



- 1.1 An example of an intracellular fluid is \_\_\_\_\_.
- A. cytoplasm
  - B. blood plasma
  - C. tissue fluid
  - D. lymph
- 1.2 Iodine is used in the production of \_\_\_\_\_.
- A. melanin
  - B. parathormone
  - C. thyroxine
  - D. cortisone
- 1.3 The movement of heat through gases or liquids from hotter areas to cooler areas is known as \_\_\_\_\_.
- A. radiation
  - B. conduction
  - C. convection
  - D. evaporation
- 1.4 The renal artery contains the following:
- A. Metabolic waste and oxygen
  - B. Less urea and more carbon dioxide
  - C. High concentration urea, carbon dioxide and glucose
  - D. Ammonia and urea
- 1.5 Urea is formed when \_\_\_\_\_ is/are broken down.
- A. nucleic acids
  - B. benzoic acid
  - C. phosphocreatine
  - D. amino acids
- 1.6 One of the following substances cannot move through the glomerular filter.
- A. Urea
  - B. Glucose
  - C. Sodium
  - D. Haemoglobin
- 1.7 One of the following substances acts as a buffer in the nephron.
- A. Bicarbonate ions
  - B. Carbon dioxide
  - C. Urea
  - D. Hydrogen ions

- 1.8 Water is reabsorbed into the peritubular capillaries through \_\_\_\_\_.
- A. active transport
  - B. tubular secretion
  - C. osmosis
  - D. diffusion
- 1.9 The following layer of the skin forms new cells to replace dead skin cells.
- A. Cornified layer
  - B. Granular layer
  - C. Malpighian layer
  - D. Dermis
- 1.10 The following glands are responsible for the lubrication of the skin.
- A. Cerumen glands
  - B. Sweat glands
  - C. Mammary glands
  - D. Sebum glands
- 1.11 The following glands are regulated by the hormone oxytocin.
- A. Cerumen glands
  - B. Sebum glands
  - C. Mammary glands
  - D. Sweat glands
- 1.12 The membranes of cells in this structure have microvilli and folds in order to enlarge the reabsorption surface.
- A. Podocytes
  - B. Proximal convoluted tubule
  - C. Loop of Henlé
  - D. Glomerulus
- 1.13 This hormone increases the permeability of cell membranes to water.
- A. Vasopressin
  - B. Aldosterone
  - C. Renin
  - D. Insulin
- 1.14 These structures in the neurons increase the speed at which impulses are conducted.
- A. Neurilemmae
  - B. Axons
  - C. Nissl granules
  - D. Nodes of Ranvier

- 1.15 This region is situated right behind the Fissure of Rolando.
- A. Region for tasting and smelling
  - B. Seat of memory and imagination
  - C. The area sensitive to sensations from the skin
  - D. Region for sight
- 1.16 The centre for the control of biological rhythms and drives, such as aggression and self-defence, is the \_\_\_\_\_.
- A. hypothalamus
  - B. thalamus
  - C. hypophysis
  - D. medulla oblongata
- 1.17 The tough, inelastic membrane lining the cranium and vertebral canal is the \_\_\_\_\_.
- A. dura mater
  - B. pia mater
  - C. arachnoid mater
  - D. myelin sheath
- 1.18 These structures are responsible for the nutrition of the developing embryo up to the 12<sup>th</sup> week of pregnancy:
- A. Amniotic fluid and amnion
  - B. Allantois and yolk sac
  - C. Endometrium and chorion
  - D. Umbilical cord
- 1.19 The \_\_\_\_\_ is/are an extension of the lining of the eyelids.
- A. eyelashes
  - B. conjunctiva
  - C. cornea
  - D. glands of Meiboom
- 1.20 Which one of the following statements regarding cone cells is correct?
- A. They contain rhodopsin.
  - B. They respond to low-intensity light.
  - C. They are found in the macula lutea and respond to bright-light intensities.
  - D. They are found on the blind spot.

