FCA(SA) Part II

THE COLLEGES OF MEDICINE OF SOUTH AFRICA

Incorporated Association not for gain
Reg No 1955/000003/08

Final Examination for the Fellowship of the College of Anaesthetists of South Africa

23 July 2019

Paper 2 (3 hours)

All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

Questions 1 - 3

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 1

A 45-year-old female patient sustained open flame burns to her chest, back, and most of upper limbs and face after being trapped in a high rise building. The incident occurred 7 days ago, and she is scheduled for re-debridement of her wounds and a dressing change.

a) Estimate the percentage burns that this patient has sustained. Show calculation. (2)

b) Why may ventilation of this patient be problematic? (2)

c) List two surgical complications of excessive fluid resuscitation. (2)

d) Which two complications of burns injury make the interpretation of haemodynamic indices challenging? (2)

PTO/Page 3 Question 1e)…

e) Apart from inadequate fluid resuscitation, give two reasons as to why may this patient develop acute kidney injury. (2)

_____

_____

_____

_____

[10]

Question 2

A 21-year-old male presents for open reduction and internal fixation (ORIF) of his right tibia and fibula following a motor vehicle accident. He is known to be using multiple illicit drugs.

a) Briefly describe 4 opioid sparing strategies and techniques which you may use to provide intra-operative analgesia to this patient. (4)

b) List 3 drugs which may be used as substitution therapy in the post-operative period. Briefly describe the pharmacology of these drugs which make them suitable for substitution therapy. (6)

[10]

Question 3

a) List the indications for peri-operative antibiotic prophylaxis as per the Centres for Disease Control and Prevention (CDC) classification of procedures. (3)

b) List 6 patient related factors which may influence the need for antibiotic prophylaxis in procedures where antibiotic prophylaxis is not necessarily indicated. (3)

c) List 4 different procedures where peri-operative antibiotic prophylaxis is not indicated. (2)

d) In a patient presenting for caesarean section, when should antibiotics be given? Give a reason for your answer. (2)

[10]

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CANDIDATE NUMBER……..

Questions 4 - 6

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 4

An obese 75-year-old patient with well controlled Type II diabetes is booked for removal of a wrist ganglion cyst under general anaesthesia as a day case procedure. The patient has no other co-morbid conditions and has good effort tolerance.

a) Based on the above information, would you assess this patient to be appropriate from an anaesthetic point of view for day case surgery? (1)

b) Justify your answer in a) above. (7)

c) What further information might you require to make a full assessment? (2)

[10]

Question 5

A plastic surgical colleague is wanting to sedate patients in his procedure room for a minor cosmetic procedure. He asks your advice as he wants to sedate the patients himself and does not feel that he requires a sedationist/anaesthetist to be present. What information (based on the SASA procedural sedation guidelines) would you give him as a guideline for safe practice as an operator-sedationist?

[10]

Question 6

You are called to the labour ward to assist with a patient in labour who has suddenly become "unstable" according to the midwife. The patient is 36-years-old and has been on an oxytocin infusion for poor progress of labour for 4 hours.

a) What clinical features may lead you to suspect an amniotic fluid embolism? (5)

b) Give two differential diagnoses that may present with similar clinical features. (2)

c) What is the cardio-respiratory pathophysiology in amniotic fluid embolism? (3)

[10]

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CANDIDATE NUMBER……..

Questions 7 - 9

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 7

A 72-year-old obese male smoker with hypertension presents for elective femoral-popliteal arterial bypass surgery of the right leg at the pre-operative clinic where you work. Please discuss the ***goals*** you would like to achieve during pre-operative assessment of this patient; how you would go about ***risk stratifying*** this patient; and how you would structure your ***report*** on preoperative assessment in the clinic.

[10]

Question 8

Briefly discuss your considerations during pre-operative assessment in a young healthy patient presenting as a living kidney donor for an unrelated recipient.

[10]

Question 9

Please answer the following questions regarding anaesthesia for carotid endarterectomy

a) Briefly state how you would mitigate the risk of life-threatening surgical complications arising intra-operatively. (5)

b) Which factors can be addressed to optimise the quality of recovery after carotid endarterectomy surgery? Briefly state how each factor can be addressed. (5)

[10]

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CANDIDATE NUMBER……..

Questions 10 - 12

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 10

a) Awake craniotomy provides the ability to functionally map eloquent brain function. What are the absolute contraindications to awake craniotomy? (5)

b) One of the components that may be utilised for awake craniotomy is the scalp block. What nerves need to be blocked to provide analgesia to the scalp? (3)

c) What are the potential complications of a scalp block? (2)

[10]

Question 11

a) List the patient related risk factors for aspiration in the paediatric population. (5)

b) List the pros and cons of the application of cricoid pressure in a classical rapid sequence induction in the paediatric population. (5)

[10]

Question 12

a) List the most important patient related risk factors responsible for causing post-operative apnoea in neonates. (5)

b) What pharmacological strategies can be used to reduce the incidence of post-operative apnoea in neonates? (5)

[10]

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CANDIDATE NUMBER……..

Questions 13 - 15

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 13

A 10-year-old boy is to undergo LASER fulguration for recurrent laryngeal papillomatosis.

a) What does the acronym LASER stand for? (1)

b) What type of LASER is most commonly used in ENT surgery? (1)

c) What precautions would you take to minimize the risk of fire during the use of LASER? (4)

d) Describe your actions in the event of thermal injury to the airway during the procedure. (4)

[10]

Question 14

A 67-year-old man with long standing hypertension and a 30-pack year history of smoking is booked for a right hemi-mandibulectomy and a free fibular osseo-cutaneous flap for infiltrating squamous cell carcinoma of his tongue.

a) List and briefly describe your peri-operative anaesthetic goals for this procedure.

[10]

Question 15

A 23-year-old man presents to casualty one hour after sustaining an injury to his left eye whilst at work. Ocular examination revealed a 5 mm laceration across the limbus (corneo-scleral junction) on the lateral aspect of his eye with leakage of blood-stained aqueous humour, a pupillary tear and hyphema (blood in the anterior chamber). The surgeon tells you that the patient has a good chance of visual recovery and wishes to take the patient to theatre urgently. The patient had lunch approximately 30 minutes prior to his injury.

a) List your peri-operative considerations. (3)

b) How would these considerations guide your anaesthetic management of this patient? (7)

[10]

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CANDIDATE NUMBER……..

Questions 16 - 18

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 16

a) List any 2 factors that influence the pharmacokinetics of antimicrobials in critically ill patients. (2)

b) Regarding antimicrobial therapy in the intensive care unit (ICU) setting

i) What measures would you take to ensure optimal antimicrobial therapy? (4)

ii) List strategies to avoid unnecessary antibiotic administration. (4)

[10]

Question 17

A 40-year-old female suffers ventricular fibrillation (VF) cardiac arrest in the surgical ward during pre-operative admission for optimisation of hypertension. Return of spontaneous circulation (ROSC) is achieved after 2 cycles of cardiopulmonary resuscitation (CPR) including cardioversion. While assessing the patient for intensive care unit (ICU) admission, you note her Glasgow Coma Scale (GCS) to be 3T although she had not received any sedatives. Please answer all of the following questions.

a) What is the benefit of targeted temperature management (TTM) following cardiac arrest and at what thresholds/targets is this benefit achieved? (2)

_____

_____

_____

_____

b) Which patients should be selected to receive TTM? (2)

_____

_____

_____

_____

c) List 2 physiologic effects of TTM under each of the following headings.

i) Cardiovascular effects (2)

_____

_____

_____

_____

ii) Haematologic effects (2)

_____

_____

_____

_____

iii) Renal/electrolytes (2)

_____

_____

_____

_____

[10]

Question 18

Vasopressors and inotropes are an important component in the management of shock once adequate fluid resuscitation has been achieved. Given this statement, complete the table below by matching the interventions listed below to the appropriate column. Note that some items may be used more than once when completing the table.

