

ANSWER EACH SECTION IN A SEPARATE ANSWER BOOKLET

Section A. Answer both questions in this section. Each question carries 20marks.

1. You have just graduated your 4th year with a Bachelor of Science in Human Biology (BSc.HB) and now in 5th year doing your first rotation in the Department of Paediatrics and Child Health at the University Teaching Hospital (UTH). Your consultant paediatrician asks you to look at Xelesi Zulu (picture below), a 3 month old infant, who is a referral from Chipata General Hospital (CGH), Eastern Zambia. She has been brought by her mother and admitted in ward AO1 with a complaint of an enlarging head for the past 2 months. [20]



1. Sun setting eyes
2. Enlarged head
3. distended veins

- a. The consultant points at you to state any 3 important signs you can identify in Xelesi [3]
- b. He further tells you that Xelesi suffers from a condition that arises from abnormal excessive accumulation of cerebrospinal fluid (CSF) in the ventricular system of the brain causing increased intracranial pressure (ICP).

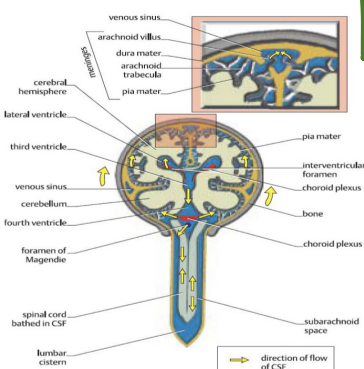
- i. Name the condition that Xelesi has [1] **Hydrocephalus**
- ii. Mention any 2 congenital and 2 acquired causes of this condition [4]
- iii. Anatomically, briefly describe the flow of CSF in the ventricular system [10]

Congenital Acquired

- TORCHES	- TB (meningitis)
- Apert's syndrome	- subarachnoid haemorrhage
- Down's Walker's syndrome	- meningococcal meningitis

- c. The consultant concludes by stating that surgery is the practical modality of treating this condition. State the two surgical methods currently available for Xelesi. [2]

Flow of CSF



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Surgical Treatment

• Surgical treatment is the preferred therapeutic option

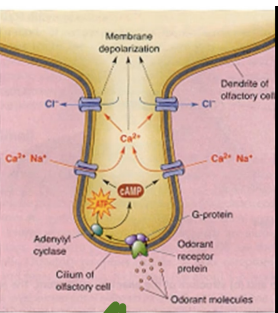
• Options:

a. **Shunting**

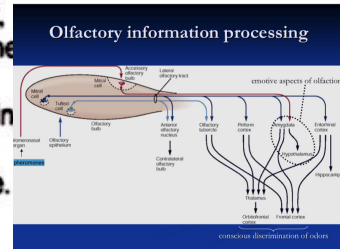
- Ventriculoperitoneal (VP)
- Ventriculoatrial (VA)
- Lumboperitoneal
- Ventriculopleural
- Torkildsen shunt

b. **Endoscopic third ventriculostomy (ETV)**

2. Celia is a 32-year-old woman who had no medical problems. One day while shopping in a department store, she was admiring a dress while walking and did not notice a clothing rack rapidly being pushed in her direction. Because she was not paying attention to what was in front of her, she collided with the clothing rack, hitting her face. She immediately noticed pain in her nose and forehead. Because her nose was bleeding, she was taken to the emergency room, where skull x-rays were performed, which revealed a small fracture in the cribriform plate that was too small for any therapy. She was sent home with pain medications and told to return if there were any further sequelae.



Two weeks later, after the swelling and bleeding had subsided somewhat, while eating dinner at a restaurant, Celia noted that she was unable to smell the food. This continued with subsequent meals, so she consulted a neurologist who tested her sense of smell with several substances including coffee grounds. He concluded that her anosmia (inability to smell) was a result of her head trauma and appeared to exist on both sides of her nose.



- a. Briefly describe the physiology of smell. 10 marks
- b) With the aid of a diagram show the central olfactory pathway and the various projections to the different cortical areas. 10 marks

Section B. Each question carries (20 marks). Answer both questions in this section.