- 1.21 The utriculus, sacculus and semicircular canals form the \_\_\_\_\_.
- A. cochlea
  - B. ossicles
  - C. vestibular apparatus
  - D. maculae
- 1.22 The failure to produce ADH causes \_\_\_\_\_.
- A. oedema
  - B. diabetes insipidus
  - C. diabetes mellitus
  - D. profuse sweating
- 1.23 When you are nervous your mouth becomes very dry due to \_\_\_\_\_.
- A. hypersecretion(oversecretion) of saliva
  - B. parasympathetic stimulation
  - C. insulin secretion
  - D. sympathetic stimulation
- 1.24 Tetany is caused by\_\_\_\_\_.
- A. hyperparathyroidism
  - B. hypoparathyroidism
  - C. blood poisoning
  - D. hypothyroidism
- 1.25 If your blood sugar level drops below 100 mg / 100 ml blood, the following hormone will be secreted to rectify the problem:
- A. Insulin
  - B. Glucagon
  - C. Adrenalin
  - D. Secretin
- 1.26 The structure in the spermatozoa responsible for dissolving the zona pellucida during fertilization is the \_\_\_\_\_.
- A. mitochondrion
  - B. centrioli
  - C. contractile fibres
  - D. acrosome
- 1.27 A girl is born with a large number of \_\_\_\_\_ in her ovaries.
- A. germ cells
  - B. secondary oocytes
  - C. primary oocytes
  - D. oogonia

- 1.28 This hormone stimulates the absorption of calcium from the intestines.
- A. Parathormone
  - B. Gastrin
  - C. Calcitonin
  - D. Adrenalin
- 1.29 The structure that joins the two hemispheres of the cerebellum is the \_\_\_\_\_.
- A. corpus callosum
  - B. vermis
  - C. arbor vitae
  - D. cortex
- 1.30 A male zygote is formed during the fusion of an ovum and a spermatozoa with a/an \_\_\_\_\_.
- A. X chromosome
  - B. XY chromosome
  - C. Y chromosome
  - D. YY chromosome

30x2=(60)

**QUESTION 1B**

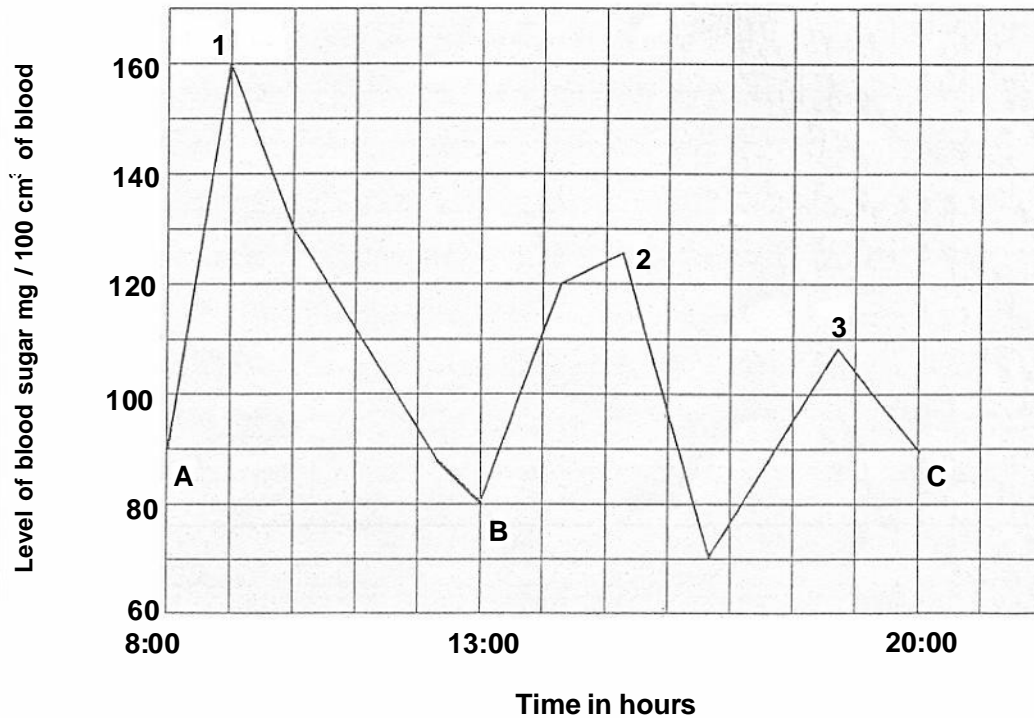
Choose the **term** in **Column B** that fits the **description** in **Column A**. Write the number and the appropriate letter in your answer book. Example: 1.41 P.