- Mean arterial pressure (MAP) ≥65 mmHg
- Noradrenaline
- Increase systemic vascular resistance
- Phenylephrine
- Adrenaline
- Increase contractility
- Dobutamine
- Restore intravascular volume

DIAGNOSIS	**HAEMODYNAMIC GOALS/ END-POINTS OF RESUSCITATION**	**INOTROPE / VASOPRESSOR OF CHOICE**
Septic shock	a)	b)
Hypertrophic obstructive cardiomyopathy (HOCM)	c)	d)
Anaphylactic shock	Restore intravascular volume	e)
Cardiogenic shock	f)	g)
Tetralogy of Fallot	h)	i)
Hypovolaemic shock	j)	Adrenaline

[10]

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CANDIDATE NUMBER……..

Questions 19 - 20

There are 7 books for this examination, please ensure that the 7 books are handed over to the invigilator for marking.

Question 19

a) List 2 disadvantages of sublingual sufentanil for acute pain management. (2)

b) Transdermal fentanyl delivery is now extensively used to treat chronic pain.

i) List 2 advantages of fentanyl patches over the parenteral route of administration. (2)

ii) What are the limitations of using transdermal patches? (2)

iii) What are the principles of managing a patient using a fentanyl patch for chronic pain, in the peri-operative period? (4)

[10]

Question 20

a) List 4 causes of a post-partum headache, other than a dural puncture. (2)

b) How could you as the anaesthetist reduce the risk of post-dural puncture headache (PDPH)? (4)

c) List pharmacological alternatives to epidural blood patch which are effective for treatment of PDPH. (4)

[10]

Candidate Number:_____

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Paper 3 (3 hours)

All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

Questions 1 - 2

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 1

You are seeing a patient in the pre-operative clinic. He needs surgery for a basal cell carcinoma on his nose. The nurse gives the following information:
56-year-old male
BMI=36 kg/m^2
BP= 145/95 mmHg

a) How will you evaluate his risk for obstructive sleep apnoea? (4)

b) How would you confirm the diagnosis in this patient? (2)

c) What factors will make day case surgery acceptable in this patient? (4)

[10]

Question 2

You are conducting the anaesthetic on a patient for a 3-vessel coronary artery bypass graft. Upon weaning from cardiopulmonary bypass, the temperature measurements are as follows:
T_1 (Axillary) = 33.2 degrees Celsius
T_2 (Oesophageal) = 36.8 degrees Celsius

a) What is the most likely explanation for the above measurements? (2)

b) Discuss the considerations in temperature management when rewarming this patient. (6)

c) During cardiopulmonary bypass, what surrogate is used for measuring cerebral temperature and how accurate is it? (2)

[10]

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Paper 3
All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

Questions 3 - 4

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 3

A 2-day-old male baby born at term in a peripheral clinic presents with a history of difficulty in breathing after feeding. On Examination:

Weight = 2.1kg
Cardiovascular system

- Heart rate = 150 bpm
- Mild peripheral cyanosis
- Heart sounds on right side of chest with a continuous murmur over the precordium

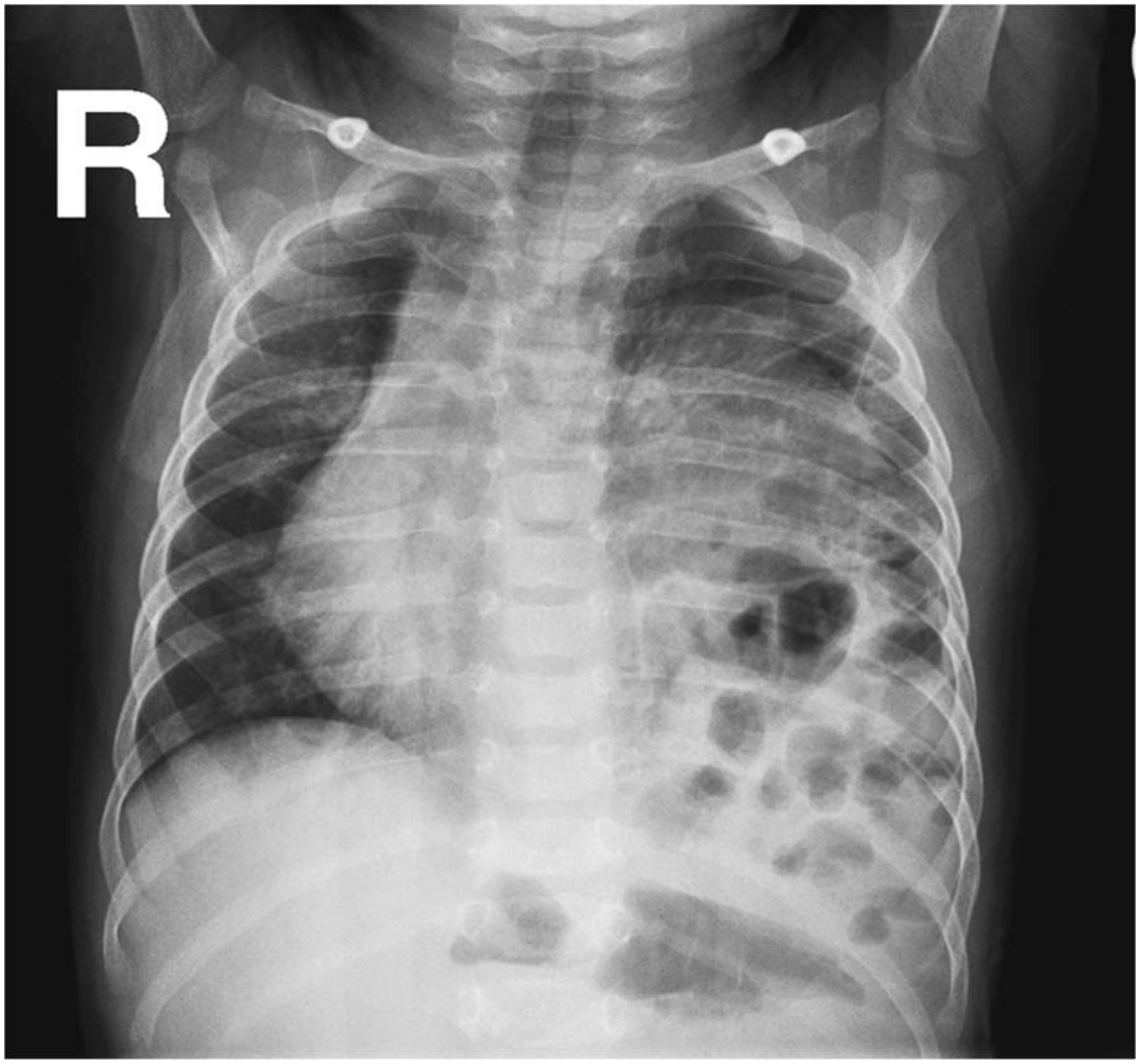
Respiratory system

- Room air saturation= 90%
- Respiratory rate= 55 breaths per minute
- Decreased air entry on the left

Special Investigations:
Arterial blood gas: done while on room air

pH	7.20
PaO2	68mmHg (9.06kPa)
PaCO2	50mmHg (6.66kPa)

Chest X-Ray



PTO/Page 3 Question 3a)…

a) What is the most likely diagnosis in this child? (1)

b) After admission and stabilization, this patient presents for corrective surgery. Discuss your ventilation strategy during anaesthesia, with reasons given to justify your approach. (9)

[10]

Question 4

A 2-year-old female patient presents to emergency theatre following a dog attack. After consent has been obtained from the parents, she is booked for vascular repair of a punctured left brachial artery and debridement of an extensive avulsion injury of the scalp.

