

FEx Net 2022 Collated SAQs:

Anaesthesia and Critical Care Answers

1. Alcohol
2. Alcohol
3. Arrest on Induction
4. Asthma Intubation
5. Asthma ventilation
6. Asthma Ventilation
7. Extubation
8. Floppy Infant
9. Foot Block
10. Hanging
11. Muscular Dystrophy
12. Neck injury
13. Nerve Block
14. Obese intubation
15. Obese Pneumonia
16. Paed asthma Ventilation
17. Paed blast injury
18. Paed Facial Injury
19. Paed pneumonia
20. Paed sedation
21. Paed Stridor
22. Paed Stridor
23. Paed Tonislectomy
24. Paed Cardiac Arrest
25. Sedation
26. Sedation
27. STEMI RSI
28. Stridor
29. Tracheostomy
30. Ventilated DKA
31. Ventilator

Question 1

Answers:

(6 marks) 4/6

(Any of following options for 1 mark each)

Resolution of underlying issue that caused need for intubation

Spontaneously breathing

Resp parameters: O₂ sats > 95% on FiO₂ < 40%, PEEP < 5, RR < 30, TV > 6mL/kg

Haemodynamic stability without need for inotropic support

Sedation & paralysis worn off

Not a difficult intubation

Obey commands

2-

(5 marks) 3/5

Staff skilled in managing extubation (Nursing & Medical)

Staff available who can reintubate if required

Equipment available for reintubation

Rest of department workload suitable

No more suitable place for this to occur (eg no ICU beds)

3-

(4 marks) 3/4

Suction

O₂ mask & supply

NIV set-up

Intubation drugs & paralysis agents (Suxamethonium 1.5mg/kg drawn up)

Equipment for urgent reintubation

Passmark 10/15 Adjust to ../10 please

Question 2

(Total 18 marks) Pass mark 12/18

A 35-year-old man has been intubated in your department overnight after ingestion of an unknown quantity of alcohol and methadone.

The indication for intubation was airway protection secondary to a low GCS. He has a normal BSL, and a CT brain performed shortly after intubation has also been reported as normal.

He has spent the night in the ED as no ICU beds were available. You are considering extubation of the patient in your department.

1-List 6 clinical criteria that must be met to ensure this patient is suitable for extubation in the ED?
(6 marks)

(Any of following options for 1 mark each)

Resolution of underlying issue that caused need for intubation

Spontaneously breathing

Resp parameters: O₂ sats > 95% on FiO₂ < 40%, PEEP < 5, RR < 30, TV > 6mL/kg

Haemodynamic stability without need for inotropic support

Sedation & paralysis worn off

Not a difficult intubation

Obey commands

2-List five non-clinical criteria must be met to ensure safe extubation of this patient in your department.
(5 marks)

Staff skilled in managing extubation (Nursing & Medical)

Staff available who can reintubate if required

Equipment available for reintubation

Rest of department workload suitable

No more suitable place for this to occur (eg no ICU beds)

3- List three pieces of equipment you would have immediately available prior to extubation of this patient in the ED.
(3 marks) 3/4

Suction

O₂ mask & supply

NIV set-up

Intubation drugs & paralysis agents (Suxamethonium 1.5mg/kg drawn up)

Equipment for urgent reintubation

The patient is successfully extubated. He currently has adequate respiratory function and is GCS 15.

4- State your 4 subsequent steps in the management of this patient.
(4 marks)

On-going observation and monitoring of respiratory function

May require admission under appropriate team if any clinical concerns

Complete history and examination of pt to look for other medical conditions and determine if any suicidality to presenting complaint

Arrange review by alcohol and drugs services +/- social worker +/- psych services

Pass mark (12/16)

Question 3 (12 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)

- AS leads to concentric LV hypertrophy and a poorly compliant ventricle which is highly dependent on pre-load for adequate diastolic filling
 - If you drop the pre-load (or the aortic end-diastolic pressure) – e.g. by vasodilation - LV filling is poor & stroke volume low
- Also dependent on diastolic filling time – so causing tachycardia is also bad (atrial fibrillation is very bad as highly dependent on atrial “kick” – normal heart = 20% of diastolic ventricular filling but in AS up to 40%)

- 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)

- Patients typically have respiratory compensation ++, need to match their minute volume peri-intubation or acidosis precipitously worsens → poor myocardial contractility, diminished catechol responsiveness

- Pre-oxygenate with their spontaneous resps (or NIV-assisted at matched RR), note ETCO₂ (and try not to let it climb), RSI but with breaths delivered throughout induction phase (no apnoea), rapid intubation, match previous minute volume

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

- Often ill for quite a while prior to arrival with decreased oral intake so under-volume to begin with
- Typically have maximal endogenous sympathetic outflow – this decreases with induction → relative vasodilation
- Positive pressure ventilation with inadequate expiratory time → raised ITP, decreased VR etc
- Consider pneumothorax

Question 4

1. List 4 other treatment options for this patient. (4 marks)

4 treatment options

- a) IV magnesium 2gm IV over 20 mins
- b) Salbutamol IVI 250mcg bolus followed by an infusion 5 -10 mcg/kg/hour
- c) BIPAP (IPAP 7 -15 cmH₂O; EPAP 3 – 5 cm H₂O)
- d) Adrenaline 0.3mg IM or IV infusion
Aminophylline also acceptable if in discussion with ICU

The patient continues to deteriorate and has become more obtunded with poor respiratory effort. You decide to proceed with intubation.

2. List 4 steps you will take to optimise the patient before proceeding with RSI. (4 marks)

Optimise for RSI

- a) Keep upright until last moment
- b) Preoxygenate (BiPaP or 15L NRBM)
- c) High flow oxygen by nasal cannula (15L/min)
- d) Continuous salbutamol nebulisation 10 – 15 mg/hr
- e) Normal Saline 1L IV bolus

The patient's BP drops to 80/ 40 immediately post intubation.

3. List 4 immediate measures you will take to manage this. (4 marks)

Post intubation hypotension

- a) Disconnect from ventilator & allow prolonged exhalation
- b) IV fluid bolus 10 – 20 ml/kg
- c) Rule out tension pneumothorax (clinical/ USS) or needle /finger thoracostomies
- d) Vasopressors eg metaraminol 0.5-1mg bolus / adrenaline 10mcg IV bolus

Question 5

- 1. Explain your initial approach to this scenario, and what your initial steps should be to diagnose this problem: (4 marks)**

High index of suspicion for a PTX given obstructive pathology, and priority is to seek and treat.