COLUMN A	COLUMN B
1.31 The layer in the skin that contains keratin	A. Free nerve endings
1.32 The only receptors found in the epidermis	B. Tympanum
1.33 The layer of skin that divides through mitosis	C. Blind spot
1.34 The structure that ensures one-way conduction of impulses	D. Malpighian layer
1.35 The lobe in the cerebrum that interprets sensations from the skin	E. Macula
1.36 Sneezing and coughing	F. Natural reflexes
1.37 The structure in the retina that contains no cones or rods	G. Conditioned reflexes
1.38 The membrane that passes vibrations to the malleus	H. Tectorial membrane
1.39 The structure in the inner ear that registers the position of the head	I. Cornified layer
1.40 The over-secretion of this hormone causes acromegaly	J. Yellow spot
	K. Parietal lobe
	L. Synapse
	M. STH (somatotropichormone)
	N. Thyroxin
	O. Pacinian corpuscles

(10)

**QUESTION 1C**

The graph below shows the blood sugar level of a healthy person during a 12-hour period. Study the graph and answer the questions that follow.

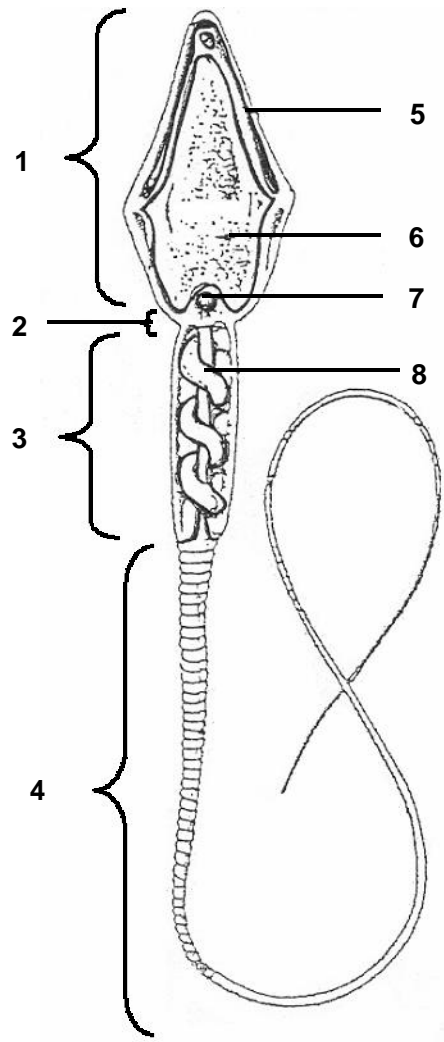


**Figure 1C: Blood sugar level of a healthy person during a 12 hour period**

- 1.41 What should the normal blood sugar level of a healthy person be? (1)
  - 1.42 At what time of the day was the blood sugar level the lowest? (1)
  - 1.43 When was the level of blood sugar 95 mg / 100 ml blood? (2)
  - 1.44 What was the person's blood sugar level at 9:00? (1)
  - 1.45 During which hour was the rate of increase in the blood sugar level the greatest? (1)
  - 1.46 Which hormone is responsible for the increase in the blood sugar level? (1)
  - 1.47 Where is the hormone mentioned in Question 1.46 secreted? (2)
  - 1.48 What is the physiological condition called when the blood sugar level is abnormally high due to the hyposecretion of insulin? (1)
- (10)**

**QUESTION 1D**

Study the diagram of the sperm and answer the questions that follow.



**Figure 1D: Diagram of a sperm**

- 1.49 Identify structures 1 to 8. (8)
- 1.50 Name the functions of structures 5 and 8. (4)
- 1.51 How many chromosomes are present in no. 6? (2)
- 1.52 What are the sex chromosomes in no. 6? (2)
- 1.53 What functions do the following cells perform in the testis?
  - 1.53.1 Cells of Leydig (2)
  - 1.53.2 Sertoli cells (2)