On Examination
Patient is cold, clammy and somnolent
Weight =12 kg
Heart Rate= 160 beats/minute
Blood Pressure =75/35 mmHg
Respiratory Rate = 55 breath/minute

Special Investigations:
Arterial blood gas: done while on room air

pH	7.06
PaO_2	80mmHg (10.66 kPa)
$PaCO_2$	30mmHg (3.99 kPa)
HCO_3	18.0 mmol/L
Base excess	-11.7
Lactate	4.5 mmol/l
Haemoglobin	5.5g/dL

a) How would you clinically estimate the hypovolaemia due to blood loss in this patient? (4)

b) Under normal circumstances, what would be the maximum allowable blood volume loss in this patient? (2)

PTO/Page 5 Question 4c)…

c) How much blood volume has this patient lost as a percentage of her blood volume? (2)

_____

_____

_____

_____

d) As part of a balanced transfusion strategy how would you *haemostatically* resuscitate this patient? (2

_____

_____

_____

_____

[10]

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Paper 3 (3 hours)

All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

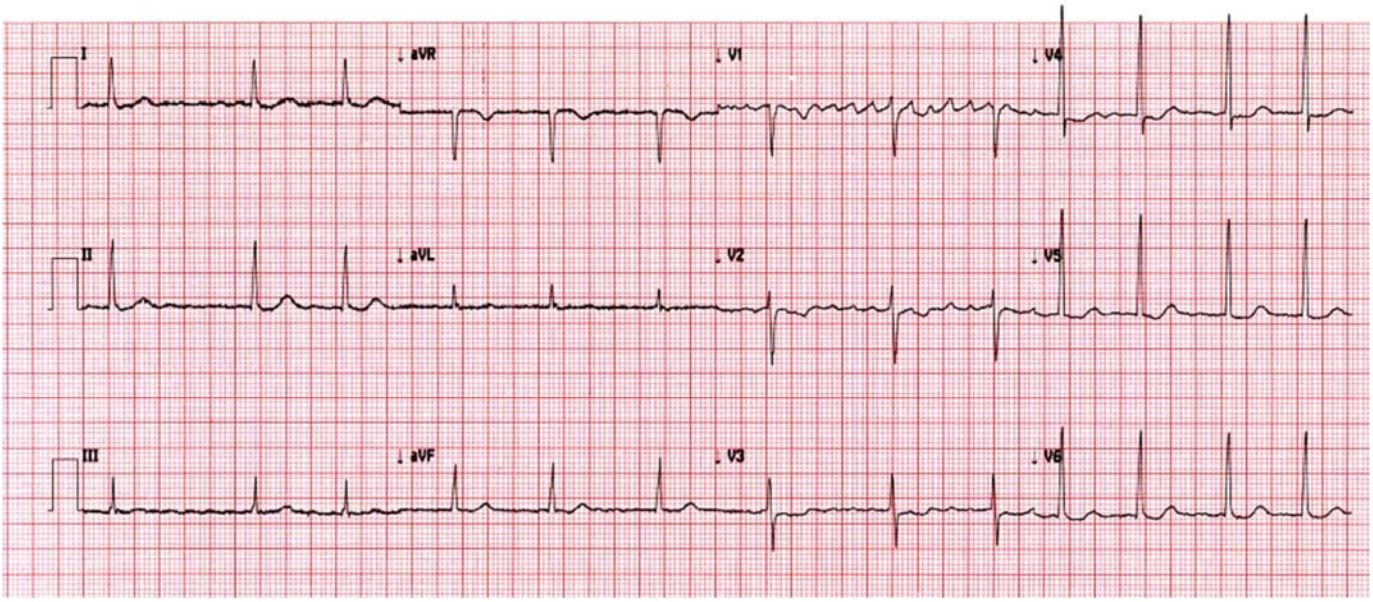
Questions 5 - 6

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 5

A 63-year-old man is booked for an ablation in the cardiac catheterization laboratory. He is a known Type 2 diabetic and hypertensive patient. He has obstructive sleep apnoea for which he is on CPAP for the last year. He has 2 pillow orthopnoea, occasional palpitations and dizziness, no syncope, he complains of increasing exercise intolerance.
His chronic medication includes: Furosemide, Spironolactone, Atenolol, Metformin and Dabigatran. He was on oral Amiodarone, until recently.

ECG :(Calibration: 25mm/sec; 10mm/mV)



a) Describe the salient features of the ECG. (1)

_____

_____

_____

b) What are the indications for the ablation in this patient? (2)

_____

_____

_____

_____

PTO/Page 3 Question 5c)…

c) Under what conditions would a general anaesthetic be indicated for an ablation in the cardiac catheterisation laboratory? (4)

d) Which volatile anaesthetic would be appropriate for maintenance of anaesthesia and what would be the electrophysiological benefits thereof? (1)

e) What are the 2 most common serious complications during an ablation procedure? (2)

[10]

Question 6

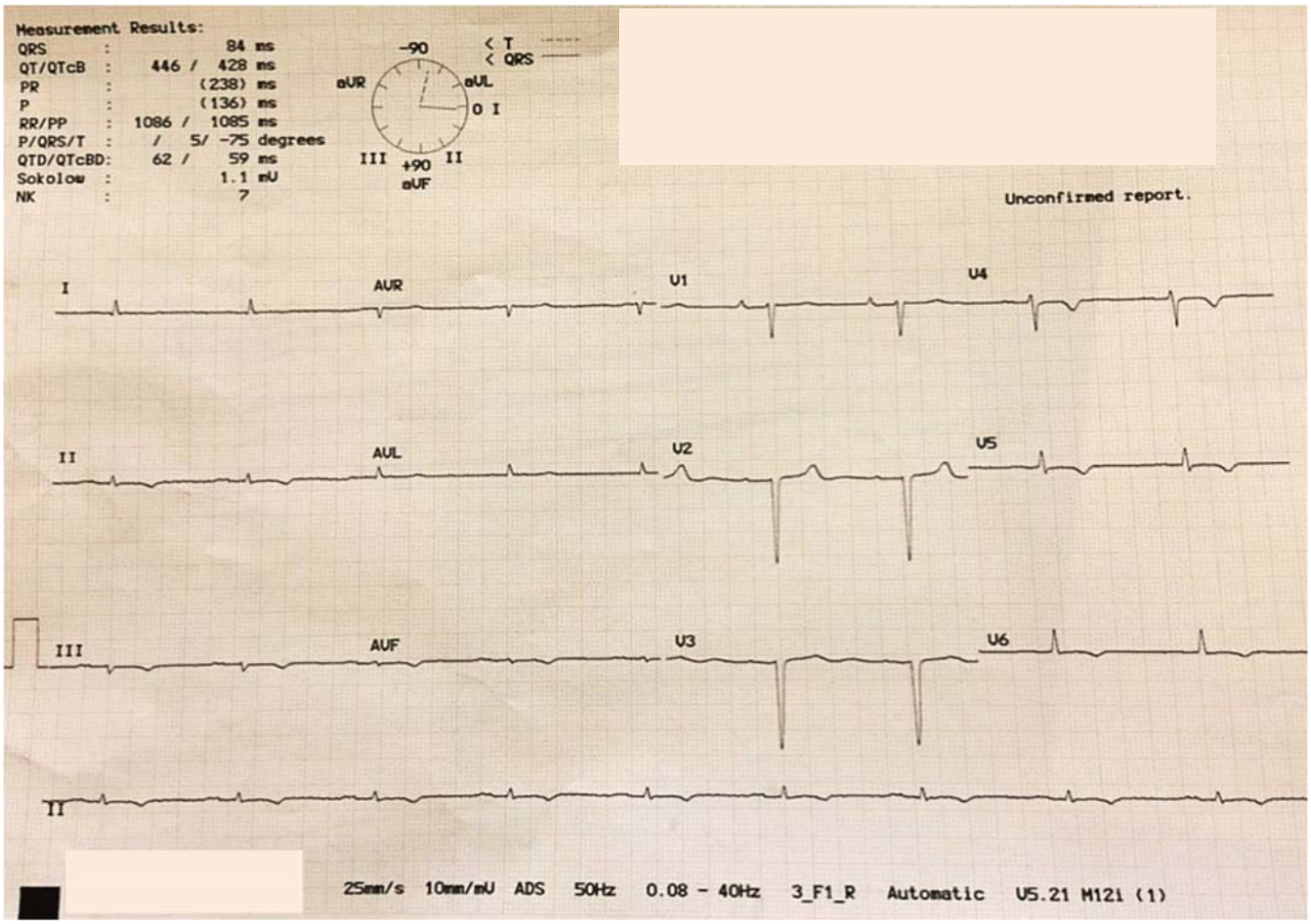
The orthopaedic surgeon refers a patient **urgently** to you for anaesthetic review. This patient is for a hemi-arthroplasty, in order to aid her nursing care. They would like to proceed on the next available daytime list.