Immediately take patient off ventilator, and place on a hand bag device (BVM, etc). Should be able to feel if the pressure is "high" with bagging. Continue to bag.

Immediately ensure patient is deeply sedated and paralysed.

Obtain CXR to confirm: ETT position, presence of PTX, presence of hyperinflated lungs, and fix accordingly (reposition, decompress, prolonged expiratory pause to allow for passive exhalation).

Once convinced no patient factors, re-introduce ventilator, increasing I:E Ratio, and reducing Resp rate.

- 2. Can you list up to 3 potential equipment problems and 3 potential patient problems that may have resulted in this alarm, and outline the initial steps to manage those problems? (12 marks)**

<u>EQUIPMENT</u>	<u>MANAGEMENT</u>
ETT migrated R Main Bronchus	Reposition ETT
ETT Blocked/narrowed	Suction and clear ETT/change
Ventilator I:E ratio too low	Increase I:E ratio to allow longer for expiration
<u>PATIENT</u>	<u>MANAGEMENT</u>
Dynamic Hyperinflation	Increase I:E Ratio and allow pause for passive exhalation. Reduce PEEP to 0
Pneumothorax	Decompress to avoid tension
Ventilator Dysynchrony	Deeply sedate and paralyse
Bronchospasm	Continue Bronchodilator therapy

- 3. Outline the principles behind ventilating a person with severe asthma: (4 marks)**

Ventilation should be a last option management in Asthmatics. It is very difficult to replicate the abnormal physiology of an asthmatic with ventilation.

Principles:

I:E Ratio > 1:3

Low rate (~8/min)

Tolerate Hypercapnoea

Avoid hypoxia – FiO₂ 100%

Tidal Volume (5-6ml/kg)

PEEP 0-2mmHg – avoids dynamic hyperinflation and reduces risk of auto-peep

Frequent pauses from ventilator

Pass mark: 12/20

Question 6

A 40 year old woman was just intubated in your department following a severe exacerbation of her asthma. She weighs approximately 60kg. Your registrar comes to you seeking advice as the ventilator keeps alarming.

The patient's vital signs are:

HR 120 bpm
BP 90/60 mmHg
Sats 100%

You find the ventilator settings below

Tidal Volume 600ml
Pressure support 10
PEEP 10
FiO2 100%
Rate 16
I:E ratio 1:2

**I. Which ventilator settings would you alter from the above settings?
(4 marks)**

Ventilator settings	Alterations
Tidal Volume	Aim 6-8ml/kg = 360-480 ml
PEEP	Decrease to 5 or 0
FiO2	Titrate down to maintain sats > 90% or pO2 > 60mmHg
Rate	Reduce to 8-10 breaths/min
I:E ratio	Increase 1:4-6

II. List two (2) other steps you could perform to optimize her ventilation

(2 marks)

- Deep sedation
- Paralysis

The patient becomes hypotensive with a BP 80/50 mmHg ten minutes after intubation

III. What is your immediate action? (1 mark)

- Disconnect ETT from ventilator and hand ventilate with BVM

IV. List five (5) possible reasons for the hypotension (5 marks)

Oversedation/induction drugs

- Anaphylaxis
- Tension pneumothorax
- Dynamic hyperinflation
- Arrhythmias
- Hypovolemia

Question 7

- 1. What 6 clinical factors must be considered to evaluate this patient's suitability for extubation in the ED? (6 Marks)**

Resolution of medical condition necessitating intubation
Time since, and agent given for paralysis; need for reversal agent
Sedation used – preferably short acting eg fentanyl/propofol – has had adequate time to wear off
Airway grade – difficult intubation anticipated should it be required
Oxygenating and ventilating adequately on minimal support (eg FiO₂ >40% with PEEP >10 and PS >15)
Neurologically alert and awake enough to obey commands, resolution of agitation/delirium
Haemodynamics stable – eg fluid status corrected, no vasoactive support
Significant medical comorbidities that may make extubation complicated such as asthma, OSA, cardiomyopathy.

- 2. List 3 non-clinical factors that must be considered to evaluate this patient's suitability for extubation in the ED? (3 marks)**

Staff skill set including experience managing extubations
Workload of resus area of the ED
Staff available who can safely reintubate the patient if required
Availability of equipment such as NIV that may be required post-extubation

- 3. List 4 complications that may occur with extubation, and for each one list a specific management option in the ED. (8 Marks)**

Complication	Management
Cough sore throat	Analgesia
Increased sympathetic response (Increase in HR, MAP; in patients with CAD up to 40% ↓ in LVEF)	Analgesia, GTN in CVS disease pts Stop inotropic support

Laryngospasm	Jaw thrust (Larsen's manourver) Positive pressure ventilation, suction, Low dose Sux but preparing for re-intubation if required
Bronchospasm	Bronchodilators
Aspiration	Antibiotics, Positioning upright, Chest physio
Respiratory failure	NIV, Re-intubation if required

<http://ceaccp.oxfordjournals.org/content/8/6/214.full.pdf+html>
<http://rc.rcjournal.com/content/respcare/59/6/991.full.pdf>

4. You proceed with a successful extubation of this patient in the ED. Your Director is impressed and asks you to write a departmental extubation protocol suitable for use in all ED extubations.

List 8 features you will include in this protocol.

(8 Marks)

Protocol Component (8)
List of Key Stakeholders
Reason for Protocol
Inclusion Criteria
Exclusion Criteria
Procedure and Monitoring Requirements
Complications and Expected Management
Post Treatment Monitoring
Planned Audit/Review schedule

Question 8

16 List 6 differentials for her presentation.

Sepsis

(6 Marks) 4/6

Congenital heart disease

Trauma/NAI

Hypovolaemia

Electrolyte imbalance

Endocrine 6 CAH

In born Error of Metabolism

Seizures

26 List your treatment priorities in sequential order.

(4 marks) 3/4

Airway/breathing – airway manoeuvres and oxygen – improve saturations, if persistent hypoxia will likely require RSI

Treat shock – IV access, IO if unable and IV fluid – 10-20ml/kg bolus (smaller bolus in case of CHD), reassess and repeat

Seek/treat hypoglycaemia 2ml/kg 10% dextrose

Source control – Assume sepsis and empirically treatment with antibiotics – cefotaxime 100mg/kg and amoxicillin 50mg/kg

If CHD strongly suspected – prostaglandin

3- You decide to intubate this baby.
What 2 sizes of ETT will you prepare?
List your drug selection with dosage:

(4 marks) – 3/4

3 + 3.5mm

Suxamethonium – 1-2mg/kg

Ketamine – 1-2 mg /kg

Avoid midazolam /thio /propofol

Fentanyl – 2-3 mcg/kg

Passmark: 10/14 Adjust to ../10 please

Question 9

A 16 year old male patient presents to your ED with a laceration to the plantar surface of the heel of his L foot sustained whilst walking in a freshwater creek bed. The wound was heavily soiled with mud and has been superficially cleaned on arrival to ED. There is no visible foreign body on X-ray.