**(20)**

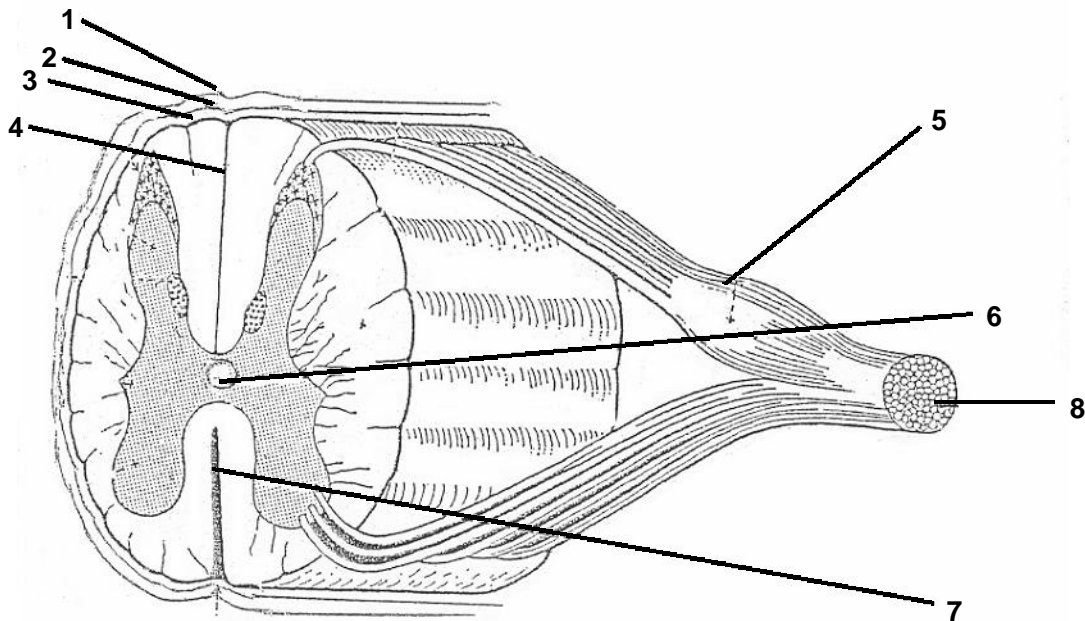
**TOTAL FOR SECTION A: [100]**



SECTION B

QUESTION 2

- 2.1 John went for a walk on his farm and got a fright when he came across a snake.
- 2.1.1 Name the hormone that was secreted in his body to prepare him for action. (1)
- 2.1.2 Name the gland that secreted the above-mentioned hormone. (2)
- 2.1.3 Describe SIX effects of this hormone in his body. (6)
- 2.1.4 Which part of the nervous system has the same effect on the body as this hormone? (2)
- 2.2 Name SIX hormones of the hypophysis. (6)
- 2.3 Tabulate the differences between the monopolar neuron and a multipolar neuron under the following headings:
- 2.3.1 Structure (4)
- 2.3.2 Function (2)
- 2.3.3 Name according to function performed (2)
- 2.4 Study the diagram of a cross-section through the spinal cord and answer the questions that follow.



**Figure 2.4**  
**Cross-section through the spinal cord**

- 2.4.1 Give labels for numbers **1** to **7**. (7)
  - 2.4.2 Write down the names of **FOUR** structures present in the spinal cord that also protect the brain. (4)
  - 2.4.3 What is found in number **5**? (2)
  - 2.4.4 How many vertebrae surround the spinal cord? (1)
  - 2.4.5 What is found in number **8**? (2)
  - 2.4.6 Discuss the pathway of an impulse of a reflex action when it enters no. **8** until it exits no. **8**. (9)
- [50]**

**QUESTION 3**

3.1 The human tongue is sensitive to four basic primary tastes which can be mainly sensed on different regions of the tongue. During an experiment you are blindfolded and asked to taste four different substances: Panado tablets, salt, lemon juice and honey.

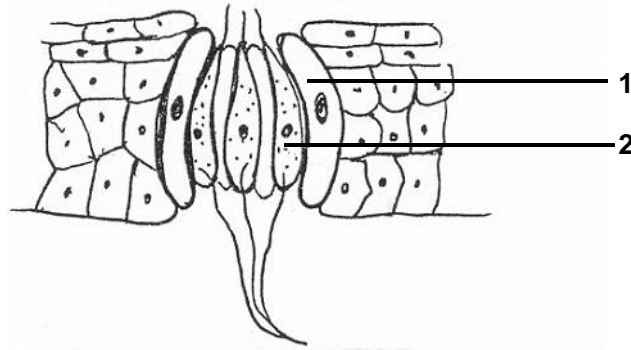
3.1.1 REDRAW the table below in your answer book and complete.

- Give the region of the tongue where each substance will be tasted best.
- Indicate the type of taste.
- Identify the type of papilla responsible for the stimulation.

