks)

_____

_____

_____

_____

c. Complete the following table regarding ketamine usage in paediatric procedural sedation by route of delivery (4 Marks)

	Intra-muscular (i.m)	**Intra-venous (i.v)**
Initial dose		
Top-up dose		
Advantage		
Disadvantage		

5 year old male presents following a fall. He complains of a painful swollen left wrist.

x-ray of his wrist is shown on the next page.

a. Describe his x-ray (2 Mark)

b. List the contra-indications to performing a Bier's block (4 Marks)

c. List the key steps in performing a Bier's block (4 Marks)

1.

2.

3.

4.

5.

6.

7.

8.

A 24 year old man presents with a wound to his proximal right index finger after an accident on a construction site. You decide that the wound requires suturing.

i. Describe the technique of a median nerve block (4 marks)

ii. What would be the maximum volume of 1% lignocaine for this man, assuming a weight of 85kg? Show your calculations (2 marks)

iii. List 6 clinical features of local anaesthetic toxicity (6 marks)

iv. List the key steps in the management of severe local anaesthetic toxicity (5 marks)

A 4 year old boy is brought to your Emergency Department having sustained a 4 cm eyebrow laceration following a fall at a playground. He is accompanied by his mother.
You plan to suture the wound under procedural sedation using ketamine.

a) List 4 contraindications to ketamine use in this patient ? (4 Marks)

_____

_____

_____

_____

b) List 4 potential side effects/complications associated with ketamine use in this patient. (2 Marks)

_____

_____

_____

_____

c) Complete the following table regarding ketamine usage in paediatric procedural sedation by route of delivery (4 Marks)

	Intra-muscular (i.m)	Intra-venous (i.v)
Initial dose		
Top-up dose		
Important Advantage		
Important Disadvantage	.	

_____

A patient presents to the emergency department after sustaining multiple lacerations to the sole of the foot from oyster shells after walking on the beach. You wish to perform a regional block to the plantar aspect of the foot.

1. Name the 3 nerves involved and their cutaneous distribution (3 marks)

2. Where would you insert LA to anaesthetise these regions (3 marks)

3. What other issues must be addressed in the treatment of this injury prior at discharge (4 marks)