He has no known allergies and is unvaccinated.

Your junior doctor has attempted to infiltrate with local anaesthetic but the skin is very thick and this has been unsuccessful.

You decide to perform regional anaesthesia to allow washout and laceration repair.

I. List the type of block and the landmarks you would use to perform a regional nerve block for this patient? (4 marks)

Posterior tibial nerve block

Landmarks:

Posterior to medial malleolus & anterior to Achilles tendon

Superior by 0.5-1cm from posterior tibial artery

Also accept Ankle Block if all nerves and landmarks at listed below.

* Posterior Tibial Nerve Block

- Palpate the posterior tibial artery behind the medial malleolus. Inject 3-5-mL of anesthetic 1-cm in depth 1-cm superior to this point.

* Sural Nerve Block

- Inject 3-5-mL of anesthetic subcutaneously in a band between the Achilles tendon and 1-cm above lateral malleolus.

* Superficial Peroneal Nerve Block

- Inject 4-10-mL of anesthetic subcutaneously in a band between the lateral malleolus and the extensor hallucis longus tendon.

* Deep Peroneal Nerve Block

- Have the patient dorsiflex their foot and insert the needle 1-cm above the medial malleolus aiming underneath the extensor hallucis longus tendon and advance until you hit the tibia. Then inject 3-5-mL of anesthetic.

* Saphenous Nerve Block

- Inject 2-5-mL subcutaneously between the medial malleolus and the anterior tibial tendon.

II. List the drug and dose you would use for the regional block for this patient. (2 marks)

Xylocaine 1% (Lignocaine) or Bupivocaine (0.25% or 0.5%) up to maximum of 5mg/kg without Adrenaline

III. State the details of your preferred method of wound closure in this patient. (2 marks)

Primary closure with sutures with 3-0 Nylon, interrupted sutures

(Wound glue not preferred in dirty wound)

IV. List 4 treatments you would prescribe in the ongoing management of this patient. (4 marks)

Ciprofloxacin 400mg bd oral (prophylaxis for freshwater exposure)

Tetanus immunoglobulin 250 IU IMI (as unimmunized)

ADT

Simple analgesia with Paracetamol 15,g/kg or Ibuprofen 10mg/kg

Question 10 (13 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)

- Needs urgent intubation – anticipate difficult airway
- Determine neuro status prior to RSI
- Manual C spine immobilization to be considered
- Neuroprotective measures
 - Head up 30deg
 - Collar off
 - Oxygenation, avoid hypercarbia
 - Sedation/paralysis

Reasonable MAP

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

- Down time; first aid/BLS rendered, initial vital signs and GCS
- Cardiac arrest at scene
- Comorbidities
- Previous/current injuries
- Estimated height of hanging fall; potential for C spine injury

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

- Pneumothorax
- RMB intubation
- Aspiration
- Airway trauma
- Bronchospasm
- Patient ventilator dyssynchrony

Question 11 (12 marks)

You have just started working as a junior consultant on a temporary contract in a metropolitan emergency department, hoping that your contract will become permanent. You are helping in the resuscitation of a patient where the team leader in this resuscitation is one of your senior FACEM colleagues who has worked at this emergency department for over 20 years, is an ACEM examiner and is very well respected.

The patient is a 9-year-old male with Duchenne's muscular dystrophy who has pneumonia and is in respiratory failure. Your colleague has told the team that the decision has been made to intubate this patient. He asks the nurse to draw up ketamine and suxamethonium (succinylcholine) for the intubation.

a) What is your response to the choice of these drugs? (1 marks)

Concern that giving suxamethonium (succinylcholine) to a patient with a muscular dystrophy could result in suxamethonium-induced hyperkalaemia that may be life-threatening.
--

b) How would you communicate this to your senior colleague? (2marks)

Communicate directly to your senior colleague

outline your concerns and reasons behind them

c) State two barriers to effective communication with your colleague in this situation? (2 marks)

Many different answers but must include hierarchy effect
--

+ one other (e.g. junior consultant; in vulnerable position re employment, senior colleague poor response to being challenged; organisation very hierarchical)
--

d) List the next steps of your communication strategy in this situation should your senior colleague not respond favourably to your initial communication? (2 marks)

Any answer that outlines a graded assertiveness communication strategy that will stop the error from being made.
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e) List 3 principles of harm minimisation: (3 marks)

error is inevitable

harm is not an inevitable consequence of error

find out what is wrong, not who is wrong
--

the person who has made the error is the person : least likely to make it again, most likely to provide the solution, most likely to prevent others from making the same error
--

most team errors are communication errors

f) What is the study of human factors? (2 marks)

the study of how people interact with complex systems (two-way)

how problems with those interactions lead to errors and breakdowns in safety
--

Question 12

Perspective (don't write this!! It's not the old exam with 15 minutes to write key issues but it explains my thinking to you)

A scary situation

Blunt trauma plus possible penetration of neck and injection of high pressure air, water or even solvent. Oh dear.

Currently alive but partially obstructed- big potential to deteriorate

Big potential to kill him with an RSI too!

safest option would be rapid awake fibre- optic requires anaesthetist

Downside is delay- RSI May become more difficult with time

The pass mark was 5/10. This is core ED stuff and a chance to kill.

Part A

List 5 pieces of equipment you would like available for management of his airway.

This was done universally well.

You could almost name any 5 bits of equipment.

Don't just put 4.

Examples:

Video or normal laryngoscopes variations of blades

Bougie

LMA

Surgical airway scalpel, boogie, artery forceps, size 6 cuffed ETT

Fibre optic scope and anaesthetist

I accepted others

A poor discriminator

Worth about 2/10 but less if you made bad errors overall!