A 66-year-old lady with left neck of femur fracture, she is a known hypertensive and type II diabetic. She has early onset dementia and had a stroke a few months ago. She has a new diagnosis of amyloidosis which is being investigated further.
Presently, she has a respiratory rate at rest of 26/min and BP = 105/55mmHg.
She has bi-basal crepitations and 3 pillow orthopnoea. For the last year she has been in the frail care section of a nursing home, needing increasing assistance with mobilization and all activities of daily life.

Blood results	Value	Reference
Haemoglobin	10.1g/dL	12 - 15g/dL
Platelet count	203 $x10^9$/L	186 - 454 $x10^9$/L
Sodium	134 mmol/L	136 - 145mmol/L
Potassium	4.4 mmol/L	3.5 - 5.1mmol/L
Urea	27 mmol/L	2.1 - 7.1mmol/L
Creatinine	448 umol/L	49 - 90umol/L

PTO/Page 5 Question 6a)…

ECG :(Calibration: 25mm/sec; 10mm/mV)



a) Interprete the ECG. (2)

_____

_____

_____

_____

Figure 1

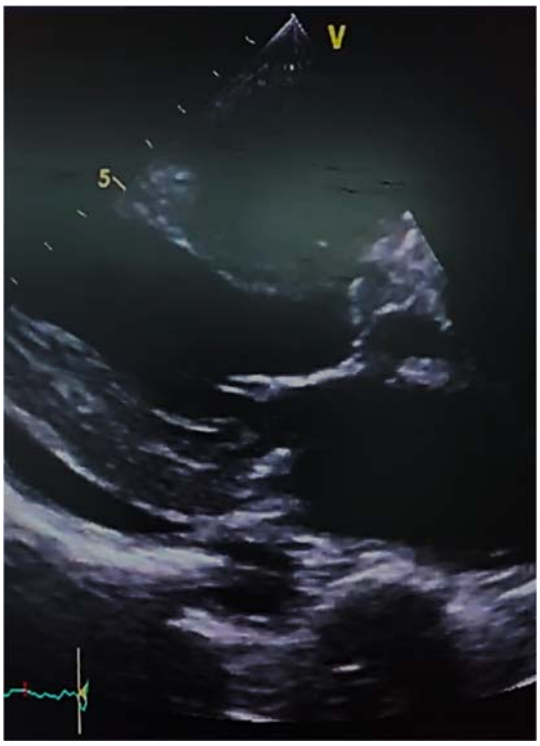
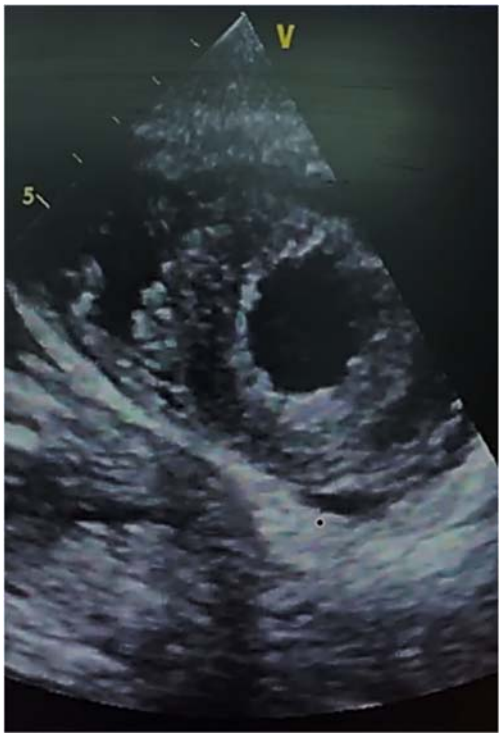


Figure 2



b) What transthoracic echocardiography (TTE) views are displayed in Figure 1 and Figure 2? (2)

c) What are the salient abnormalities on the TTE views? (3)

d) What is your assessment of this patient and recommendations for management? (3)

[10]

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Paper 3 (3 hours)

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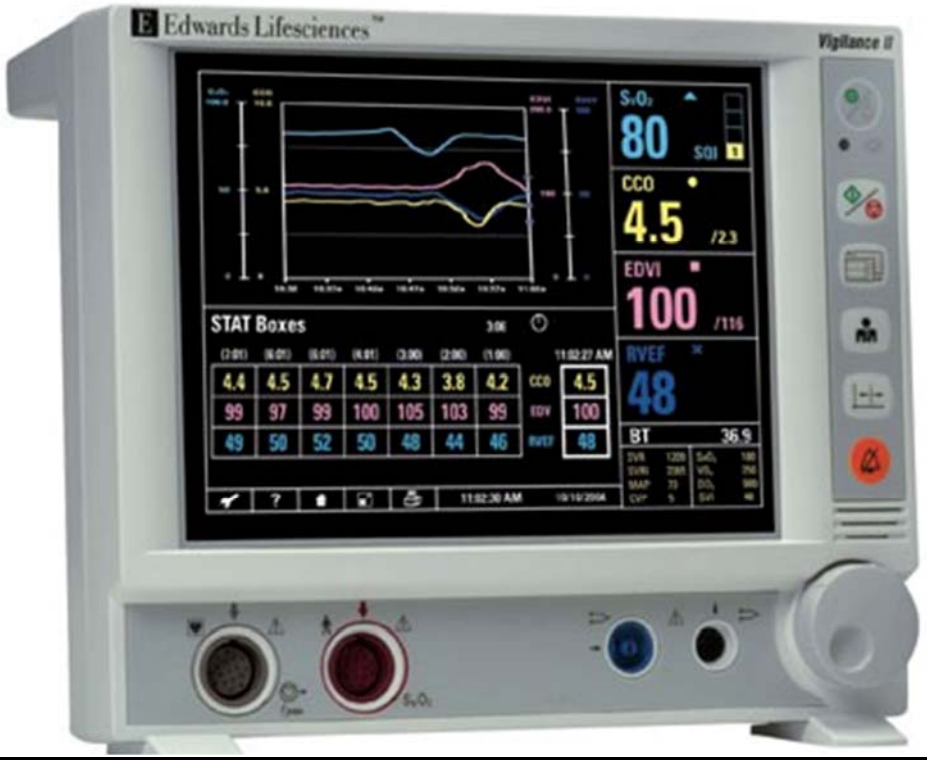
CANDIDATE NUMBER……..

