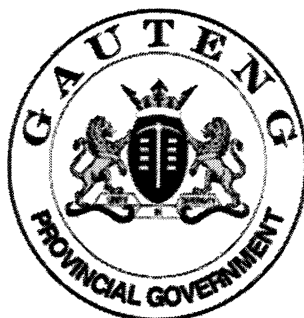


**SENIOR CERTIFICATE EXAMINATION
SENIORSERTIFIKAAT-EKSAMEN**



**OCTOBER / NOVEMBER
OKTOBER / NOVEMBER**

2004

PHYSIOLOGY

FISIOLOGIE

HG

307-1/0

**17 pages
17 bladsye**

PHYSIOLOGY HG



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GAUTENGSE DEPARTEMENT VAN ONDERWYS
SENIORSERTIFIKAAT-EKSAMEN

FISIOLOGIE HG

TYD: 3 uur

PUNTE: 300

INSTRUKSIES:

- Die vraestel bestaan uit drie Afdelings: AFDELING A: 90
AFDELING B: 160
AFDELING C: 50
 - Al die vrae in Afdeling A en B is VERPLIGTEND.
 - Beantwoord EEN vraag uit Afdeling C.
 - Beantwoord Vraag 1 (meervoudige keusevrae) op die **antwoordblad** aan die **binnekant van die omslag** van jou **antwoordboek**.
 - Nommer jou antwoorde in ooreenstemming met die vraestel.
 - Gebruik die ingeslote grafiekpapier.
-
-

AFDELING A
VERPLIGTEND

VRAAG 1
MEERVOUDIGE KEUSEVRAE

Vier moontlikhede word as antwoorde op die volgende vrae verskaf. Dui die korrekte antwoord aan met 'n kruis (X) oor die toepaslike letter op die **antwoordblad** aan die **binnekant van die omslag** van jou **antwoordboek**.

VOORBEELD: Speeksel word afgeskei in die _____ .

- A. mond
- B. esofagus
- C. maag
- D. duodenum

ANTWOORD:

<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
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GAUTENG DEPARTMENT OF EDUCATION
SENIOR CERTIFICATE EXAMINATION

PHYSIOLOGY HG

TIME: 3 hours

MARKS: 300

INSTRUCTIONS:

- The question paper consists of three Sections : SECTION A: 90
SECTION B: 160
SECTION C: 50
 - In Sections A and B all questions are COMPULSORY.
 - Answer ONE question from Section C.
 - Answer Question 1 (multiple-choice questions) on the **answer sheet** on the **inside cover** of your **answer book**.
 - Number your answers in accordance with the question paper.
 - Use the graph paper provided.
-
-

**SECTION A
COMPULSORY**

**QUESTION 1
MULTIPLE-CHOICE QUESTIONS**

Four possibilities are given as answers to each of the following questions. Indicate the correct answer, by marking the relevant letter with a cross (X) on the **answer sheet** on the **inside cover** of your **answer book**.

EXAMPLE: Saliva is secreted in the _____ .

- A. mouth
- B. oesophagus
- C. stomach
- D. duodenum

ANSWER:

A	B	C	D
--------------	---	---	---

- 1.1 Die langdurige gebruik van kortisoos as 'n geneesmiddel sal die volgende tot gevolg hê:
- A. Inhibeer die afbreek van oortollige proteïene.
 - B. Edeem (waterretensie).
 - C. Hoë stresvlakke.
 - D. Lae bloedsuikervlakke.
- 1.2 Watter een van die onderstaande stellings is **korrek**?
- A. Oksitosien is 'n lipiedagtige hormoon.
 - B. Vrystellingsfaktore word vanaf die hipotalamus na die anterior lob van die hipofise vervoer.
 - C. Hormonale boodskappe word relatief stadig oorgedra en het 'n kort reaksietyd.
 - D. Senuwee-impulse word na meer as een effektor gelyktydig vervoer.
- 1.3 Ammoniak in die urien is die produk van die _____ .
- A. afbreek van nukleïensure
 - B. deaminasie van glutamien
 - C. deaminasie van aminosure in die lewer
 - D. afbreek van eritrosiete in die milt en lewer
- 1.4 'n Urienmonster van 'n persoon is getoets en die toetsresultate toon dat daar proteïene aanwesig is. Watter van die volgende strukture is moontlik geïnfekteer?
- A. Buise van Bellini
 - B. Glomerulus
 - C. Lus van Henlé
 - D. Distale gekronkelde buisie
- 1.5 'n Persoon word in 'n motorongeluk beseer. Hy kan dit voel as voorwerpe aan sy regterbeen raak, maar kan nie sy been beweeg nie, omdat _____ .
- A. die sensoriese senuwees in die been beskadig is
 - B. die medulla oblongata beskadig is
 - C. daar ernstige skade aan die rugmurg is
 - D. die motoriese senuwees in sy been beskadig is
- 1.6 Die sensasie van gehoor, smaak en reuk word geïnterpreteer in die _____ lob van die serebrum.
- A. pariëtale
 - B. oksipitale
 - C. frontale
 - D. temporale

- 1.1 The continuous use of cortisone as a medicine will result in the following:
- A. Inhibits the breakdown of excess proteins.
 - B. Oedema (retention of water).
 - C. High levels of stress.
 - D. Low blood sugar levels.
- 1.2 Which one of the following statements is **correct**?
- A. Oxytocin is a lipid-like hormone.
 - B. Releasing factors are transported from the hypothalamus to the anterior lobe of the hypophysis.
 - C. Hormonal messages travel relatively slow and lasts only a short time.
 - D. Nerve impulses are transported to more than one effector at the same time.
- 1.3 Ammonia in the urine is a product of _____ .
- A. the breaking down of nucleic acids
 - B. deamination of glutamine
 - C. deamination of amino acids in the liver
 - D. the breaking down of erythrocytes in the spleen and liver
- 1.4 A urine sample of a person is tested and the test results indicate the presence of proteins. Which of the following structures would probably be infected?
- A. Tubes of Bellini
 - B. Glomerulus
 - C. Loop of Henlé
 - D. Distal convoluted tubule
- 1.5 A person is injured in a car accident. He can feel objects touching his right leg but cannot move his leg because _____ .
- A. the sensory nerves in the leg have been damaged
 - B. there is damage to the medulla oblongata
 - C. there is extensive damage to the spinal cord
 - D. the motor nerves in the leg have been damaged
- 1.6 The sensations of hearing, taste and smell are interpreted in the _____ lobe of the cerebrum.
- A. parietal
 - B. occipital
 - C. frontal
 - D. temporal

- 1.7 Die witstof in die serebrum bestaan uit _____ .
- A. die versameling van gemiëlineerde senuvesels
 - B. die versameling van selliggame van neurone
 - C. die versameling van bipolêre neurone
 - D. serebrospinale vloeistof
- 1.8 Watter van die volgende is die gevolg van parasimpatiese stimulasie?
- A. Versnelde hartklop
 - B. Vertraagde peristaltiese beweging
 - C. Vergrote pupille
 - D. Verhoogde speekselafskeiding
- 1.9 Nagblindheid word veroorsaak deur _____ .
- A. 'n gebrek aan iodopsien
 - B. 'n gebrek aan keëltjies in die retina van die oog
 - C. 'n gebrek aan retinol wat veroorsaak word deur 'n vitamien A-tekort
 - D. 'n katarak in die lens van die oog
- 1.10 Tydelike doofheid kan veroorsaak word deur _____ .
- A. beskadiging van die sensoriese haarselle weens blootstelling aan hoë-intensiteit-geraas
 - B. 'n beskadigde kogleasenuwee
 - C. 'n balletjie serum wat voor die timpanum versamel
 - D. onherstelbare skeuring van die timpanum
- 1.11 Wanneer die adenohipofise by 'n groeiende kind onderontwikkel is, sal die kind _____ .
- A. akromegalie ontwikkel
 - B. 'n dwerg met vertraagde seksuele ontwikkeling wees
 - C. vroeër as 'n normale kind geslagsryp word
 - D. 'n baie hoë metaboliese tempo besit
- 1.12 Die volgende hormone word in die hipotalamus geproduseer en dan met die senuweevesels na die pituïtêre klier vervoer, waar dit gestoor word.
- A. STH en TSH
 - B. FSH en oksitosien
 - C. ADH en oksitosien
 - D. Prolaktien en MSH
- 1.13 Albino's het 'n tekort aan die volgende pigment in hulle oë, vel en hare:
- A. Hemoglobien
 - B. Melanien
 - C. Oksihemoglobien
 - D. Bilirubien