Part B

You had to put an awake option to pass the question overall. Anyone who didn't mention this option started with a 4/10

Awake fibre- optic in theatre ENT back up

Pros: no need to RSI less risk of can't incubate/ ventilate, can back off if poor view, best option

Cons: needs anaesthetist with special skills, cause delay may deteriorate

RSI with surgical airway back up

Pros- familiar and rapid

Cons: May fail, causing worsening

Surgical airway

Pros- overcomes supraglottic obstruction, can pass cuffed tube

Cons- invasive, airway may be distorted, unfamiliar, failure

Others could have been gas induction, awake in ED.

LMA was a poor option to secure an airway

Applying oxygen or "doing nothing" was even worse- a waste of time and poor perspective

Part 3

This was done relatively poorly

The request for drug doses forced people into the RSI they said was NOT their preferred option. The question asked you for your preferred option therefore describe it!

As few of us routinely do awake scopes I was very forgiving of local anaesthetic techniques and doses

5 steps mean 5 steps. A line goes through numbers 6 to 10.

1. Sit up, explain, consent
2. Senior anaesthetist as proceduralist, RSI and surgical airway back up
3. Local anaesthetic cophenylcaine 6 sprays or 2% lignocaine nebulise or even Ketamine low dose 10-30 mg accepted
4. View cords through scope ETT preloaded and passed
5. Sedate (accept anything! Accept paralysing too if you wanted it) and secure and check tube position

What wasn't accepted:

Straight to surgical airway

RSI drugs then straight to surgical airway

Standard RSI (most common). Slightly better if you said if anaesthetist not available do not delay and had surgical airway as back up

Avoid:

IV access team approach- just used up points

Standard RSI- dangerous and out gestalt marking sheet penalises the deadly harshly.

Reassuring for the public really.

Question 13

A 78 yo gentleman presents to your major metropolitan Emergency Department after slipping over whilst putting out the bins. X-Rays reveal a left sided subcapital fractured neck of femur, however, fortunately there are no other injuries.

Your registrar decides to use an ultrasound guided femoral nerve block to help manage the patient's pain and asks for your help supervising.

a) Using the US image obtained (**PROP**) name the numbered structures. (3 marks)

1. **Femoral Vein**
2. **Femoral Artery**
3. **Femoral Nerve**

b) Which structure is most lateral ? (1 mark)

Femoral Nerve

c) List the steps involved in performing an ultrasound guided femoral nerve block. (8 marks)

- Consent – include alternatives, risks including failure of block and LA toxicity. Involve family / NOK if not competent.
- Sterile technique including probe cover on US, chlorhex prep to area
- Prepare LA and dilute to 20 – 30mL with saline for volume block
 - max 3mg / kg ropivacaine
 - max 2mg / kg bupivacaine
 - may choose to inject small amount of lignocaine to skin (ie skin wheal), but not necessary. If do use lignocaine, have to factor this in to total LA dose for toxicity calculations.
- Identify anatomy with US
- In plane or out of plane technique with nerve block needle – ensure needle tip visualised at all times.
 - if needle tip lost, hold probe still, manipulate needle gently whilst looking at screen to find needle (can reverse this, with principle being that you only ever move one of the 2 (probe or needle) at a time to re-establish orientation.
 - must not inject if needle tip not seen.
- When needle visualised near nerve, aspirate to ensure not in vessel, then inject local slowly, aspirate every 3-5mL to document no vessel entry, aim for 'donut' of LA around nerve.
- Review possible signs of LA toxicity with patient and ensure nursing staff aware of these and to check patient for them and block effectiveness closely in the next 15 minutes.
- Document procedure.

Question 14

- 1. List up to 7 steps you would tell your registrar to do in preparation, to facilitate intubation when you arrive:**

(7 marks)

Don't do anything that will distress this patient any further. Ensure the registrar you are on your way, and give them a direct line to you.

Establish and secure IV Access

Prepare the difficult airway trolley, and have it ready at the bedside including VL and suction

Pre-oxygenate the patient with 100% O₂ and PEEP if tolerated via NIV.

Give fluid bolus of 500mls to aim reduction in HR to 100BPM and increase in BP to 100 systolic

Prepare the patient in a Ramped position aiming for ear to Sternoclavicular notch. Keep patient in a semi – upright position to facilitate ventilation

Prepare drugs for intubation. Ketamine 1mg/kg and Rocuronium 1mg/kg

Prepare and have ready Adrenaline Infusion to commence at 10mcg/min predicting hypotension at induction

Give broad spectrum Ab's to cover CAP.

Inform Intensive Care of your intentions, and the requirement for a bed.

- 2. You were successful in intubation. Despite 100% O₂, you are still inadequately oxygenating the patient. The ETT has been confirmed in the correct place.**

Please outline up to 4 possible causes for Hypoxia in this case and identify a treatment to deal with this:

(8 marks)

<u>CAUSE</u>	<u>MANAGEMENT</u>
Ongoing V/Q Mismatch (Collapse, mucous plug)	Suction, Increase PEEP, Position,
Anaphylaxis	Adrenaline infusion
Hypovolaemia	Fluid Bolus
PTX	Decompression

Pass mark: 9/15

Question 15

Each difficulty ½ mark

½ mark for each of 2 acceptable solutions with extra ½ for specific consultant level answers

PASS MARK – 6/8

1. Difficulty: hypotension

Solution: optimise haemodynamics pre-intubation – IV fluid boluses N/S 1000mL, bolus metaraminol 0.5mg, aiming for systolic >90mmHg

Difficulty: hypoxia

Solution: optimise pre-oxygenation, high flow nasal prongs in addition to BVM with tight seal, bag pt through apnoeic period

Difficulty: difficult intubation due to obesity

Solution: positioning – ramp position (head up), 1-2 pillows under head, have backup intubation equipment ready – bougie, LMAs, large laryngoscopes

Difficulty: difficulty ventilating pt

Solution: well sedated and paralysed once intubated, head up to unload diaphragm, airway adjuncts, ensure peak pressure limits, backup equipment, prepared for surgical airway if needed

Difficulty: difficult BVM

Solution: use of airway adjuncts – Guedels, nasopharyngeal airways, optimise position (as above),

*** one mark per identified problem

One mark for a sensible solution

	YOUR SETTING
FiO2	1.0
Respiratory rate	Something sensible – (14 – 25)
Tidal volume	Something sensible – (350 – 500 mL)
Positive end-expiratory pressure	5 – 10cmH2O
Peak pressure limit	35 – 40cmH2O

Pass 4/5

Total pass 10/13 corrects to **7.5/10**

Question 16

1f What are 6 cardinal features of life threatening asthma?