Questions 7 - 8

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 7

The following is a screenshot of continuous cardiac output monitoring using thermodilution. Answer the following questions regarding mixed venous saturation.



a) What is meant by mixed venous saturation? (1)

_____

_____

_____

b) Re-organising the Fick equation, demonstrate the determinants of mixed venous saturation. (1)

_____

_____

_____

c) Name 4 causes of a VO_2:DO_2 ratio imbalance causing mixed venous desaturation, with appropriate treatment for each cause. (8)

[10]

Question 8

The following screenshot of an anaesthetic monitor, and arterial blood gas analysis is from a healthy 50-year-old patient undergoing an emergency laparotomy for an abdominal gunshot wound.

pH	7.32
pCO_2	6.5 kPa (49mmHg)
pO_2	27.7 kPa (208mmHg)
Na^+	133 mmol/L
K^+	3.5 mmol/L
Ca^{++}	0.98 mmol/L
Glucose	6.8 mmol/L
Lactate	4.2 mmol/L
Hct	25.5%
HCO_3^-	23.7 mmol/L
TCO_2	28.1 mmol/L
BE	- 4.1 mmol/L
SO_2	100%
THb	8.5 g/dL

a) Referring to the screenshot of the anaesthetic monitor and arterial blood gas values, what is the diagnosis? Motivate your answer. (2)

_____

_____

_____

_____

PTO/Page 5 Question 8b)…

b) What would be the appropriate treatment for the abnormality observed? (1)

c) When would you consider blood transfusion if this patient has a history of ischaemic heart disease? Motivate your answer. (2)

d) If objective stroke volume variation or pulse pressure variation monitoring was available, at which value would you consider intravascular volume replacement? (1)

e) Name 4 prerequisites for the use of stroke volume and pulse pressure variation. (4)

[10]

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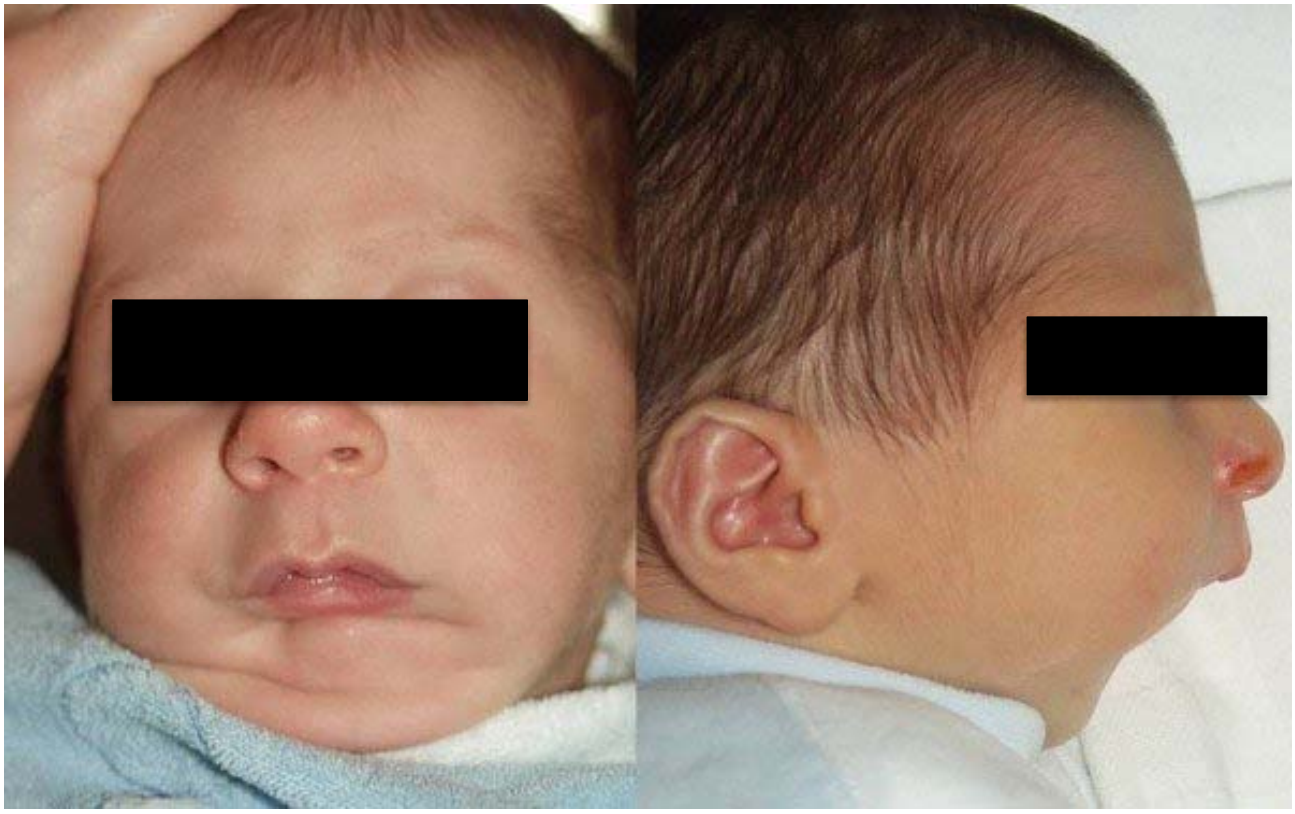
CANDIDATE NUMBER……..

Questions 9 - 10

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 9

The 6-week-old baby depicted below is booked on your slate for surgery.



a) What is the diagnosis? (1)

b) What are the airway abnormalities found in this condition? (3)

c) If at any stage this child becomes very distressed, what manoeuvre can be performed? (1)