<b>Substance</b>	<b>Region on tongue</b>	<b>Taste</b>	<b>Type of papilla that is stimulated</b>
Panado			
Salt			
Lemon			
Honey			

(12)

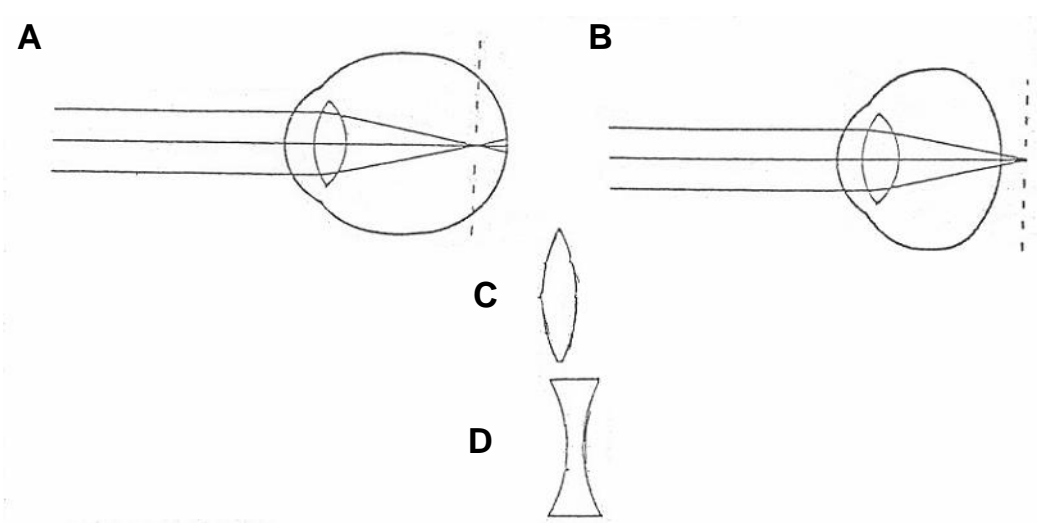
3.1.2 The diagram below represents a taste bud.



**Fig 3.1.2 A taste bud**

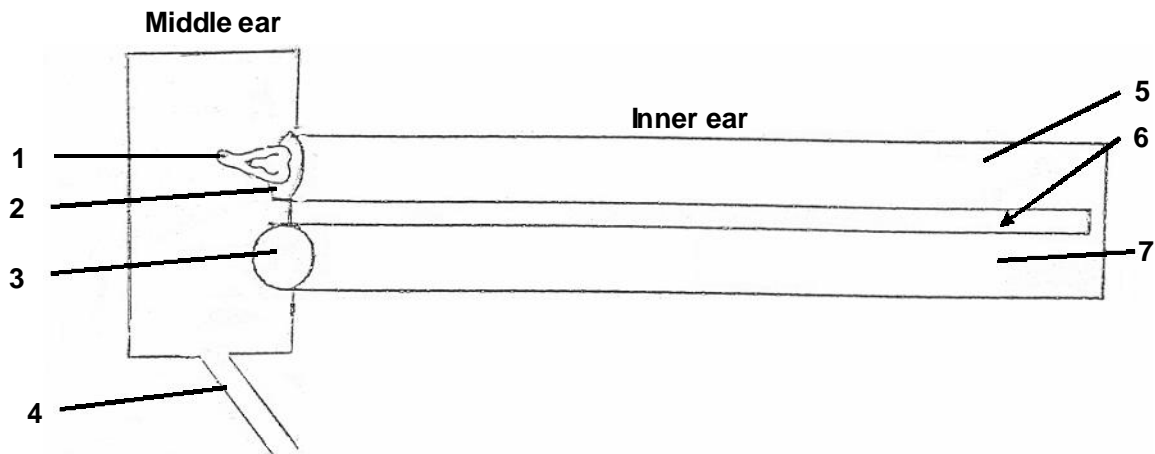
- (a) Give labels for numbers 1 and 2. (2)
- (b) Explain how the sensation of taste occurs. (5)

3.2 Diagrams **A** and **B** represent different eye defects due to refraction problems. **C** and **D** represent two different kinds of lenses that can be prescribed to overcome these problems.



- 3.2.1 Identify eye defects **A** and **B**. (2)
- 3.2.2 Indicate which lens (**C** or **D**) will be used to rectify each eye defect. (2)