- 1.7 White matter of the cerebrum is made up of _____ .
- A. the collection of myelinated nerve fibres
 - B. the collection of cell bodies of neurons
 - C. the collection of bipolar neurons
 - D. cerebrospinal fluid
- 1.8 Which of the following would be the result of parasympathetic stimulation?
- A. Increased heart rate
 - B. Peristaltic movement slowing down
 - C. Dilation of the pupils
 - D. Increased saliva secretion
- 1.9 Night blindness is caused by _____ .
- A. a lack of iodopsin
 - B. a lack of cones in the retina of the eye
 - C. a lack of retinol caused by Vitamin A deficiency
 - D. a cataract in the lens of the eye
- 1.10 Temporary deafness can be caused by _____ .
- A. damage to the sensory hair cells caused by exposure to high-intensity noises
 - B. impairment of the cochlear nerve
 - C. a ball of cerumen which lies in front of the tympanum
 - D. irreparable rupture of the tympanum
- 1.11 If the adenohypophysis in a growing child is under-developed it will cause _____ .
- A. acromegaly
 - B. a dwarf with retarded sexual development
 - C. early sexual development
 - D. a very high metabolic rate
- 1.12 The following hormones are produced in the hypothalamus, and then pass down the nerve fibres to be stored in the pituitary gland.
- A. STH and TSH
 - B. FSH and oxytocin
 - C. ADH and oxytocin
 - D. Prolactin and MSH
- 1.13 Albinos lack the following pigment in their skin, eyes and hair:
- A. Haemoglobin
 - B. Melanin
 - C. Oxyhaemoglobin
 - D. Bilirubin

- 1.14 Watter hormoon word deur die mukosa van die duodenum gesekreter en stimuleer die pankreas om bikarbonaat-ione in die pankreassap vry te stel?
- A. Duokrinien
 - B. Sekretien
 - C. Gastrien
 - D. Enterokrinien
- 1.15 Die hormoon cholesistokinien stimuleer _____ .
- A. die lewer om gal te produseer
 - B. die galblaas om gestoorde gal vry te stel
 - C. die alfaselle in die pankreas om glukagon te sekreter
 - D. glikogenolise
- 1.16 Indien 'n persoon se bloedglukosevlak bokant 100 mg/100 ml bloed styg, sal die volgende gebeur:
- A. Insulien sal die proses van glikogenese stimuleer.
 - B. Insulien sal die proses van glikogenolise stimuleer.
 - C. Die onttrekking van glukose uit die bloed sal geïnhibeer word.
 - D. Glukagon sal deur die pankreas gesekreter word.
- 1.17 Alkohol onderdruk die afskeiding van ADH. Daarom sal 'n persoon wat onder die invloed van alkohol is _____ .
- A. klein hoeveelhede gekonsentreerde urien produseer
 - B. groot hoeveelhede verdunde urien produseer
 - C. hiperglukemies wees
 - D. nierstene hê
- 1.18 'n Ryp vroulike follikel sekreter die volgende hormone:
- A. Prolaktien en oksitosien
 - B. Testosteron en progesteron
 - C. Estrogeen en progesteron
 - D. Slegs progesteron
- 1.19 Met watter metode van geboortebepanking sal die moontlikheid van ongewenste swangerskap die laagste wees?
- A. Die pil
 - B. Onttrekking
 - C. Intra-uterinêre toestel
 - D. Vasektomie en afbinding van die Fallopiese buise

- 1.14 Which hormone is secreted by the duodenal mucosa and stimulates the pancreas to secrete bicarbonate ions in the pancreatic juices?
- A. Duocrinin
 - B. Secretin
 - C. Gastrin
 - D. Enterocrinin
- 1.15 The hormone cholecystokinin stimulates _____ .
- A. the liver to produce bile
 - B. the gall bladder to secrete the bile that is stored in it
 - C. alpha cells in the pancreas to secrete glucagon
 - D. glycogenolysis
- 1.16 If the blood sugar level of a person is higher than 100 mg/100 ml blood the following will happen:
- A. Insulin will stimulate the process of glycogenesis.
 - B. Insulin will stimulate glycogenolysis.
 - C. The withdrawal of glucose from the bloodstream will be inhibited.
 - D. Glucagon will be secreted by the pancreas.
- 1.17 Alcohol suppresses the secretion of ADH. Therefore a person under the influence of alcohol will _____ .
- A. produce small quantities of concentrated urine
 - B. produce large quantities of diluted urine
 - C. be hyperglycaemic
 - D. have kidney stones
- 1.18 The mature female follicle secretes the following hormones:
- A. Prolactin and oxytocin
 - B. Testosterone and progesterone
 - C. Oestrogen and progesterone
 - D. Progesterone only
- 1.19 Which method of contraception is least likely to lead to unwanted pregnancy?
- A. The pill
 - B. Withdrawal
 - C. Intra-uterine device
 - D. Vasectomy and Fallopian tube ligation

- 1.20 Die pil, as kontrasepsiemiddel (geboortebepערking) werk soos volg:
- A. Dit verhoed dat die bevrugte ovum implanteer.
 - B. Dit bevat klein hoeveelhede estrogeen en progesteron en onderdruk dus die sekresie van FSH en LH deur die pituitêre klier.
 - C. Dit bevat klein hoeveelhede FSH en LH en onderdruk dus die sekresie van estrogeen en progesteron.
 - D. Dit verlam die Fallopiese buise en verdik die servikale mukus wat die indringing van sperms verhoed.
- 1.21 In die naelstring is daar _____ .
- A. twee naelstring-venes (are) wat ryk is aan suurstof en voedingstowwe
 - B. twee naelstring-arteries (slagare) wat ryk is aan koolstofdioksied en metaboliese afvalstowwe
 - C. twee naelstring-venes wat ryk is aan koolstofdioksied en metaboliese afvalstowwe
 - D. een naelstring-arterie wat ryk is aan suurstof en voedingstowwe
- 1.22 Die plasenta bestaan uit die _____ .
- A. endometrium en bloedsinusse
 - B. desidua en die naelstring
 - C. desidua en die chorioniese villi
 - D. chorion, chorioniese villi, desidua en miometrium
- 1.23 Na agt weke van swangerskap word daar na die bevrugte ovum verwys as die _____ .
- A. sigoot
 - B. embrio
 - C. baba
 - D. fetus
- 1.24 Die primêre spermatosiet bevat _____ .
- A. 44 outosome en 2 geslagschromosome (XY)
 - B. 22 outosome en 'n X- of Y-chromosoom
 - C. 46 outosome
 - D. 22 paar outosome en 1 paar geslagschromosome (XX)
- 1.25 Die ontwikkelende spermatiede in die spermbuisies word gevoed deur die _____ .
- A. Sertoli-selle
 - B. Leydig-selle
 - C. Interstisiële selle
 - D. Seminale vesikels

25 x 2 = [50]

- 1.20 The pill as a way of contraception (birth control) works as follows:
- A. It prevents a fertilized egg from implanting.
 - B. It contains small amounts of oestrogen and progesterone and therefore decreases the secretion of FSH and LH by the pituitary gland.
 - C. It contains small amounts of FSH and LH and therefore decreases the secretion of oestrogen and progesterone.
 - D. It paralyses the Fallopian tubes and makes the cervical mucus thick and impenetrable to the sperm.
- 1.21 In the umbilical cord there are _____ .
- A. two umbilical veins rich in oxygen and nutrients
 - B. two umbilical arteries rich in carbon dioxide and metabolic waste
 - C. two umbilical veins rich in carbon dioxide and metabolic waste
 - D. one umbilical artery rich in oxygen and nutrients
- 1.22 The placenta consists of the _____ .
- A. endometrium and blood sinuses
 - B. decidua and the umbilical cord
 - C. decidua and the chorionic villi
 - D. chorion, chorionic villi, decidua and myometrium
- 1.23 After eight weeks of pregnancy, the fertilized egg is referred to as the _____ .
- A. zygote
 - B. embryo
 - C. baby
 - D. foetus
- 1.24 The primary spermatocyte contains _____ .
- A. 44 autosomes and 2 sex chromosomes (XY)
 - B. 22 autosomes and an X or Y chromosome
 - C. 46 autosomes
 - D. 22 pairs of autosomes and 1 pair of sex chromosomes (XX)
- 1.25 The developing spermatids in the seminiferous tubules receive nourishment from _____ .
- A. Sertoli cells
 - B. Leydig cells
 - C. Interstitial cells
 - D. Seminal vesicles

2 x 25 = [50]

VRAAG 2

Pas die kenmerk/funksie/byskrif in Kolom B by die genommerde dele in die diagramme in Kolom A.

Skryf SLEGS die korrekte letter teenoor die ooreenstemmende nommer in jou antwoordboek neer, bv. 11N. Skryf elke antwoord op 'n nuwe reël neer.