PTO/Page 3 Question 9d)…

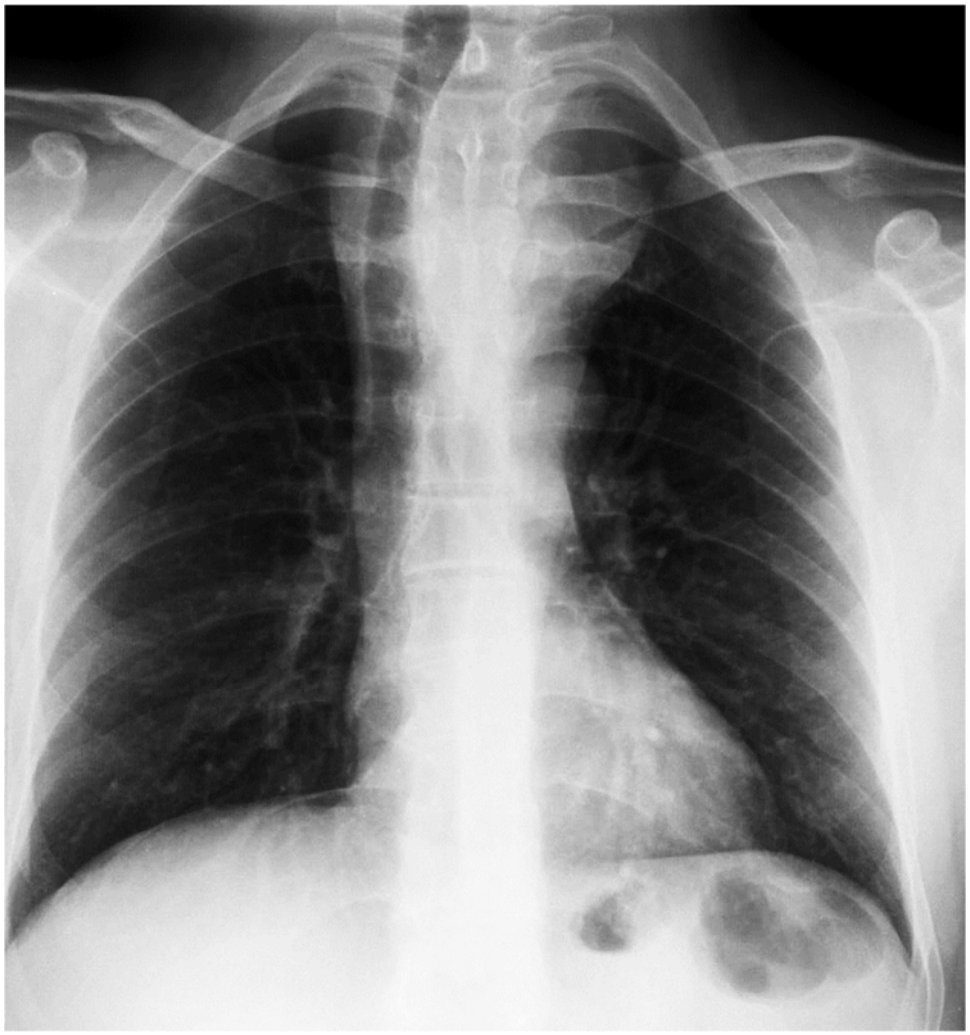
d) What therapeutic interventions may be offered for airway obstruction? (4)

e) Name a syndrome associated with this condition. (1)

[10]

Question 10

The following chest x-ray is from a 50-year-old female with a mass in the chest. She presented with symptoms of weight loss and palpitations.



a) List two features on this chest x-ray that suggest the mass is in the anterior mediastinum. (2)

_____

_____

_____

_____

b) What other concerning symptom would you want to exclude prior to anaesthetising this patient? (1)

_____

_____

_____

c) What is the most likely diagnosis in this patient? (1)

_____

_____

_____

d) Draw a normal flow volume loop and superimpose that which you would expect in this patient with expiratory stridor. (6)

[10]

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All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

Questions 11 - 12

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 11

A 22-year-old female patient presents with abnormal vaginal bleeding. Her last normal menstrual period was 2 months ago. On examination she has a uterus palpable just below the level of the umbilicus. The patient has a tachycardia of 110 bpm, an elevated BP of 145/90 and is breathing at a rate of 22 per minute. A set of thyroid function tests has been obtained.

Test	Result	Units	Normal Range
TSH	<0.07	mIU/L	0.3 to 4.2
Free T4	5.59	ng/dl	0.8 to 2.0
T3	451	ng/dl	60 – 181
β-hCG	8,04,578	mIU/ml	<20

a) What is the most likely underlying diagnosis in this case? (2)

b) What are the major perioperative concerns with this patient? (3)

PTO/Page 3 Question 11c)…

c) What drugs would you use peri-operatively to avoid peri-operative complications? Motivate your answer. (5)

[10]

Question 12

a) A pregnant patient is at 30 weeks gestation. She is known to have severe kyphoscoliosis. She is sent for pre-delivery evaluation at the anaesthetic clinic. The patient appears comfortable at rest but was breathless after walking. The following pulmonary function tests were obtained.

Forced vital Capacity (FVC)	0.95L	29 % predicted
Forced Expiratory Volume in one second (FEV_1)	0.8L	35 % predicted
FEV_1/FVC	85%	

i) Comment on this set of results. (1)

_____

_____

_____

b) An Arterial Blood Gas sample is obtained whilst the patient is breathing room air (21 kPa)

pH	7.4	
pCO_2	6 kPa	(45 mmHg)
pO_2	8.5 kPa	(64 mmHg)
HCO_3	35 mmol/L	
$stdHCO_3$	24 mmol/L	

i) Comment on the arterial blood gas. (2)

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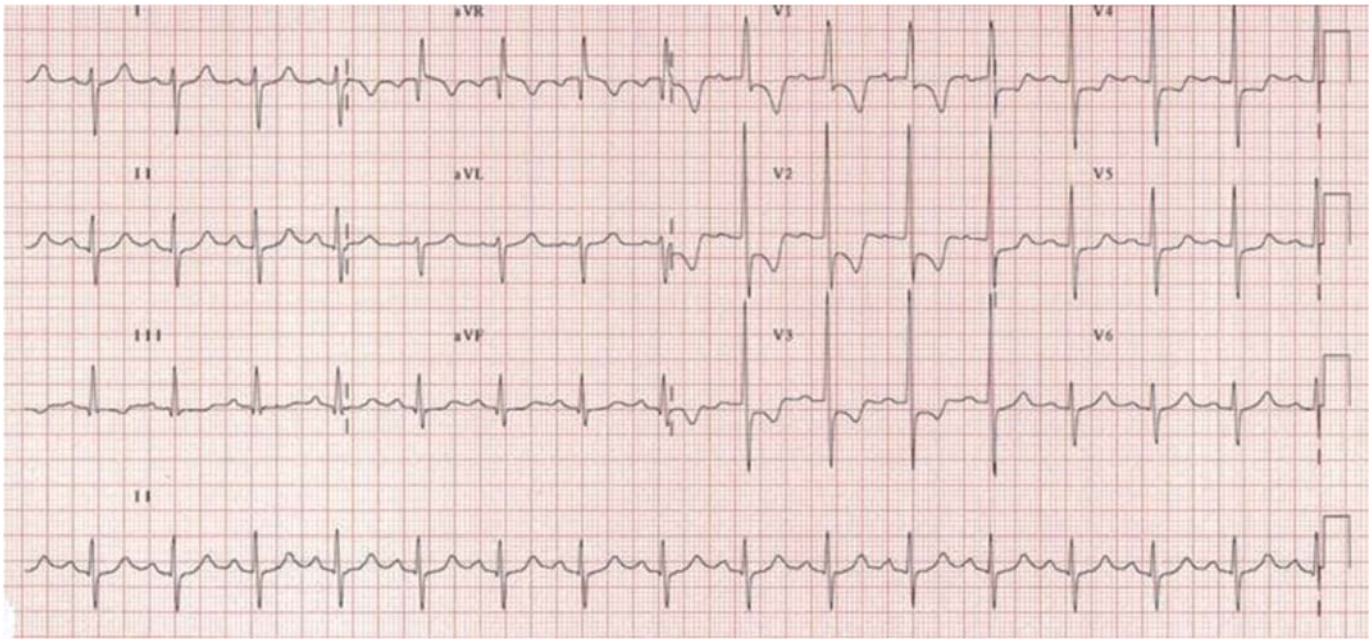
PTO/Page 5 Question 12c)…

c) Electrocardiogram: Calibration (25mm/sec; 10mm/mV)



i) What features of the above ECG are concerning? (3)

ii) What recommendations would you make regarding this patient's mode of delivery? (4)

[10]

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Paper 3 (3 hours)

All questions are to be answered in the space provided.

CANDIDATE NUMBER……..