CNS stimulants

Amphetamine and methamphetamine

- MOA: ↑ release of dopamine and norepinephrine and inhibits their reuptake
- Effects: increased motor activity, euphoria and excitement, anorexia and insomnia, hyperreflexia, stereotyped behavior (repetitive or ritualistic movement, posture, or utterance) and paranoid psychosis with prolonged use
- Clinical uses: narcolepsy/sleep disorder characterized by e.g. excessive sleepiness, attention deficit hyperactivity disorder and paranoid psychosis with prolonged use
- Withdrawal causes deep long sleep and the patient wakes up feeling tired, depressed and hungry

Specific acute treatment

- Triptan - sumatriptan, naratriptan, rizatriptan, eletriptan, zolmitriptan, almotriptan & frovatriptan
- Selective activity on 5-HT_{1B/1D} agonist
- Mechanisms of action:
 - ↑ cerebral vasoconstriction
 - Modulating neurotransmitter release from neuronal terminals

1. List the pharmacological effects and clinical uses of the following drugs:

- A. Dronabinol
B. Amphetamine
C. Sumatriptan
D. Risperidone

[Write 5 – 10 sentences on each drug]

Risperidone

- Atypical antipsychotic
- Blocks D₂, 5-HT₂, ALPHA₁ adrenergic, & has antihistaminic activity
- EPS are rare at low doses
- No anti-emetic effect
- Used for treatment of schizophrenia, & short term treatment of mania associated with bipolar disorder

2. Describe the mechanisms leading to the following in the vestibular apparatus of the inner ear.

- A. Rotational acceleration. 10 marks
B. Linear acceleration. 10 marks

Answer on last page

TREATMENT OF ALCOHOL WITHDRAWAL

- A. **BENZODIAZEPINES**
- Symptoms of alcohol withdrawal can be suppressed by benzodiazepines. The patient is stabilized with long acting benzodiazepine (e.g. diazepam and chlordiazepoxide) and the drug is gradually withdrawn over a period 2 weeks
- B. **NON-SELECTIVE BETA-ADRENERGIC BLOCKER**
- Propranolol is used as an adjunct to benzodiazepines during the withdrawal process. The beta-blocker blocks the effects of excessive sympathetic activity that occurs during withdrawal. It permits reduction in benzodiazepine dose and accelerates improvement in vital signs.
- C. **CLONIDINE (AN ALPHA₂ ADRENERGIC AGONIST)**
- Clonidine is used as an adjunct to benzodiazepines during the withdrawal process. It acts by inhibiting the exaggerated noradrenergic release that occurs during withdrawal.
- D. **ANTI-PSYCHOTIC DRUGS**
- To control the agitation and hallucinations
- E. **ANTI-CONVULSANT DRUGS**
- Chlormethiazole and phenytoin for seizures not responding to benzodiazepines

Section C (20 marks). Answer any 4 questions out of 6

1. Discuss the clinical features and drug management of ethanol withdrawal syndrome [10 – 20 sentences] – 10 marks
2. i. Discuss the drug management of convulsive status epilepticus [5 – 10 sentences] – 5 marks
- ii. Pharmacological properties and clinical uses of benzodiazepines [5 – 10 sentences] – 5 marks

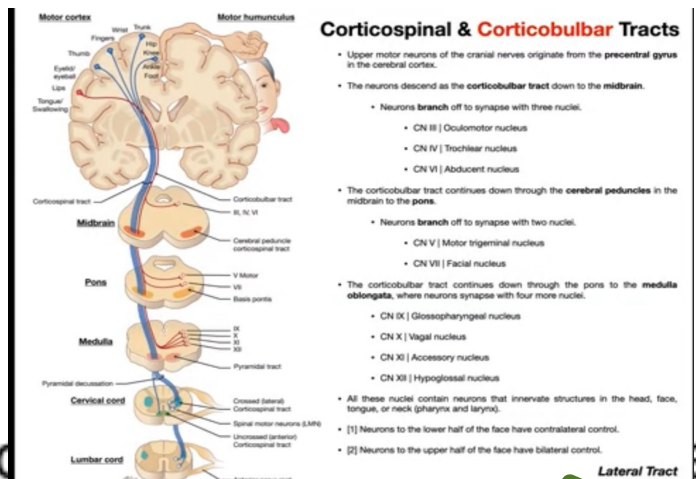
Management of Status Epilepticus

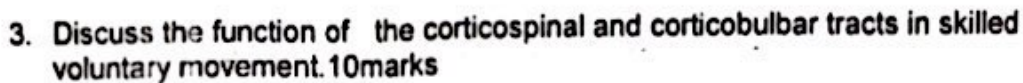
- Status epilepticus is a seizure lasting more than 5 minutes or more than 2 seizures without full recovery of consciousness between seizures
- It is a medical emergency
- Immediate treatment is essential to prevent neuronal damage and death
- Management is usually to secure immediate intravenous access
- Stabilization of airway, breathing, circulation, and glucose
- First-line treatment: benzodiazepines (lorazepam, clonazepam, diazepam)
- Second-line treatment: phenytoin, fosphenytoin, valproate, levetiracetam
- Third-line treatment: barbiturates (phenobarbital, sodium amobarbital)
- Supportive care: oxygen, fluids, electrolytes, and monitoring of vital signs