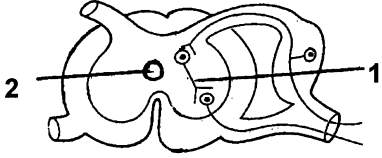
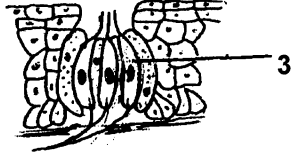
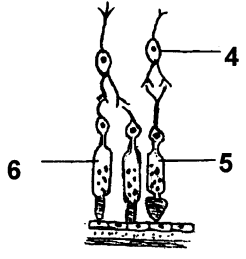
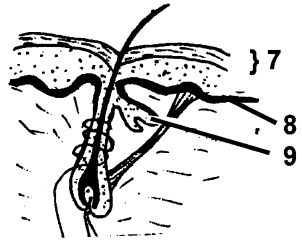
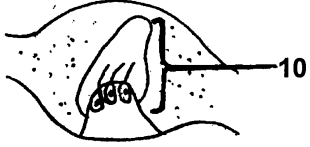
KOLOM A	KOLOM B
	<ul style="list-style-type: none"> A. Gevul met serebrospinale vog B. Bevat rodopsien C. Bevat melanosiete wat melanien produseer D. Monopolêre neuron E. Bevat otoliete F. Verantwoordelik vir kleurvisie G. Is geleë in die ampulla H. Verbind die sensoriese en motoriese neurone I. Sekreteer sebum J. Bevat keratien K. Bipolêre neurone L. Chemoreseptors M. Vervaardig serumen

10 x 2= [20]

QUESTION 2

Match the characteristic/function/label from Column B with the numbered parts in the diagrams in Column A.

Write ONLY the correct letter next to the corresponding number in your answer book e.g. 11N. Write each answer on a new line.

COLUMN A	COLUMN B
    	<ul style="list-style-type: none"> A. Filled with cerebrospinal fluid B. Contains rhodopsin C. Contains melanocytes that produce melanin D. Monopolar neuron E. Contains otoliths F. Responsible for colour vision G. Situated in the ampulla H. Connects the sensory and motor neurons I. Secretes sebum J. Contains ceratin K. Bipolar neurons L. Chemoreceptors M. Produces cerumen

10 x 2= [20]

VRAAG 3

Gee die **fisiologiese term** vir elk van die volgende omskrywings. Skryf elke antwoord op 'n nuwe reël neer.

- 3.1 Die geboorteproses
- 3.2 Die selle tussen die spermbuies wat die hormoon testosteroon vrystel
- 3.3 Die afbreek en uitskeiding van die boonste lae van die endometrium met 'n mate van bloeding
- 3.4 Die hormoon wat glikogenolise stimuleer
- 3.5 Die papille op die tong wat vir aanraking, eerder as vir smaak gevoelig is
- 3.6 Die laaste tien paar senuwees wat langs die rugmurgkanaal afloop
- 3.7 Totale kleurblindheid
- 3.8 Die ensiem wat deur die niere gesekreter word wat help om die bloeddruk te beheer
- 3.9 Die metaboliese afvalproduk wat gevorm word deur die afbreek van nukleïensure
- 3.10 Die bediening van organe deur beide die simpatiese en parasimpatiese senuweestelsels

10 x 2 =

[20]

TOTAAL VIR AFDELING A:

[90]

AFDELING B
VERPLIGTEND

VRAAG 4

- 4.1 Bestudeer die onderstaande diagram en beantwoord die vrae. **A, B, C** en **D** verteenwoordig intra- en ekstrasellulêre vloeistowwe in die liggaam.

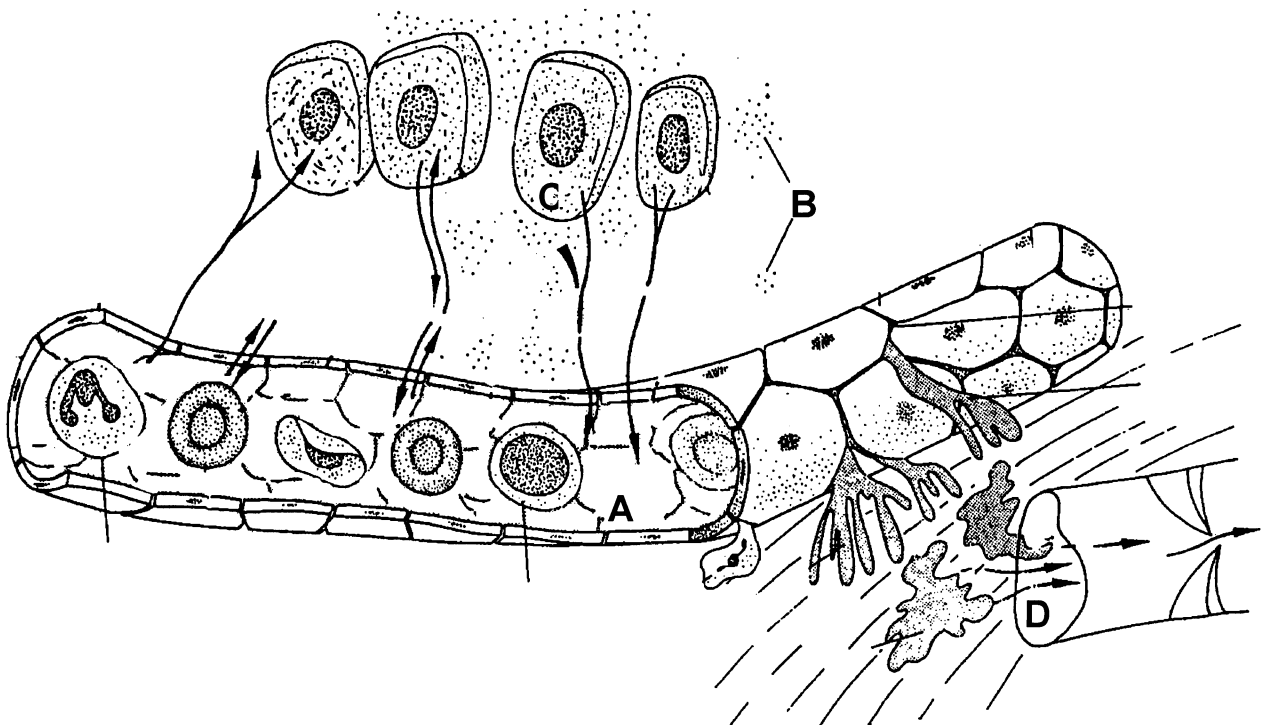


Fig. 4.1 Diagrammatiese voorstelling van die intra- en ekstrasellulêre vloeistowwe in die liggaam

QUESTION 3

Give the **physiological term** for each of the following descriptions. Write each answer on a new line.

- 3.1 The process of giving birth
- 3.2 Cells between the seminiferous tubules that secrete the hormone testosterone
- 3.3 The disintegration and shedding of the upper layers of the endometrium and a little blood
- 3.4 The hormone that stimulates glycogenolysis
- 3.5 The papillae on the tongue that are sensitive to touch rather than to taste
- 3.6 The last ten pairs of nerves that proceed along the vertebral canal
- 3.7 Total colour-blindness
- 3.8 The enzyme secreted by the kidneys, which plays a role in the control of the blood pressure
- 3.9 The metabolic waste product that derives from the breakdown of nucleic acids
- 3.10 The serving of organs by both the sympathetic and parasympathetic nervous systems

10 x 2 = [20]

TOTAL FOR SECTION A: [90]

SECTION B
COMPULSORY

QUESTION 4

- 4.1 Study the diagram below and answer the questions. A, B, C and D represent intra- and extracellular fluids in the body.