Confusion

Coma

Exhaustion

poor respiratory effort

silent chest

cyanosis

hypotension

(6 marks)

2- On examination, she is unable to speak in full sentences and has marked use of accessory muscles.

List your immediate management, including any drug doses.

(4 marks)

Ventolin 6 puffs by MDI or nebuliser Q20min x3 then review,

Ipratropium bromide 4 puffs Q20 min

Prednisolone 1mg/kg (methylpred/hydrocort alternatives)

MgSo4 50mg/kg IV bolus

3- List 4 complications that may ensue during this scenario.

(4 Marks)

Worsening hypoxia or hypercarbia despite escalation of treatment

Apnea

ALOC

Pneumothorax

Vomiting

Agitation 2nd to salbutamol toxicity

SAQ 10 (Part 2 of Double Question continue):

4- Despite appropriate escalation of treatment, the child's condition deteriorates over several hours and she has been intubated in the ED.

State your ventilation settings and provide appropriate justification.

(10 marks)

Parameter	Setting	Justify
Respiratory Rate	<10/min	Normal RR in 5y 20-30, answer should be less than this to allow time for expiration
Tidal volume	5-7ml/kg	Decreases barotrauma
Peak inspiratory pressure	35-50cmH2O	Necessary to overcome high airway pressures
PEEP	0-5cm H2O	Patient has high intrinsic PEEP - low extrinsic PEEP prevents gas trapping
I:E ratio	1:4-8	Allows time for expiration

5- After connecting to the ventilator the patient suddenly deteriorates becoming progressively hypotensive and tachycardic.

Give three possible causes.

(3 marks)

Dynamic hyperinflation/gas trapping

Tension pneumothorax,

Effect of induction agents,

Hypovolaemia,

Equipment failure - tube dislodgement/O2 not connected)

Question 17 (12 marks)

You are the consultant in charge of the paediatric section of a rural emergency department. A 5-year-old boy presents via the ambulance following an accident with a home barbecue, thirty minutes ago. The ambulance reports the family was cooking lunch on the barbecue which was set up inside the house due to rainy weather when the gas bottle exploded and started a fire.

On assessment the boy has considerable soot on his face and there is severe swelling to his cheeks, lips, and eyelids.

His vital signs are:

SaO ₂	89% on 15L oxygen via non-rebreather
Pulse	120 bpm
Cap refill	3 seconds
Resp rate	28 breaths/min

You decide to intubate the patient for airway protection. You perform a rapid-sequence induction but are unable to visualise the cords using video laryngoscopy. You are unable to ventilate the child with a bag-valve mask or a laryngeal mask airway. The on-call anaesthetist is on the way but is still more than ten minutes away.

a). State your immediate management. (5 marks)

Declare critical situation: (1 mark)
Can't intubate, can't ventilate scenario. Child under 8 years old so needs jet insufflation.
Perform Cannula Cricothyroidotomy: (2 marks)
Extend the neck (shoulder roll) + Stabilise larynx with non-dominant hand + Access cricothyroid membrane with a dedicated 14/16 gauge cannula + Aim in caudal direction Confirm position by air aspiration using a syringe filled with saline
Perform jet insufflation: (2 marks)
Connect to either an adjustable pressure limiting device, set to lowest delivery pressure OR a 4Bar O ₂ source with flowmeter (match flow L/min to child's age) and Y-connector. Cautiously increase inflation pressure/flowrate to achieve adequate chest expansion. Wait for full expiration before next inflation. Maintain upper airway patency to aid in expiration

Marking criteria: Must recognise that the child is too young for a surgical airway, though these have been described and successful in the paediatric age group.

b). List three (3) causes of impaired oxygenation in this patient, and their causes. (3 marks)

Cellular hypoxia: Carbonmonoxide; Cyanide, (Methaemoglobinaemia)
Bronchospasm: Secondary to fumes and minute particles.
Atelectasis and airway obstruction: Smoke particles causes hypersecretion, inflammation, and mucosal sloughing.

Lung contusions and alveolar trauma: Blast injuries.
--

The anaesthetist arrives and successfully intubates the patient.

c). List your ventilator settings with a justification for this patient. (4marks)

FiO ₂ 1.0: aim SaO ₂ 94-98%
PEEP 5 cmH ₂ O PS 10 cmH ₂ O : May develop parenchymal damage giving ARDS picture
TV 6ml/kg: Permissive hypercapnoea
Plateau pressures <30cmH ₂ O: minimise barotrauma

Ref: <https://www.inkling.com/read/cameron-textbook-adult-emergency-medicine-4th/section-3/3-11-burns>
<https://das.uk.com/guidelines>

Question 18 (14 marks)

A five-year old boy has been kicked in the face by a horse and has been brought to your rural base hospital by ambulance. He is unconscious, has extensive facial injuries and partial airway obstruction.

Vital signs:

HR 140

SBP 80

GCS 3

Sats 85%

At laryngoscopy the view is obscured by anatomical derangement, massive tongue swelling, blood and debris and he cannot be oro-tracheally intubated.

- i. Explain why partial/complete upper airway obstruction is a relative contraindication to percutaneous transtracheal ventilation (3 marks)

In routine use of percutaneous transtracheal ventilation (PTV) through a catheter, much of the expired air comes out of the mouth and nose. Thus, with complete upper airway obstruction, egress of expired air is difficult. Initial studies in animals suggested that PTV in the setting of complete upper airway obstruction led to development of massive distension of lungs, severe barotrauma, and death. Subsequent studies have shown successful use of PTV in settings of complete upper airway obstruction using modified techniques that consist of prolonged expiratory time, larger internal diameter catheters, and lower oxygen flow rates.

PTV may be used successfully in partial laryngeal obstruction as the "ball-valve" effect, while constraining natural inspiration, adequately permits exhalation. For infants and young children with complete upper airway obstruction and where other methods have been unsuccessful, it is reasonable to use PTV. Ventilatory methods should use a longer expiratory time (eg, I:E ratio of 1:8 to 1:10), lower oxygen delivery pressure and flow rate, and as large a catheter as possible. In addition, the clinician should carefully monitor for chest rise and fall with inspiration and expiration. Diminished chest fall with expiration should lead to further reduction in respiratory rate, longer expiratory time, and emergent chest radiography to look for signs of pulmonary barotrauma.