Questions 13 - 14

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

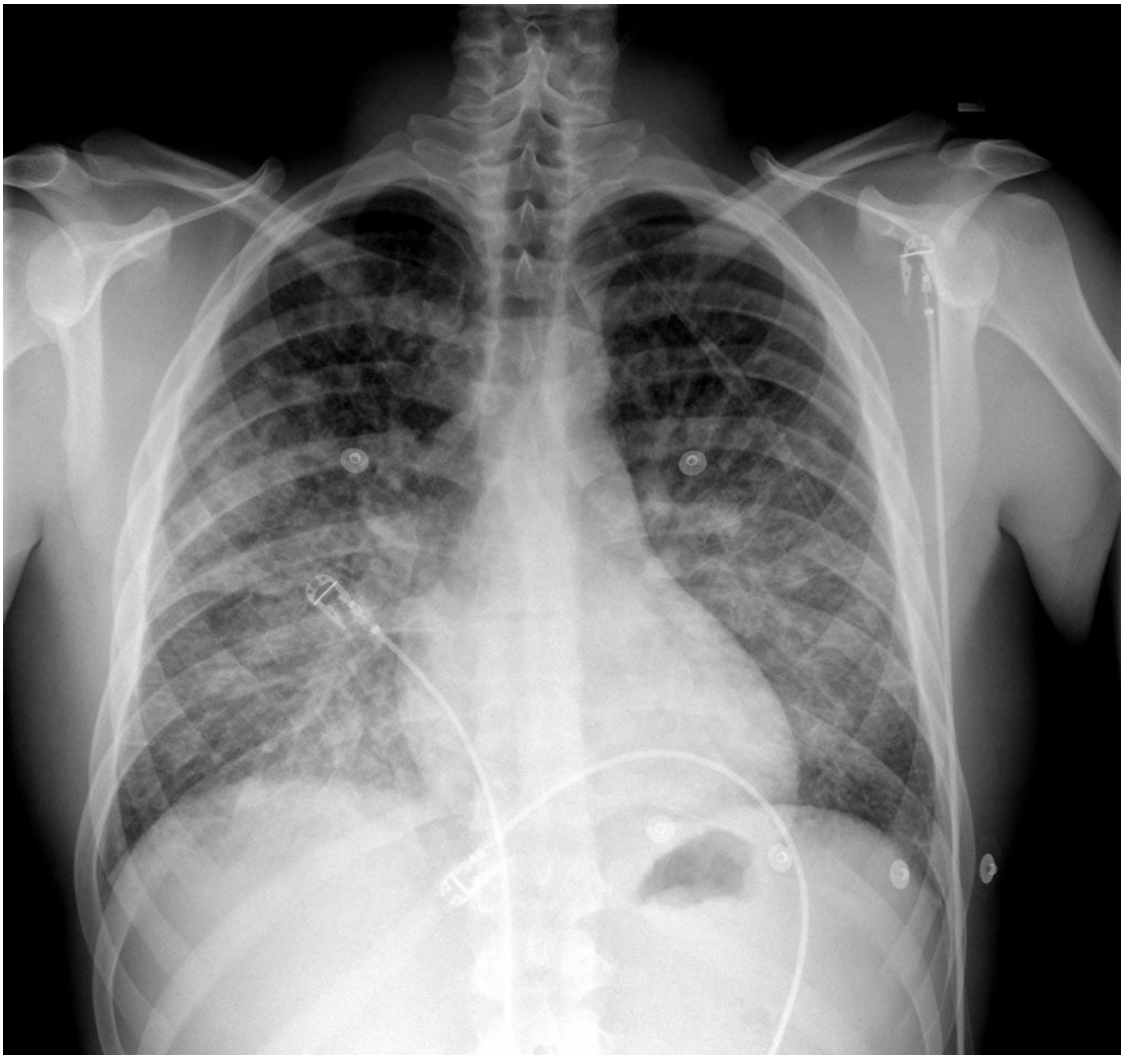
Question 13

A 32-year-old female marathon athlete is admitted to ICU with the following history:
She was retrieved close to the finish line of a marathon appearing pale and complaining of nausea, headache and general weakness. She received treatment at the medical tent, including oral fluids and IV Ringers lactate. She then vomited and developed a generalised tonic-clonic convulsion which was terminated with IV Midazolam.
On admission she is post-ictal, sleepy and confused but rousable. She has signs of respiratory distress, breathing rate of 28/min, nasal flaring and peripheral saturation of 89% on a rebreathing O_2 mask.
The following blood results are available on admission and an urgent Chest x-ray is ordered.

		Normal reference range
pH	7.31	7.35 – 7.45
pO2	64mmHg (8,4kPa)	80 – 100 mmHg (10.5 – 13.3 kPa)
pCO2	52mmHg (6,9kPa)	35 – 45 mmHg (4.6 – 6 kPa)
SO_2	91%	94 – 100%
SBE	-1.4 mmol/L	0 ± 2 mMol/L
Lactate	1.2 mmol/L	0 - 2 mmol/L
Na+	124 mmol/L	136-145 mmol/L
K+	3.3 mmol/L	3,5-5.1 mmol/L
Urea	4.5 mmol/L	2.9-8.2 mmol/L
Creatinine	80 umol/L	71-115 umol/L

PTO/Page 3 Question 13a)…

Chest X-ray



a) What is the most likely diagnosis? (4)

b) What would your immediate management be? (2)

c) What is a feared complication of this treatment and how will you prevent it? (4)

[10]

Question 14

A 58-year-old male patient with known end-stage alcoholic liver disease undergoes elective laparoscopic cholecystectomy for gall stones. The procedure is converted to open because of injury to a large blood vessel with massive bleeding. He receives 3 U of emergency packed red blood cells. Post operatively he is admitted to the ICU. Bleeding is observed in the nasogastric tube, the wound dressings are soaked with blood and oozing from the CVP site is noted. His blood and thromboelastogram (TEG) results are as follows:

Haemoglobin	7.5 g/dl
White cell count	14 x 10^9 /l
Platelets	18 x 10^9 /l
INR	1.8
Fibrinogen	118mg/dl (200-450mg/dl)
AST	69 U/l (15-40)
ALT	55 U/l (10-40)
ALP	864 U/l (53-128)
GGT	547 U/l (< 68)
Lactate	4.8
Urea	11.6 mmol/L(2.9-8.2mmol/L)
Creatinine	114 mmol/L(71-115mmol/L)

Thromboelastogram values

Reaction time	4.7min (2.5-7.5min)
Kinetic time	12.2min (0.8-2.8min)
α-angle	38.1 degrees (55.2-78.4 degrees)
Maximum amplitude	25.2 mm (50.6-69.4mm)
Ly-30	0.0% (0-7.5)

PTO/Page 6 Question 14a)…

a) What are the possible causes of coagulopathy in this patient? (6)

b) List the abnormalities on the available TEG and state what blood products and/or drugs you would prescribe for each abnormality. (4)

[10]

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CANDIDATE NUMBER……..

Questions 15 - 16

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 15

Mrs BM, a 42-year-old woman was diagnosed with stage 1 breast cancer in her left breast 12 months ago. 2 weeks after her diagnosis, she underwent a partial left mastectomy and axillary node dissection. Surgery was followed by radiation therapy. Mrs BM experienced significant post-operative pain which was eventually controlled with a morphine PCA pump and other oral analgesics.

4 months after her surgery, Mrs BM was still experiencing pain in her left anterior-lateral chest wall and axilla. It was now predominantly a burning sensation accompanied by a persistent ache in her left arm. Her surgeon started her on pain medication and has subsequently adjusted the dosages several times.