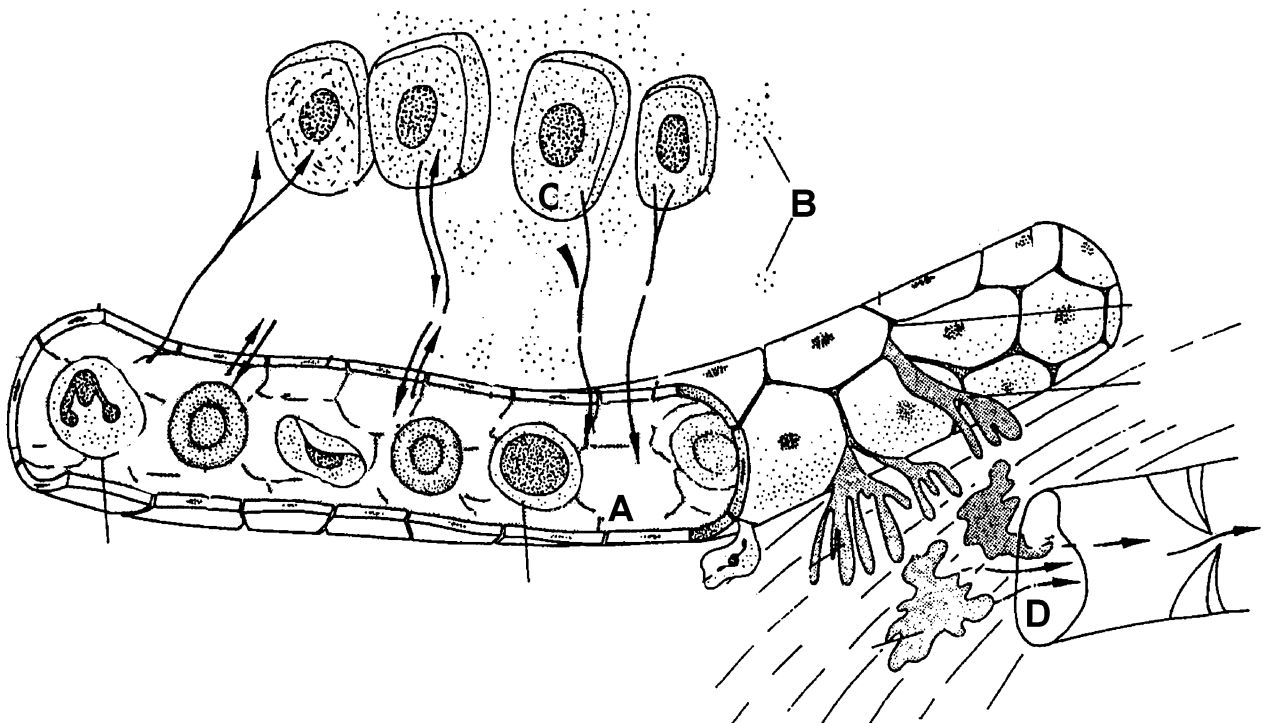


Fig. 4.1 Diagrammatic representation of the intra- and extracellular fluids in the body

- 4.1.1 Noem die faktor wat vloeistof **A** in staat stel om deur die porieë van die endoteellaag van die kapillêre vate in die glomerulus te filtreer. (2)
- 4.1.2 Watter partikels (deeltjies) bly in die kapillêre vate agter? Gee 'n rede vir jou antwoord. (3)
- 4.1.3 Watter vloeistowwe word onderskeidelik deur **B** en **C** voorgestel? (2)
- 4.1.4 Aminosure is aanwesig in vloeistowwe **A**, **B** en **C**. In **C** word dit vir proteïensintese aangewend. Bespreek wat met die oortollige aminosure wat in **A** aanwesig is, gebeur. (8)
- 4.1.5 Noem TWEE ander metaboliese afvalstowwe, wat nie in Vraag 4.1.4 genoem is nie, wat in vloeistof **C** voorkom. Sê ook hoe elk van hierdie stowwe gevorm is. (4)
- 4.2 Die onderstaande skets is 'n voorstelling van die vroulike voortplantingstelsel. Bestudeer die skets en beantwoord die daaropvolgende vrae.

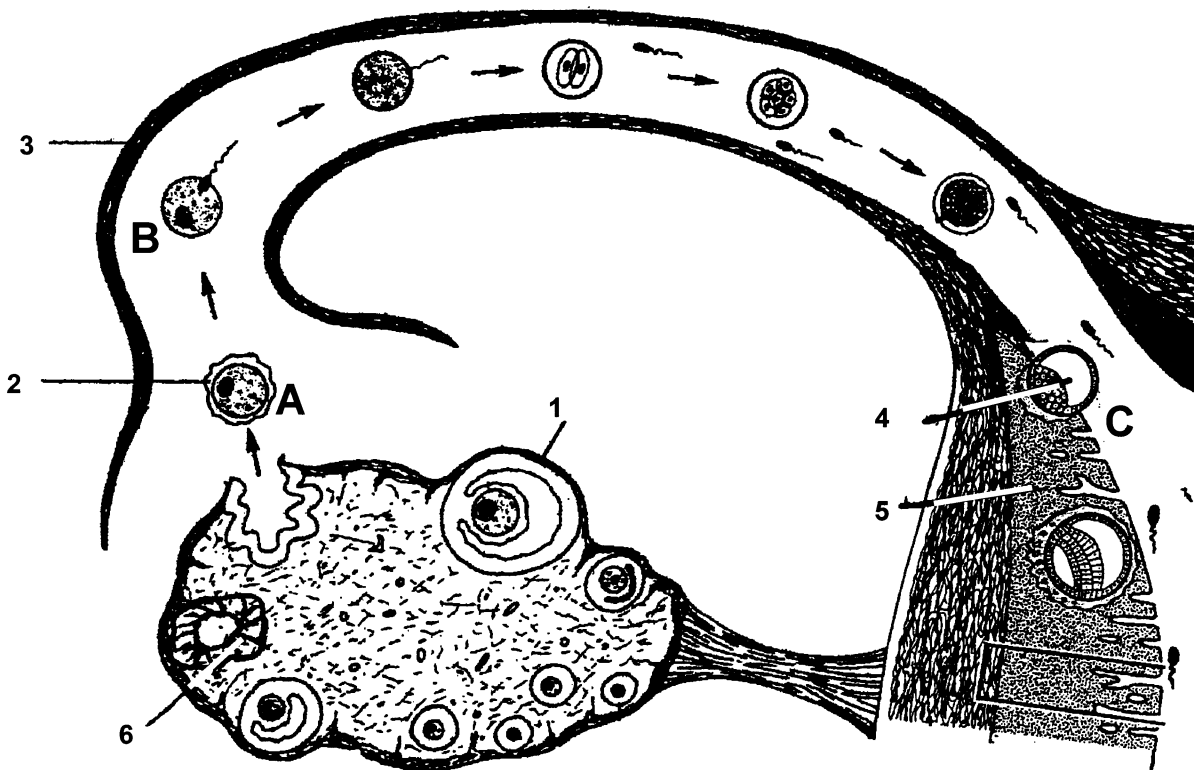


Fig. 4.2 Die vroulike voortplantingstelsel

- 4.2.1 Watter prosesse vind onderskeidelik by **A**, **B** en **C** plaas? (3)
- 4.2.2 Benoem die dele genommer 1, 3, 4, 5 en 6. (5)
- 4.2.3 Wat word struktuur 2 genoem wat tydens proses **A** vrygestel word? (2)

- 4.1.1 Name the factor that enables liquid **A** to filter through the pores in the endothelial layer of the capillaries in the glomerulus. (2)
- 4.1.2 Which particles stay behind in the capillaries? Give a reason for your answer. (3)
- 4.1.3 Which fluids are represented by **B** and **C** respectively? (2)
- 4.1.4 Amino acids are present in fluids **A**, **B** and **C**. Inside **C** they are used for protein synthesis. Discuss what happens to the excess amino acids present in **A**. (8)
- 4.1.5 Name TWO other metabolic waste products, not mentioned in Question 4.1.4, present in **C** and mention how each product was produced. (4)

4.2 The diagram below is a representation of the female reproductive system. Study the diagram and answer the questions that follow.