- ii. Describe a method for connecting a bag-valve device to a 16-gauge catheter that has been inserted successfully through the cricothyroid membrane (3 marks)

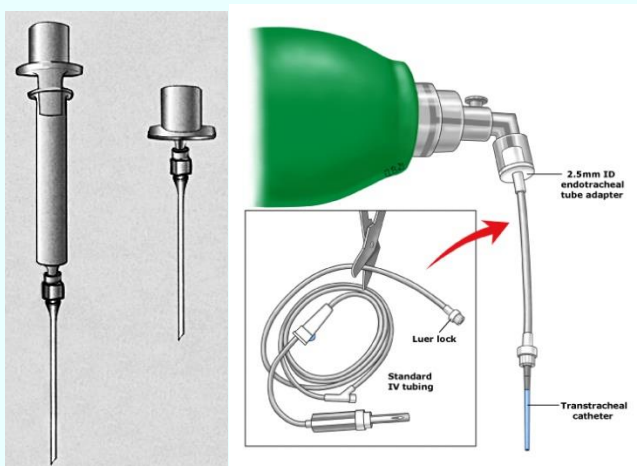
Bag-valve-mask connector options — If a bag-valve-mask will be used for patient ventilation, then it should connect to the catheter using one of the following improvised adapters:

10ml syringe with plunger removed – insert small ETT and inflate cuff

Three mL Luer lock syringe with plunger removed with 7.5 mm ID endotracheal tube connector (bag-valve-mask connector)

3.0 mm ID endotracheal tube connector attached directly to the catheter (bag-valve-mask connector)

2.5 mm ID endotracheal tube connector attached to cut off IV tubing with Luer lock end connected directly to the catheter



- iii. Outline the ventilation parameters you would use if a commercially available jet ventilation device with variable-flow oxygen is available (3 marks)

Begin regular ventilation by intermittently opening and closing the in-line valve; by intermittently occluding the side port, y-connector, or stopcock; or by ventilations with the self-inflating resuscitation bag, depending on the system in use.

●Use I:E ratio of 1:4 to 1:5, with a breath rate of 10 to 12/minute for most children. Change the ratio to 1:2 to 1:3 with a breath rate of 15 to 20/minute in the setting of increased intracranial pressure to improve CO₂ elimination. With partial or complete upper airway obstruction, use the ratio of 1:8 to 1:10 with a breath rate of 5 to 6/minute to reduce the risk of pulmonary barotrauma. Adjust these ratios based on clinical monitoring, blood gas measurements, and chest radiography.

iv. List 5 complications of percutaneous transtracheal ventilation (5 marks)

Category	Complication
Unsuccessful catheter placement OR Successful catheter placement with subsequent obstruction, kinking, or dislodgement	Inability to ventilate
	Subcutaneous emphysema
Barotrauma	Subcutaneous emphysema
	Pneumomediastinum
	Pneumothorax
	Pneumatocele of the larynx
Damage to adjacent structures	Posterior tracheal laceration or perforation
	Esophageal perforation
	Mediastinitis
	Vocal cord injury
	Laryngeal injury and/or laryngospasm
Excessive bleeding	Hematoma (cutaneous and/or airway) with extrinsic or intrinsic airway narrowing
Infection	Cellulitis and abscess (cutaneous and/or prevertebral)
	Tracheitis
	Osteomyelitis of the cervical spine

Question 19

1

Pre-oxygenation / hypoxia

- Maximal FiO₂ – 15L NRB / BVM with 15L / MIV 100%
- Addition of NP at 15L for apnoeic oxygenation
- Avoid apnoea – bag until able to intubate
- Experienced intubator

Hypotension

- IV N/S bolus 20ml/kg
- Choice of induction agent and dose – eg ketamine ~1mg /kg
- Vasopressor/ inotrope with induction – including safe dose

2

TV 90mL

RR at least 20

FiO₂ 100%

Limit at least 35cmH₂O, not more than 45cmH₂O

Question 20 - **This was the genuine mark scheme**

Seriously, I've had enough. Pretty much anything sensible will do here...

Pass 8 of 15 corrects to 5/10

TOTAL PASS MARK 189.5/300

Question 21

- 1. List 6 possible causes for stridor in paediatric population (other than croup): (6 Marks)**

Bacterial tracheitis
Epiglottitis
Retropharyngeal abscess
Laryngeal FB
Angioneurotic oedema
Subglottic haemangioma
Laryngomalacia

- 2. State five indications for intubation in this scenario. (5 marks)**

Exhaustion from increased work of breathing
Hypercapnoeic (type II) respiratory failure
Hypoxaemic (type I) respiratory failure
Decreased level of consciousness and unable to protect airway
Imminent complete airway obstruction

- 3. As you make your way hurriedly into the department, you advise the registrar to prepare for rapid sequence induction and intubation.**

Please complete the following information. Please provide doses and sizes for any drug or equipment used. (Total 13 marks)

Answers:

Preparation of patient	Keep pt calm and upright for as long as possible
	Optimise medical management – Adrenaline neb 5mg, Dexamethasone 0.3mg/kg PO/IV
	High-flow oxygen (potentially 2L/kg) via nasal prongs
	IV access (may delay until last minute)
	Explanation to parent
Equipment	Bag Valve Mask (Child size)
	Laryngoscope with Miller blade (size 2) and Macintosh blade (size 2)
	ETT 4.0-4.5 and one size <i>below</i> due to anticipated laryngeal oedema
	Bougie
	Suction
	Laryngeal Mask Airway (size 2)
	Surgical airway equipment – needle cricothyrotomy

RSI Drugs	Ketamine 2mg/kg or Fentanyl 2-5 mcg/kg or Propofol 1-2 mg/kg
	Suxamethonium 1-2 mg/kg or Rocuronium 1.2 mg/kg

- 4. The patient is successfully intubated in your ED. As you prepare the patient for transfer to the Paediatric ICU, the ventilator starts alarming that the airway pressures are high.**

List six causes of high airway pressures in this patient. (6 marks)

Displacement of ETT
 Blockage of ETT (eg secretions)
 Kinking of circuit
 Bronchospasm (eg: anaphylaxis to induction drugs or part of viral croup)
 Pneumothorax
 Inadequate patient sedation

- 5. List 5 anatomical airway difference in paediatric population in comparison with adult airway:**

(5 Marks)

Larger tongue
 Larynx more cephalic
 Increase compliance of chest wall
 Bulging occipital process (Flexed neck)
 Smaller mandible
 Narrowest part at cricoid cartilage
 Smaller diameter at airway, therefore, higher resistance to airflow.