Despite this, Mrs BM is still experiencing the same pain 6 months later. She is unable to lie on her left side and hasn't had a decent night's sleep since the operation. This ongoing problem is making her progressively more anxious and depressed. Her surgeon has now referred her to you for further pain management. Currently, Mrs BM is taking the following medications:

- Tamoxifen 20mg by mouth daily
- Lorazepam 2mg by mouth at bedtime as needed
- Acetaminophen 1g by mouth 8 hourly
- Ibuprofen 400mg by mouth as needed – she usually takes a dose before bedtime
- Oxycodone (extended release) 20mg by mouth 12 hourly
- Oxycodone 5mg by mouth 4-6 hourly when needed – she takes on average 2 doses daily
- Senna 2 tabs by mouth daily as needed

Examination of Mrs BM reveals a well healed 3cm scar in the upper outer quadrant of her left breast. There is no obvious inflammation or tenderness at the incision site, but significant hyperesthesia can be elicited in her anterior axilla.

a) What is the most likely diagnosis? (1)

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b) What risk factors does Mrs BM have for developing this condition? (2.5)

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c) What is the underlying pathogenesis? (2)

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PTO/Page 3 Question 15d)…

d) What drug/s would you consider adding to Mrs BM's prescription to assist with the control of her pain? (2)

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e) Calculate Mrs BM's daily morphine milligram equivalent (MME/day). (1.5)

_____

_____

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_____

f) Based on this result, what other drug would you consider adding to Mrs BM's prescription? (1)

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[10]

Question 16

Mrs JS, a 30-year-old woman with a history of opioid dependence, presents to theatre for a laparotomy for bowel obstruction. For the last 5 months, she has been taking 150mg sustained release morphine twice a day.
Intraoperatively, she receives 15 mg of morphine intravenously. In recovery Mrs JS complains of severe pain which eventually settles after 3 further boluses of 4mg morphine intravenously. A morphine PCA pump (1mg boluses with a 10-minute lock-out) is set up for her and she is transferred to the ward.
Four hours later you are called by frustrated ward staff, to assess Mrs JS, who is again complaining of severe pain. When you arrive at her bedside, Mrs JS appears diaphoretic and is frantically pressing the buttons on the PCA pump. She has received 24 boluses of morphine after 72 attempts.

a) What is the most likely diagnosis? Explain your answer. (2)

b) What is the pathophysiology of the above-mentioned condition? (1)

c) What would have been a more appropriate post-operative pain management plan? (7)

[10]

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CANDIDATE NUMBER……..

Questions 17 - 18

There are 10 books for this examination, please ensure that the 10 books are handed over to the invigilator for marking.

Question 17

An 84-year-old woman presented with a 2-day history of jaundice, fever and abdominal pain. She is scheduled for endoscopic retrograde cholangiopancreatography (ERCP) in the Endoscopy unit. Laboratory workup revealed:

	Patient's values	Lab Range
White cell count	17.4 x 10^9 /l	4.0-11.0 x 10^9 /l
C-reactive protein	8.3 mg/dL	< 0.1 mg/dL
Bilirubin	30 µmol/L	2-17 µmol/L
Alkaline phosphatase	893 U/L	45-115 U/L
Gamma-glutamyl transferase	1143 U/L	0-30 U/L
Aspartate aminotransferase	231 U/L	0-35 U/L
Alanine aminotransferase	178 U/L	0-45 U/L

a) What is the most likely cause of this patient's abnormal liver function? (1)

b) How would you assess suitability for general anaesthesia in this patient for ERCP? (5)

PTO/Page 3 Question 17c)…

c) During the procedure the patient develops severe hypotension following intravenous administration of an antibiotic. How will you manage this patient in the Endoscopy Unit? (4)

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[10]

Question 18

With the safety and efficacy of Electroconvulsive Therapy (ECT) in mind, please answer the following questions.

a) Rank the following induction agents in order from 1 to 6 in the following table. (6)

	Seizure duration **6 = longest** **1 = shortest**	**Ability to reduce Cerebral Metabolic Rate for Oxygen ($CMRO_2$)** **6 = greatest** **1 = least**	**Emergence time** **6 = longest** **1 = shortest**
Etomidate			
Ketamine			
Methohexital			
Sevoflurane			
Thiopental sodium			
Propofol			

PTO/Page 5 Question 18b)…

b) How do you monitor Electro Convulsive Therapy (ECT) seizure duration and what are the features of an optimal seizure? (4)

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[10]

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CANDIDATE NUMBER……..

Questions 19 - 20

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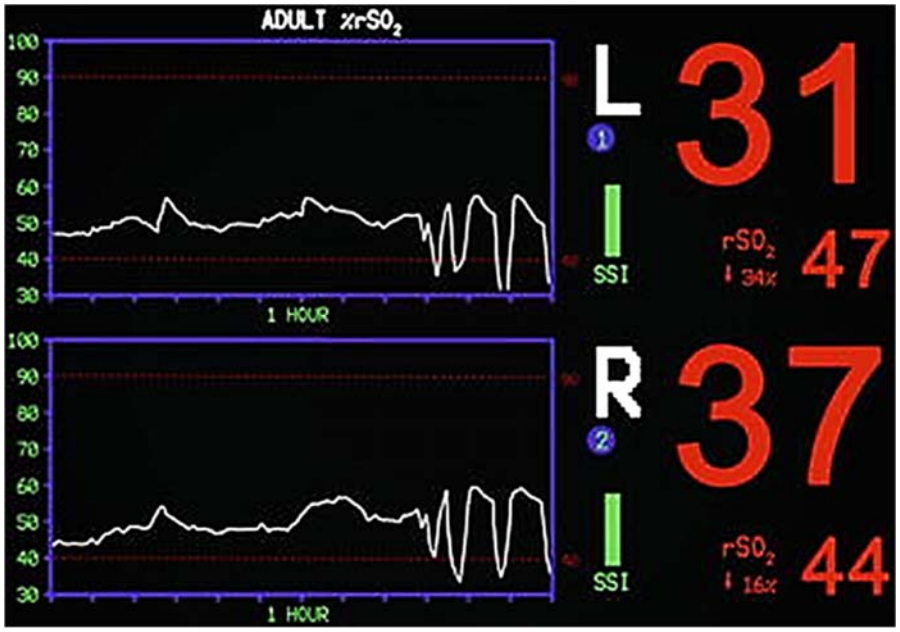
Question 19

a) How does one manage a patient with the following cerebral oximetry reading under general anaesthesia? (5)



PTO/Page 3 Question 19b)…

b) A patient on cardiopulmonary bypass has the following reading. Which factors could be addressed to improve the reading? (3)

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c) Name two other techniques to monitor cerebral oxygen delivery and metabolism. (2)

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[10]

Question 20

a) In a patient with a neuromuscular disorder, why should the following be avoided?

i) Succinylcholine/depolarising muscle relaxant. (1)

ii) Non-depolarising muscle relaxant (NDNMBD). (1)

b) If a full adult dose of NDNMBD is administered in an adult patient with Myasthenia Gravis, what will be its effect on the following neuromuscular monitoring parameters?

i) Train-of-four count. (1)

ii) Twitch response to a single stimulus. (1)

iii) Fade during continuous stimulation. (1)

PTO/Page 5 Question 20c)…

c) Draw the evoked response to a post-tetanic stimulation in a patient with Eaton-Lambert Syndrome. (3)

d) In the presence of pre-eclampsia, which additional factor must be kept in mind in the obstetric patient with a neuromuscular disorder? (1)

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_____

_____

e) What is the place of sugammadex in the clinical management of patients with neuromuscular disorders and how would it affect the neuromuscular stimulation response? (1)

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[10]

Candidate Number:_____