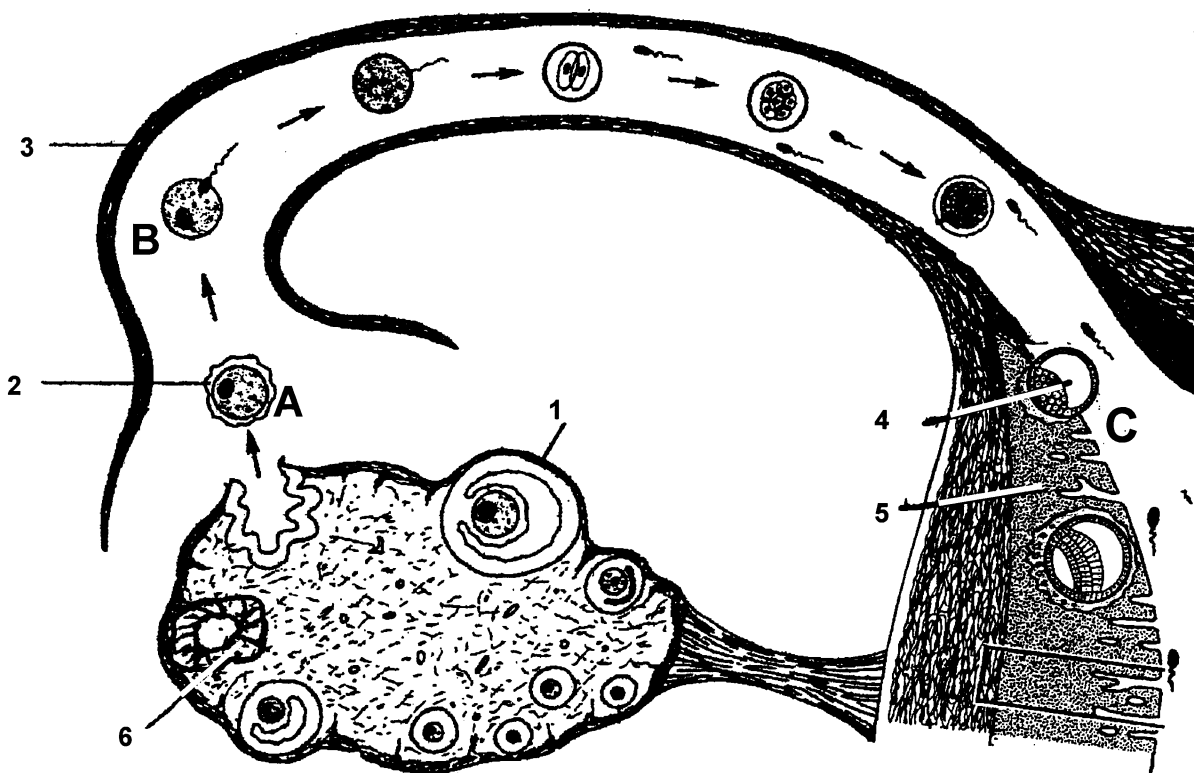


Fig. 4.2 The female reproductive system

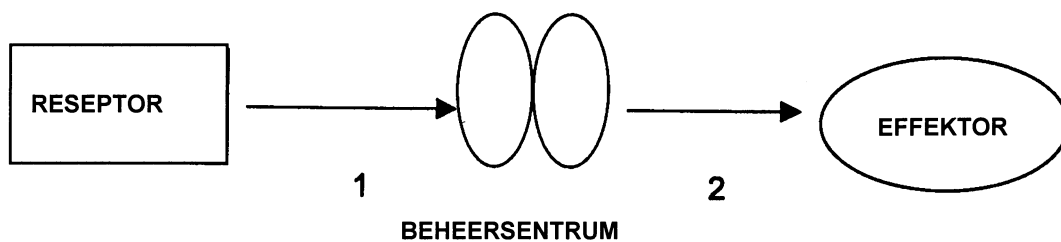
- 4.2.1 Which processes occur at **A**, **B** and **C** respectively? (3)
- 4.2.2 Label the structures numbered 1, 3, 4, 5 and 6. (5)
- 4.2.3 What is structure 2 called that is released during process **A**? (2)

4.2.4 700 miljoen sperms word vrygestel in die vagina tydens ejakulasie. Bespreek die faktore wat die sperms in staat stel om die ovum te **bereik** en te **bevrug**. 4x2=(8)

4.2.5 Bespreek waaruit struktuur **4** bestaan op die sewende dag na bevrugting. (3)
[40]

VRAAG 5

5.1 Alle lewende organismes, ook die mens, word voortdurend aan veranderinge in die omgewing, beide intern en ekstern, blootgestel. Om te kan oorleef moet 'n mens in staat wees om dié veranderinge waar te kan neem, dit te kan interpreteer en op 'n gekoördineerde wyse daarop te kan reageer.



5.1.1 Die menslike liggaam neem die veranderinge in sy omgewing met sy reseptore waar. Voltooi die onderstaande tabel oor stimuli en reseptore. Skryf slegs die letter en die antwoord in jou antwoordboek neer.

Tabel 5.1.1: Stimuli wat reseptore in die menslike liggaam stimuleer (10)

ALGEMENE TIPE RESEPTOR	STIMULUS	RESEPTOR	LIGGING VAN RESEPTOR
Meganoreseptore	Druk	Liggaampies van Paccini	Dermis van vel
	Ligte aanraking	(a)	Dermis van vel
	Klankgolwe	(b)	(c)
	Pyn	Vrye senuwee-eindpunte	(d)
Fotoreseptore	Helder lig	(e)	(f)
(g)	Hitte	Liggaampie van Ruffini	Dermis van vel
	Koue	Liggaampie van Krause	Dermis van vel
(h)	Strekking van organe	Golgi-apparaat in tendons en spiere	Ligamente, spiere gewigte en (i)
Chemoreseptore	Opgeloste stowwe	(j) Olfaktoriese streek in die neus	Tong Neus

5.1.2 **Nommers 1 en 2** op diagram 5.1 stel onderskeidelik neurone in die senuweestelsel voor.

(a) Klassifiseer No. 1 volgens sy **funksie**. (1)

(b) Klassifiseer No. 2 volgens sy **bou**. (1)

4.2.4 700 million sperm are released in the vagina during ejaculation. Discuss the factors that enable the sperm to **reach** and **fertilize** the ovum.

4x2=(8)

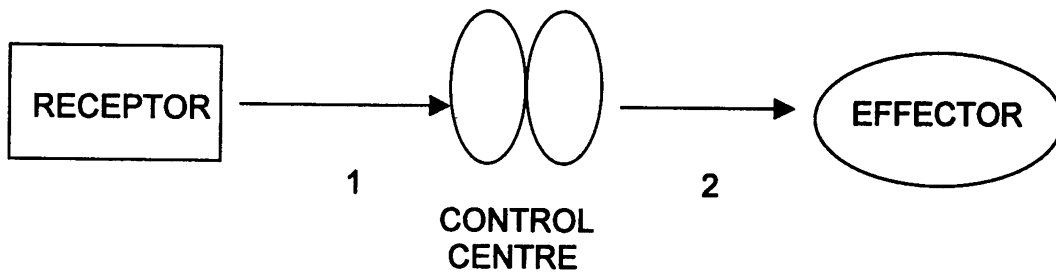
4.2.5 Discuss what structure **4** consists of on the seventh day after fertilization.

(3)

[40]

QUESTION 5

5.1 All living organisms, including humans, are continually exposed to changing conditions in the environment, both internally and externally. To survive, man must be able to sense these changes, interpret them and react in a co-ordinated way accordingly.



5.1.1 The human body senses the changes in the environment with its receptors.

Complete the following table concerning stimuli and receptors. Write only the letter and the answer in your answer book.

Table 5.1.1: Stimuli stimulating receptors in the human body

(10)

GENERAL TYPE OF RECEPTORS	STIMULUS	RECEPTOR	LOCATION OF RECEPTOR
Mechanoreceptors	Pressure	Pacinian corpuscles	Dermis of skin
	Slight touch	(a)	Dermis of skin
	Sound waves	(b)	(c)
	Pain	Free nerve endings	(d)
Photoreceptors	Bright light	(e)	(f)
(g)	Heat	End organ of Ruffini	Dermis of skin
	Cold	End organ of Krause	Dermis of skin
(h)	Stretching of organs	Golgi apparatus in tendons or muscles	Ligaments, muscles, joints and (i)
Chemoreceptors	Dissolved substances	(j) Olfactory region in nose	Tongue Nose

5.1.2 **Numbers 1** and **2** on the diagram of 5.1 represent respectively neurons in the nervous system.

(a) Classify Number 1 according to its **function**.

(1)

(b) Classify Number 2 according to its **structure**.

(1)