Pass mark: 20/35

Question 22

A 5 month old baby presents to ED with a history of increasingly noisy breathing.

His vital signs are:

GCS 15 E4 V5 M6
Pulse 170 beats/min
CRT 2 seconds
BP 90/50mmHg
O₂ Sats 99%FiO₂ 0.21
Temp 36.4 °C
BSL 4.2 mmol/l

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

- Smaller mandible
- Larger head and occiput
- Paediatric airways
- Tongue is relatively larger
- Epiglottis is longer and floppier
- Larynx is higher and more anterior
- Narrowest part is cricoid ring (until about 5 years)
- Airway is shorter and narrower

2. List three (3) causes of stridor and DESCRIBE the nature of the stridor that would be associated with each cause (3)

Cause	Noise
Supraglottic: Foreign body, Down Syndrome, Choanal atresia	Expiratory Stridor, Sonorous, coarse, gurgling
Glottic lesions: Foreign body	Biphasic Stridor
Subglottic lesions eg Subglottic stenosis, subglottic haemangiomas, vascular ring, croup, bacterial tracheitis	Inspiratory Stridor, high pitched

3. When assessing an infant with stridor LIST five (5) important clinical features and their significance (JT - note original question paper does not have a table here. Question authors have used a table for clarity in the range of possible answers.)

Clinical Feature	Significance
Position of child	Sitting upright and forward means unable to maintain airway when flat
Fever	Infective causes - croup, retropharyngeal abscess
Toxic looking	Severe infections - bacterial tracheitis
Drooling	Severe pain, unable to swallow due to obstruction
Muffled voice	Supraglottic - epiglottitis
Respiratory distress (Respiratory rate, work of breathing, saturations)	Assess the effort and efficacy of breathing
Neck stiffness	Infective causes, foreign body, trauma
Cyanosis, hypotonia, altered mental state	Severe respiratory compromise with impending loss of airway
Character of noise	Biphasic - glottic Expiratory - supraglottic Inspiratory - subglottic

4. As you are assessing the patient their stridor worsens. They become lethargic and cyanosed. LIST 5 actions you would take to safely secure the airway (5 marks)

Aim to manage airway in theatre with anaesthetics and ENT present.

Infant in position of comfort and preferred position, parents close

Minimise distress - avoid iv, avoid topical anaesthesia, avoid unnecessary transfer

Consider oral dexamethasone

ED airway only if resp arrest

Check and prepare for DL or VL

Anticipate difficult airway

Anticipate CICO prepare for FONA

Question 23

1.

Ice gargles

Hydrogen peroxide gargles

Co-phenylcaine spray

Adrenaline soaked gauze on Magill's forceps

Intubation and packing

2.

❖ Hypoxia post induction / difficulty pre-oxygenation / aspiration lung injury

- 15LO2 via NRB plus nasal prongs at max, sit up until stops breathing, 2 suckers, apnoeic intubation as fast as possible (use of NIV would be incorrect given blood)

❖ hypotension post induction

- 2 IV access, adequate fluid load 20mL/kg N/S pre-induction, have O negative blood ready for use

❖ difficult laryngoscopy due to blood

- use 2 suckers, extra assistant, have backup airway equipment ready esp LMA

❖ Scared child / unco-operative child

- Have parents with child for support, also dedicated nurse for family / child support

❖ IV access

- Have dedicated nurse to help with this, use IO if patient not able to be cannulated

❖ Difficult BVM due to blood

- Early change to LMA, aim to have apnoeic intubation

Question 24 (24 marks) – DOUBLE QUESTION

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	2x birth weight	6-8kg
ETT size		3.5 uncuffed / 3.0 cuffed
DC shock joules	4 J/kg	25-30J
Adrenaline dose	10mcg/kg or 0.1ml/kg 1:10,000	0.0 mg or 0.7 mL
10% glucose dose	5ml/kg	35ml

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

Group	Ratio
Neonatal	3:1 = from birth to “a few hours” post-partum
Paediatric	15:2 = from “a few hours post partum” to approx 8 years old or?? Puberty
Adult	30:2 = beyond 8 years old/??puberty

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

- Younger population more likely to have asphyxia cause of arrest so increased emphasis on ventilation (A/B) versus compressions (C)

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

- Simply an attempt to reduce confusion & increase bystander CPR attempts

- 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

- Sedation
 - thiopentone need low dose eg 1mg/kg
 - propofol similar eg 1mg/kg
 - ketamine 1-2mg/kg
 - can probably use other alternatives too

- Paralysis
 - sux then 1.5mg/kg is pretty standard
 - roc then should give similar or slightly less

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

- Narrowest part of paed airway subglottic. Older paed ETTs had small volume, high pressure cuffs made of poorly tolerated materials leading to tracheal injury & subsequent subglottic stenosis. Newer devices have larger volume, lower pressure cuffs

Question 25 15 marks)

What is the minimal level of monitoring would you require, in order to conduct a safe procedural sedation? (3 marks)

- Continuous pulse oximetry - mandatory
- If available suggest end tidal CO₂ / CO₂ waveform capnography
- 5 minute interval pulse and blood pressure
- ECG monitoring.

Please complete the following table regarding this medication (8 marks)

Ketamine	
Onset of effect	IM – 2-4 minutes IV – 60-90 seconds
Dose	IM – 4mg/kg IV - 1mg/kg
Duration of effect	IM – 15-30 minutes IV – 10-15 minutes
Adverse effect	• Laryngospasm • Hyper salivation • Emergence phenomenon • Vomiting • Respiratory depression

List four (4) factors which will predict difficult bag-mask ventilation (4 marks)

- Poor Mask seal e.g. beard / thin face
- Obesity
- Age >55yrs
- No teeth
- Stiffness of chest e.g. Asthma, COPD

Question 26 (9/12)

1.

Edentulous patient

Facial dysmorphism

Beard/Facial Hair

Obese

Snoring/Sleep Apnoea History

2.

Mallampati score II/IV

3-3-2 rule (short in any of these)

Upper Airway Obstruction

Impaired Neck Mobility

3.