Benzodiazepines

- Increase GABA action
- (midazolam, lorazepam, diazepam, clonazepam)
- Clonazepam can be used in absence seizures
- Benzodiazepines (diazepam, temazepam, lorazepam, midazolam)
- Can be used as pre-medication during anaesthesia
- Uses - Anxiolysis, sedation, amnesia, and as adjunct to general anaesthesia

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4. Discuss the Physiology of the hypothalamus .10marks

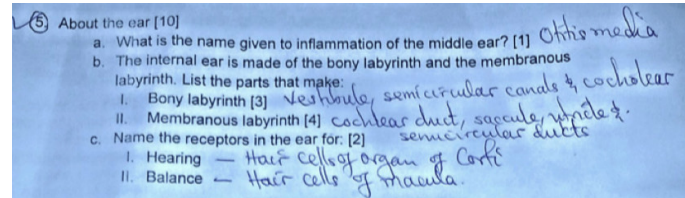
5. About the ear [10]

a. What is the name given to inflammation of the middle ear? [1]

b. The internal ear is made of the bony labyrinth and the membranous labyrinth. List the parts that make: _____

- I. Bony labyrinth [3]
II. Membranous labyrinth [4]
Name the receptors in the ear for: [2]
I. Hearing
II. Balance

Otitis media

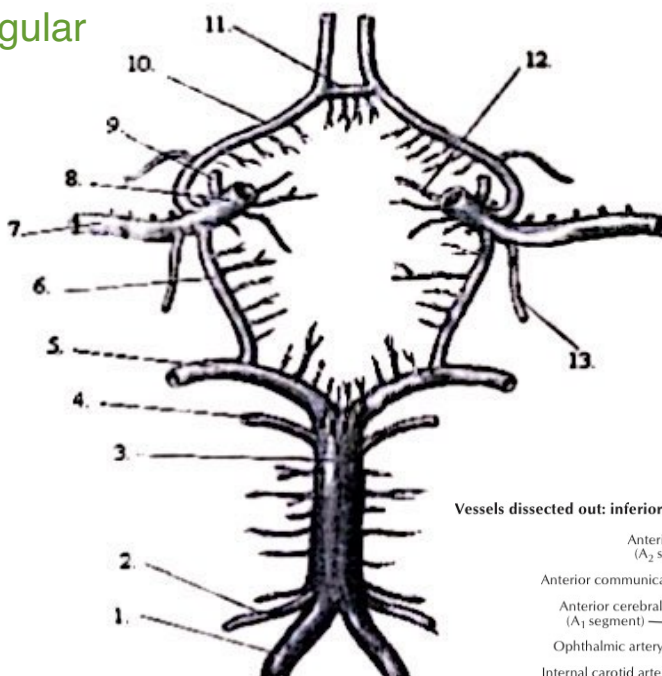
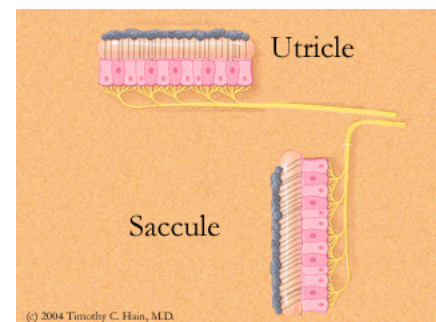
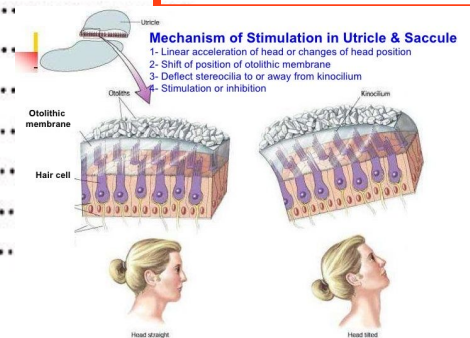


6. Arterial circle of Willis. Label the numbered arteries 1-10

Question. 2

Question 2

Linear acceleration



Vessels dissected out: inferior view