5.1.3 Beskryf die werking van 'n sinaps. (7)

5.1.4 Noem 'n voorbeeld van 'n neuro-oordragstof (neurotransmitter). (1)

5.2 Die volgende diagram is 'n frontale aansig van die brein en die rugmurg.

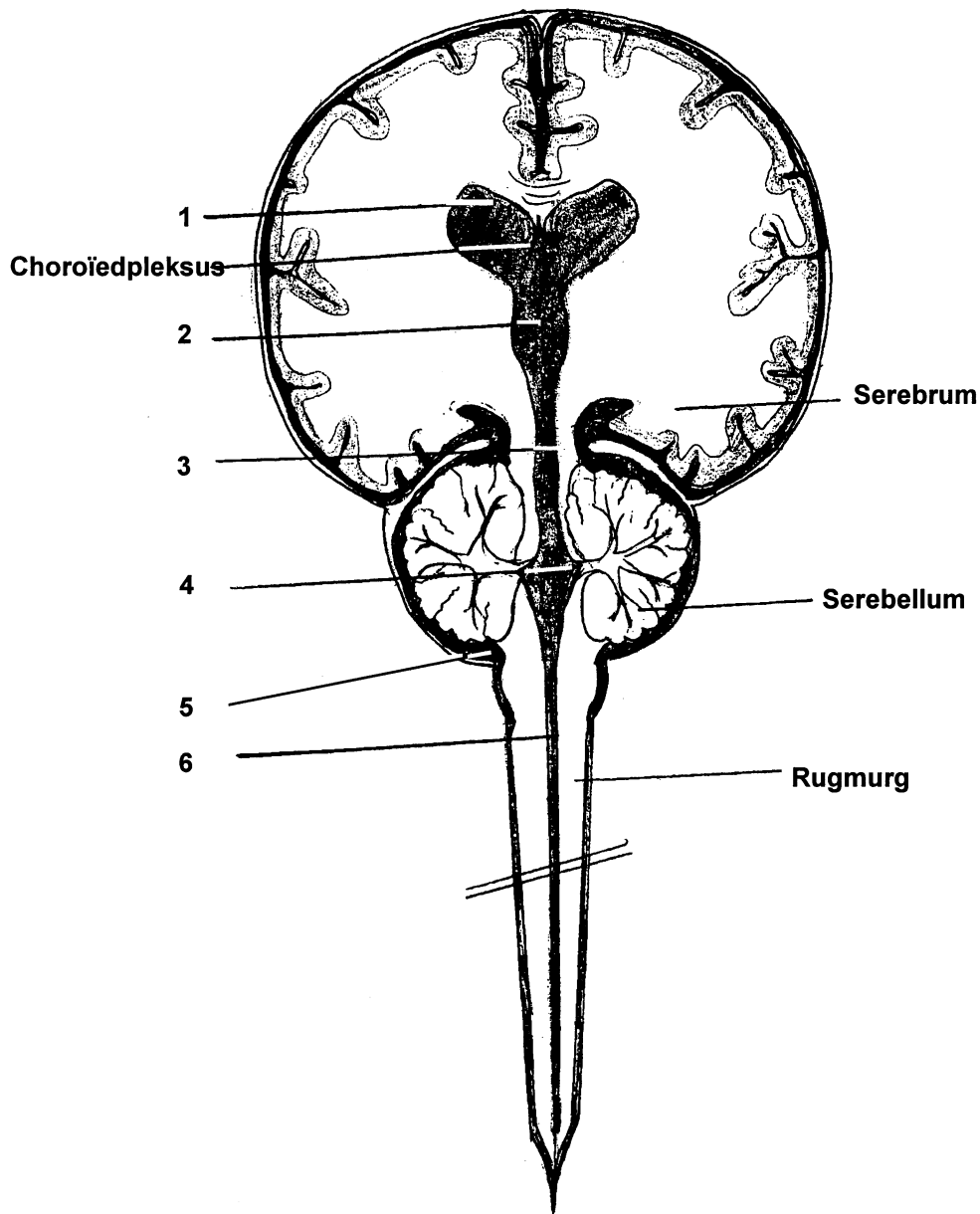


Fig. 5.2: Frontale aansig van die brein en rugmurg

5.2.1 Benoem die ventrikels, ruimtes en kanaaltjies genummer 1 tot 6 in die diagram. (6)

5.2.2 Wat word in die choroïedpleksus geproduseer? (1)

5.2.3 Wat is die funksie van die vloeistof in die ventrikels en ruimtes (holtes) in die brein? (5)

5.1.3 Describe the way a synapse works. (7)

5.1.4 Name an example of a neurotransmitter. (1)

5.2 The following diagram is a frontal section of the brain and spinal cord.

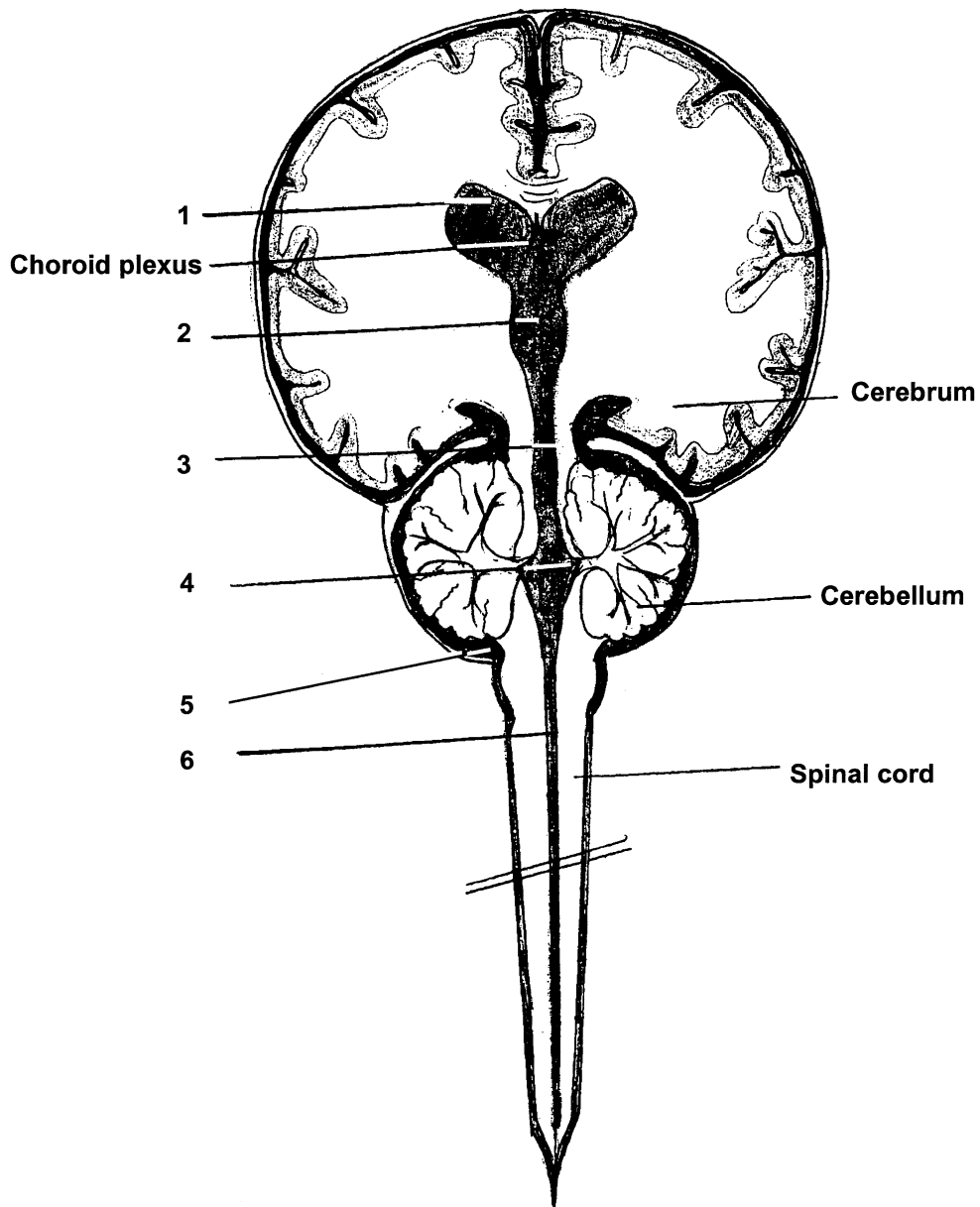


Fig. 5.2: Frontal view of the brain and spinal cord

5.2.1 Label the ventricles, spaces and canals numbered 1 to 6 in the diagram. (6)

5.2.2 What is produced in the choroid plexus? (1)

5.2.3 What is the function of the fluid in the ventricles and cavities in the brain? (5)

5.2.4 Die volgende toestande in die mens weens 'n ongeluk of infeksie kan tot die volgende lei:

- (a) Meningitis
- (b) Amnesie (geheueverlies)
- (c) Ataksie
- (d) Hidrokefalie (waterhofie)

Noem in elke geval die deel van die brein wat geïnfekteer of beskadig word. (4)

5.2.5 Water invloed het die parasimpatiese senuweestelsel op elk van die volgende strukture in die liggaam?

- (a) Iris van die oog
- (b) Bronchioli
- (c) Hart
- (d) Blaas

(4)
[40]

VRAAG 6

6.1 Bestudeer die onderstaande diagram wat 'n gedeelte van die menslike oor voorstel en beantwoord die vrae wat volg.

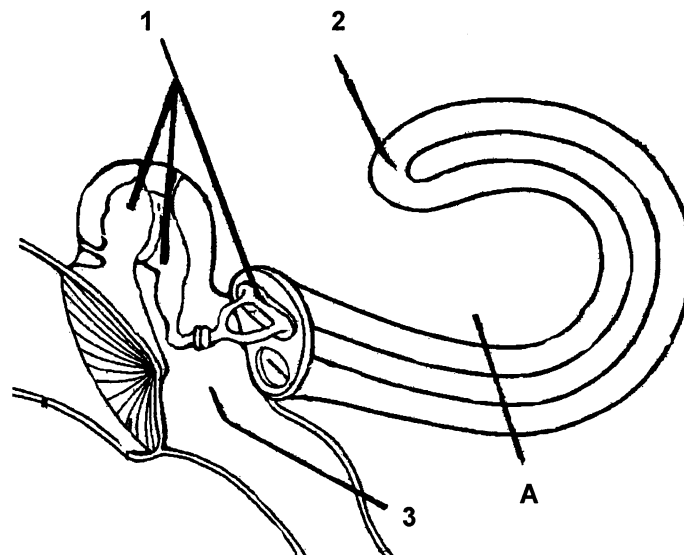


Fig. 6.1: Dwarsdeursnit deur die menslike oor

- 6.1.1 Benoem strukture 1 en 2 en bespreek hul funksies. (4)
- 6.1.2 Noem die VIER openinge wat in gedeelte 3 voorkom, en noem kortliks die funksie van elke opening. (8)
- 6.1.3 Teken 'n netjiese benoemde diagram van 'n dwarsnit deur die gedeelte wat deur A op die diagram voorgestel word. Voorsien die diagram van 'n gepaste opskrif. (8)

b.o.