Optimise positioning – elevate occiput with pillow – indication: hyperextension/flexion leading to possible upper airway obstruction

Two-person technique – indication – inadequate seal/leak with one-person BVM

Oropharyngeal/Nasopharyngeal adjunct – suspected upper airway obstruction from oedematous or just large soft tissues

Sedation (ie Propofol) – laryngospasm

Paralysis and endotracheal intubation – failure to respond to above measures

Question 27

Q1

LBBB

Concordant ST elevation I,aVL,V4

Concordant ST depression inferior leads

Excessively discordant ST elevation V2,3

Q2

Acute MI with LBBB, meets Sgarbossa criteria/STEMI equivalent, for reperfusion

Q3

Pre-oxygenate sitting up

Add 15L O2 via NP to standard BVM (or use NIV to preox)

Reduce dose of induction agent

Use of adrenaline prior to induction (either infusion running or 50mcg dose or so with induction)

Bag pt through apnoea

(probably some others)

Question 28 (12 marks)

A 48-year-old man presents to your regional Emergency Department with 24 hours of dysphagia and fevers, and new respiratory distress. He has no past medical history and is not on any medications. On arrival, he is sitting upright and is reluctant to lie back on the bed. He is having difficulty swallowing his secretions and also has a mild stridor with a hoarse voice.

His vital signs are:

BP 140/80 mmHg

HR 90 bpm

SpO2 99% RA

Temp 37.8°

RR 24

The nearest tertiary centre is a 2 hour drive away by road. You obtain a lateral neck x-ray, shown in the Props Booklet (Figure 8).

a). State the likely diagnosis and name the relevant positive finding on this radiograph (2 marks)

Acute epiglottitis

Thumb-printing sign of epiglottitis

b). What is the most common causative organism for this patient's diagnosis? (1 mark)

Strep pneumoniae

c). What would be your anti-microbial of choice for this patient? (1 mark)

Ceftriaxone or Cefotaxime 1g IV

The patient develops worsening stridor and distress within 20 minutes of arrival at your department. He is becoming increasingly agitated and his oxygen saturations start to drop. You make the decision to intubate the patient in the ED. There is no anaesthetist available.

d). Complete the following table, listing the issues you might face during the intubation of this patient and how you would address these problems. (8 marks)

Factor	Anticipated problem	Proposed solution

Positioning	Pt unable to lie flat	Pre-oxygenate in upright position
Laryngoscopy	Large epiglottis likely to distort view	Use of straight (Miller) blade Hyper curved blade may improve view
Tube delivery	Laryngeal inlet may be narrowed or soiled with pus	Use of more narrow bore ETT or bougie
Failed airway plan	Unlikely to be able to ventilate through LMA	Have equipment and landmarks ready for a surgical cricothyroidotomy.

Note: There are clearly other issues that may arise. I am happy to give marks for these, but they must be accurately described and addressed

Question 29

1. List the 5 initial steps in your approach to this situation? (5 Marks)

Apply FiO2 100% to face and tracheostomy

Remove inner cannula or speaking valve and attempt FiO2 100% BVM

If not resolved, attempt to pass suction catheter and oxygenate via tracheostomy

If not able to pass suction catheter: deflate cuff and attempt to allow patient to breathe around or BVM applied around tracheostomy

If unable to do this, remove tracheostomy and attempt replacement

If unable to replace then proceed to RSI with direct laryngoscopy or surgical airway depending on indication for tracheostomy

2. The patency of the patient's tracheostomy is achieved, however the bleeding from the site has become significantly worse.

List 2 possible causes of this bleeding? (2 Marks)

Tracheo-arterial (innominate) fistula

Infection

Granuloma

3. List 5 priorities in your ongoing management of this situation? (5 Marks)

1. Immediate notification of anaesthetics, ENT and vascular for urgent management in theatre

2. Thrombostatic medications: TXA 1g, reversal of anticoagulation

3. Early use of blood products, activation of MTP and use of minimal volume resuscitation technique

B 4. Slowly hyper-inflate tracheostomy cuff with 10-35mL air

5. If this fails to stop bleeding, attempt RSI with oral ETT, remove tracheostomy and then manually compress fistula against posterior border of the sternum

Question 30

Variable	Formula Used	Result <i>Not required for marks as this is not a maths test</i>	Clinical Implication in this case
Expected CO ₂	$1.5 \times \text{HCO}_3 + 8$	24.5	Severe Respiratory acidosis is present
A-a gradient	Alveolar O ₂ = $713 \times 1 - 60/0.8$	<i>Alveolar = 640 gradient = 440.</i>	Marked A-a gradient – implies ineffective gas transfer – shunt/V/Q mismatch
Anion Gap	$\text{Na} - (\text{Cl} + \text{HCO}_3)$	28	HAGMA present (likely ketones given lactate not too high, could be renal failure or toxic alcohols)
Delta Gap	Change in AG/ change in HCO ₃	$28 - 12 / 24 - 11 = 16 / 13 = 1$	Pure HAGMA
Corrected Na ⁺	$\text{Na} + (\text{Gluc} - 5) / 3$	$125 + 10 = 135$	No hyponatraemia present

1 mark total for formula and result, 1 mark for clinical implication

2. Goals:

Achieve synchrony – sedate further +/- drug paralyse patient (2 marks)

Improve Ventilation – increase RR to 16-20 (1 mark)

Improve Oxygenation –

increase PEEP to 10-15cm H₂O (1 mark)

Tidal volume to 480-500mls (6mls/kg) (1 mark)

SAQ 22:

1. Hospital Exec – they need to know and will help facilitate flow

Pre-hospital – Ambulance – diversion of non tertiary patients to alternate centres

ED groups: Senior Nursing/Triage/Resus – for surge preparedness/capacity issues

ED Medical Staff – ensure all available staff on duty to meet surge demand

Question 31

1.

Tension pneumothorax (must be tension)

Blocked ETT

Malpositioned ETT – ie right main bronchus intubation

Awake pt – ventilator asynchrony

Ventilator malfunction

bronchospasm

2.

Disconnect from ventilator – remove machine as possible source

Examine for tension pneumothorax

Chest Xray for tube position / pneumothorax

Pass suction catheter down ETT

Sedate and paralyse pt

3.

Change in ventilator setting	Potential adverse effect
Increase PEEP	Hypotension, may decrease tidal volume
Increase pressure limit	Risk barotrauma eg pneumothorax, ARDS
Increase I time / decrease I:E ratio	Potential worsen hypercapnoea if bronchospasm

NOT ACCEPT – increase TV (this is not being reached), increase RR (unlikely to improve oxygenation)