5.2.4 The following conditions in humans can result from an accident or infection:

- (a) Meningitis
- (b) Amnesia (memory loss)
- (c) Ataxia
- (d) Hydrocephalus

In each case name the part in the brain that is infected or damaged. (4)

5.2.5 What influence does the parasympathetic nervous system have on each of the following structures in the body?

- (a) Iris of the eye
- (b) Bronchiole
- (c) Heart
- (d) Bladder

(4)
[40]

QUESTION 6

6.1 Study the diagram below, representing a part of the human ear, and answer the questions that follow.

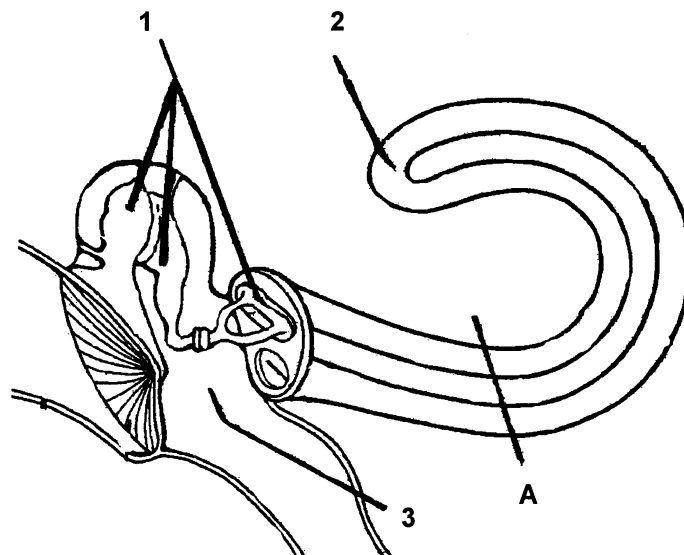


Fig. 6.1: Cross-section of the human ear

- 6.1.1 Label numbers 1 and 2 and discuss their functions. (4)
- 6.1.2 Name the FOUR openings present in part 3 and briefly state the function of each opening. (8)
- 6.1.3 Draw a neat, labelled diagram of the cross-section of the part represented by A in the diagram. Provide the diagram with an appropriate heading. (8)

6.2 Lees die volgende paragraaf en beantwoord die vrae wat volg.

Bewegingsiekte (Karsiekte/Seesiekte) is naarheid en braking wat veroorsaak word deur herhaaldelike hoekige, liniêre of vertikale beweging. Die oorsaak is 'n oorstimulasie van die vestibulêre apparaat deur beweging. Senuwee-impulse word oorgedra van die binne-oor na die braaksentrum in die brein. Emosionele faktore soos vrees en angstigheid kan ook bydra tot bewegingsiekte.

Aangepas uit Tortora G.J. 1996: *Principles of anatomy & physiology 8ste uitgawe.*

6.2.1 Bespreek die bou van die vestibulêre apparaat volledig. (10)

6.2.2 Waar in die brein is die sentrum vir naarheid (braaksentrum) geleë? (1)

6.3 Bespreek die werking van 'n negatiewe terugvoer-meganisme deur te verwys na die verband tussen die pituïtêre klier en die adrenale korteks. (9)
[40]

VRAAG 7

7.1 'n Persoon se liggaamstemperatuur word oor 'n periode van 24 uur rektaal gemeet. Die resultate word in die onderstaande grafiek voorgestel. Bestudeer die grafiek en beantwoord die vrae wat volg.

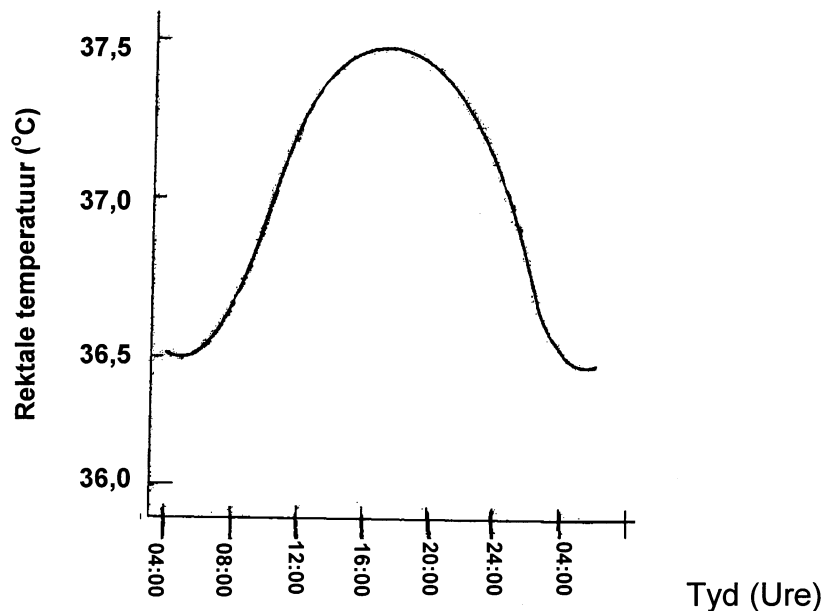


FIG. 7.1: Liggaamstemperatuur van 'n persoon oor 24-uur.

7.1.1 Mense is homiootermiese organismes. Verklar die term **homiootermies**. (2)

7.1.2 Een van die funksies van die vel is om 'n normale (konstante) liggaamstemperatuur te handhaaf.

- (a) Wat is die normale liggaamstemperatuur van die mens? (1)
- (b) Watter tyd van die dag (hoe laat) was hierdie persoon se liggaamstemperatuur normaal? (2)
- (c) Wat was sy/haar liggaamstemperatuur om 16:00? (2)

6.2 Read the following passage and answer the questions that follow.

Motion sickness is nausea and vomiting brought on by repetitive angular, linear or vertical motion. The cause is excessive stimulation of the vestibular apparatus by motion. Nerve impulses from the internal ear are conducted to the vomiting centre in the brain. Emotional factors such as fear and anxiety can also contribute to motion sickness.

Adapted from: Tortora G.J., 1996: *Principles of anatomy & physiology 8th edition.*

6.2.1 Discuss the structure of the vestibular apparatus in detail. (10)

6.2.2 Where in the brain is the vomiting centre situated? (1)

6.3 Discuss the operation of a negative-feedback mechanism by referring to the connection between the pituitary gland and the adrenal cortex. (9)
[40]

QUESTION 7

7.1 The body temperature of a person is measured through the rectum over a period of 24 hours. The results are presented in the following graph. Study the graph and answer the questions that follow.

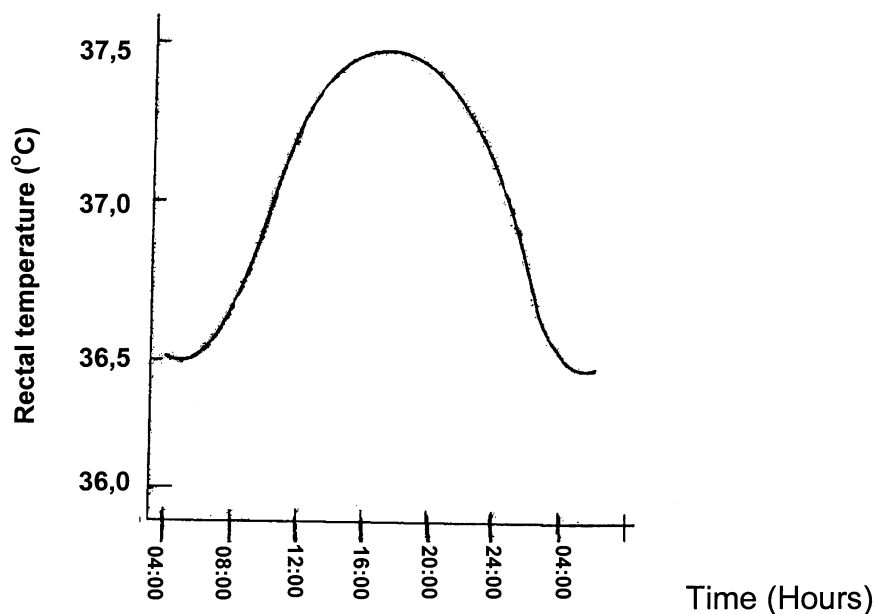


Fig: Body temperature in a human over 24 hour period.

7.1.1 Humans are homoiothermic organisms. Explain the term **homoiothermic**. (2)

7.1.2 One of the functions of the skin is to help maintain a normal (constant) body temperature.

(a) What is the normal body temperature of humans? (1)

(b) At which time of day was the body temperature of this person normal? (2)

(c) What was his/her body temperature at 16:00? (2)

- (d) Hierdie persoon se rektale temperatuur het 'n styging getoon tussen 06:00 en 12:00. Bespreek die rol van die vel om die styging in liggaamstemperatuur gedurende die dag moontlik te maak. (15)
- (e) Noem nog VYF ander funksies van die vel, buiten die funksie wat voorheen genoem is. (5)
- (f) Noem EEN hormoon wat hitteproduksie in die liggaam stimuleer. Gee 'n rede vir jou antwoord. (2)

7.2 Sommige gemeenskappe in Afrika eet glad nie vis en gejodeerde sout nie.

- 7.2.1 Aan watter mikro-element sal hierdie mense 'n tekort toon? (1)
- 7.2.2 Bespreek die fisiologiese invloed wat die tekort aan hierdie element op 'n persoon sal hê. (6)
- 7.2.3 Noem die gebreksiektes wat deur hipotiroïdisme veroorsaak word by die volgende:
- (a) Kinders (2)
- (b) Volwassenes (2)

[40]

TOTAAL VIR AFDELING B: [160]

AFDELING C

Beantwoord slegs EEN vraag uit hierdie afdeling. Kies **óf** Vraag 8 **óf** Vraag 9. As jy albei vrae beantwoord, sal slegs die eerste vraag gemerk word.

VRAAG 8

Die onderstaande tabel toon die samestelling van vloeistowwe wat met 'n baie fyn glasbuisie uit drie verskillende dele van 'n tipiese menslike nier verwyder is. Bestudeer die tabel en beantwoord dan die vrae wat volg.

Tabel 8.1

Bestanddeel	Plasma (afferente arteriool) (mg/100 ml)	Glomerulêre filtraat (Kapsel van Bowman) (mg/100 ml)	Urien (versamelbuis) (mg/100 ml)
Ureum	30	30	2 000
Glukose	100	100	0
Aminosure	50	50	0
Ammonium	0	0	50
Proteïen	8 000	0	0
Soute	720	720	1 500
Kreatinien	1	1	100
Uriensuur	2	2	30
Totale vloei per uur	14ℓ	2,8ℓ	0,05ℓ

Tabel 8.1: : Bestanddele van niervloeistowwe

- (d) This person's rectal temperature showed an increase between 06:00 and 12:00. Discuss the role of the skin in enabling the body temperature to increase during the day. (15)
- (e) Name FIVE other functions of the skin in addition to the function mentioned earlier. (5)
- (f) Name ONE hormone that stimulates heat production in the body. Give a reason for your answer. (2)

7.2 People in certain communities in Africa do not eat fish and iodised salt.

- 7.2.1 Which micro-element will these people lack? (1)
- 7.2.2 Discuss the physiological influence of the shortage of this element on the body. (6)
- 7.2.3 Name the deficiency diseases caused by hypothyroidism in the following:
- (a) Children (2)
- (b) Adults (2)

[40]

TOTAL FOR SECTION B: [160]

SECTION C

Answer only ONE question from this section. Choose **either** Question 8 **or** Question 9. If you answer both questions, only the first one will be marked.

QUESTION 8

The table below indicates the constituents of liquids extracted from three different regions in the human kidney with a thin glass tube. Study the table and answer the questions.

Table 8.1

Constituent	Plasma (afferent arteriole) (mg/100 ml)	Glomerular filtrate (Bowman capsule) (mg/100 ml)	Urine (collecting duct) (mg/100 ml)
Urea	30	30	2 000
Glucose	100	100	0
Amino acids	50	50	0
Ammonium	0	0	50
Protein	8 000	0	0
Salts	720	720	1 500
Creatinine	1	1	100
Uric acid	2	2	30
Total flow per hour	14ℓ	2,8ℓ	0,05ℓ

Table 8.1: Constituents of liquids in the kidney

- 8.1 Teken 'n benoemde kolomgrafiek om die hoeveelhede van die stikstof-bevattende afvalstowwe wat in die glomerulêre filtraat voorkom aan te toon (gebruik die grafiekpapier wat voorsien is). (7)
- 8.2 Hoeveel gram ureum sal daar per dag uitgeskei word, indien hierdie vloeitempo's konstant bly? (1 000 mg = 1 g) (3)
- 8.3 Bereken die persentasie bloed wat die nefron binnedring vanuit die bloed wat deur die glomerulus vloei. (3)
- 8.4 8.4.1 Noem die organiese stowwe in die tabel wat deur die nierbuisies geherabsorbeer sal word. (2)
- 8.4.2 Noem waar die stowwe in 8.4.1 geherabsorbeer word en bespreek die meganisme van hierdie herabsorpsie. 1+4=(5)
- 8.4.3 Bespreek hoe die nierbuisie aangepas is vir effektiewe herabsorpsie. (5)
- 8.5 Glukose maak deel uit van die glomerulêre filtraat in hierdie gesonde persoon.
- 8.5.1 Noem vier redes vanuit die tabel waarom dié persoon as gesond beskou kan word. (4)
- 8.5.2 Die persoon toon skielik die volgende simptome weens hormonale afwykings:
- * Skei groot volumes verdunde urien uit
 - * Onlesbare dors
- Noem twee moontlike siektes, asook die hormonale afwyking wat dié simptome kan veroorsaak in die persoon. (4)
- 8.6 Noem vier ander stowwe, wat nie in tabel 8 voorkom nie, wat wel in urine kan voorkom. (4)
- 8.7 Bespreek die korrekte volgorde van die pad wat 'n glukosemolekuul moet volg, van waar dit die nier binnekom totdat dit die nier verlaat. (13)

[50]**OF**

- 8.1 Draw a labelled bar-graph to indicate the amount of each of the nitrogenous waste products present in the glomerular filtrate (use graph paper provided). (7)
- 8.2 How much urea will be excreted per day, if the flow tempo stays constant?
(1 000 mg = 1 g) (3)
- 8.3 Calculate the percentage of blood that enters the nephron from the blood that flows through the glomerulus. (3)
- 8.4 8.4.1 Name the organic substances in the table that will be reabsorbed in the renal tubules. (2)
- 8.4.2 State where those substances in 8.4.1 are reabsorbed and discuss the mechanism of reabsorption. 1+4=(5)
- 8.4.3 Discuss the adaptations of the renal tubule for effective reabsorption. (5)
- 8.5 Glucose forms part of the glomerular filtrate in this healthy person.
- 8.5.1 State four reasons from the table why this person can be regarded as a healthy person. (4)
- 8.5.2 This person suddenly shows the following symptoms due to hormonal abnormalities:
- * Excreting large quantities of diluted urine
 - * A unquenched thirst
- Name two possible diseases as well as the hormonal anomaly that could cause these symptoms in this person. (4)
- 8.6 Name four other substances, not listed in table 8, that can be present in urine. (4)
- 8.7 Describe in the correct order the path which a glucose molecule will follow from where it enters the kidney until it leaves the kidney. (13)
- [50]**

OR

VRAAG 9

- 9.1 'n Persoon sien twaalfuur die middag 'n skip op die horison, terwyl hy op die strand sit. Bespreek wat in die oog gebeur onder die volgende hoofde:
- Pad van die ligstrale (15)
 - Beeldvorming (3)
 - Akkommodasie van die lens (9)
 - Opwekking en geleiding van die senuwee-impuls, totdat die sensasie van sig ontstaan. (15)
- 9.2 'n Persoon is 55 jaar oud. Na 'n onlangse oogtoets het die optometris (oogkundige) hom/haar meegedeel dat die lense in sy/haar oë hulle vermoë om te akkommodeer verloor het. Bespreek dié oogdefek met verwysing na die volgende:
- Naam van oogdefek
 - Simptome
 - Oorsake
 - Behandeling (8)
- [50]**
- TOTAAL VIR AFDELING C: [50]**
- TOTAAL: 300**

QUESTION 9

9.1 While sitting on the beach at noon a person sees a ship on the horizon. Discuss the events that take place in the eye, using the following headings:

- Pathway of light rays (15)
- Image formation (3)
- Accommodation of the lens (9)
- Pathway of nerve impulses until the sensation of sight takes place (15)

9.2 A person is 55 years old. After a recent eye test the optometrist told him/her that the lenses in his/her eyes had lost their ability to accommodate. Discuss this eye defect by referring to:

- Name of the eye defect
- Symptoms
- Cause
- Remedy (8)

[50]**TOTAL FOR SECTION C: [50]****TOTAL: 300**