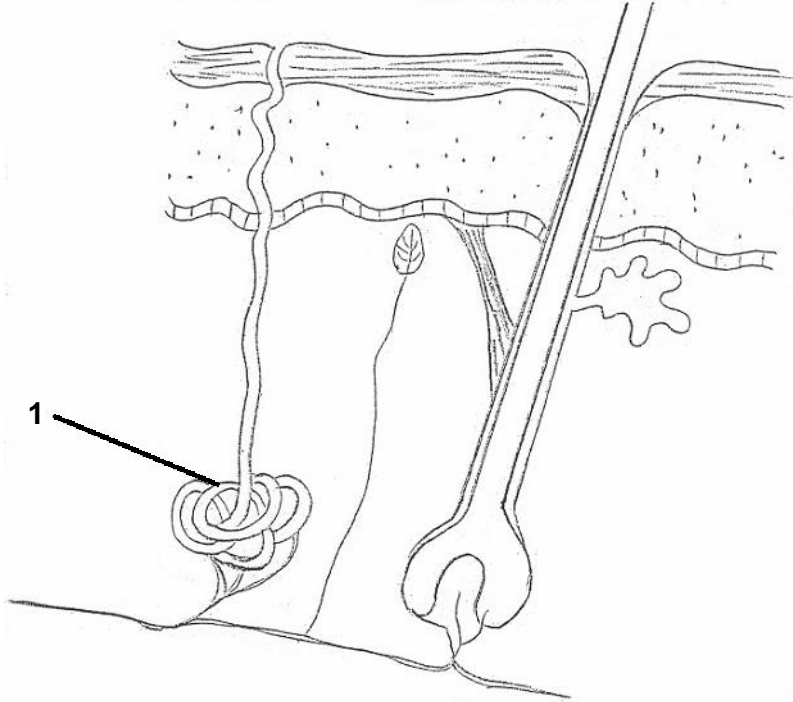
3.3 The following diagram represents a part of the middle and inner ear.



**Fig 3.3 Representation of the middle and inner ear**

- 3.3.1 What fills the middle ear? (2)
- 3.3.2 Which structure is indicated by no. 1? (1)
- 3.3.3 Name the membranes numbered 2 and 3. (2)
- 3.3.4 What is the name of the canal indicated by number 4 and what is its function? (3)
- 3.3.5 Identify canals 5, 6 and 7 that form the cochlea. (3)
- 3.3.6 Name the fluids that fill canals 5, 6 and 7 respectively. (3)
- 3.3.7 What is the name of the receptor found in canal 6? (2)

3.4 The diagram below represents a part of the skin.



**Figure 3.4: Diagram of the skin.**

- 3.4.1 Name the TWO exocrine glands represented in this diagram. (2)
- 3.4.2 How does structure 1 function on a hot summer's day to maintain a constant body temperature? (7)
- 3.4.3 Which part of the skin provides protection against the harmful UV rays of the sun? (2)

**[50]**

## QUESTION 4

- 4.1 The table indicates the substances present in the glomerular filtrate. The diagram represents the nephron. Study the table and the diagram and answer the questions.

Substance present in the glomerular filtrate
Water
Inorganic salts (sodium)
Glucose
Amino acids
Urea
Uric acid
Creatinine

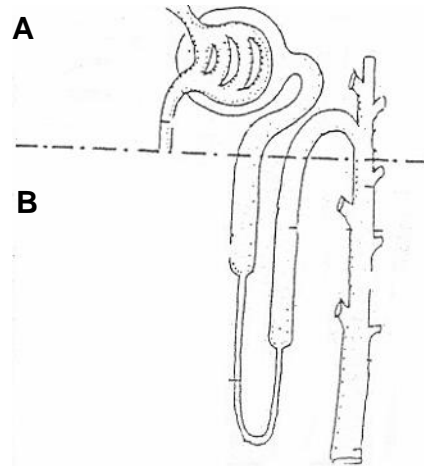


Table: Contents of glomerular filtrate

Diagram: Nephron

- 4.1.1 Identify the parts of the human kidney labelled **A** and **B**. (2)
- 4.1.2 Where in the nephron does ultrafiltration occur? (2)
- 4.1.3 The structure mentioned in Question 4.1.2 is a microfilter. Discuss how the structure is adapted to form a microfilter that is responsible for ultrafiltration. (6)
- 4.1.4 Which of the substances in the table will **not** form part of urine in a healthy person? Explain why. (5)
- 4.1.5 Discuss the origin of the metabolic waste products mentioned in the table. (5)
- 4.1.6 Explain why ammonium does not form part of the filtrate but is part of urine. (5)
- 4.1.7 (a) Name the TWO substances in the table that are homeostatically regulated through hormonal intervention in the distal convoluted tubule. (2)
- (b) Name the TWO hormones as well as the glands that secrete each hormone. (4)
- (c) Discuss how the nephron with the help of a certain hormone will intervene to prevent one from dehydrating on a hot day. (8)

- 4.1.8 Discuss what happens to urine when it enters the collecting ducts until it is excreted from the body.

(11)  
[50]

### QUESTION 5

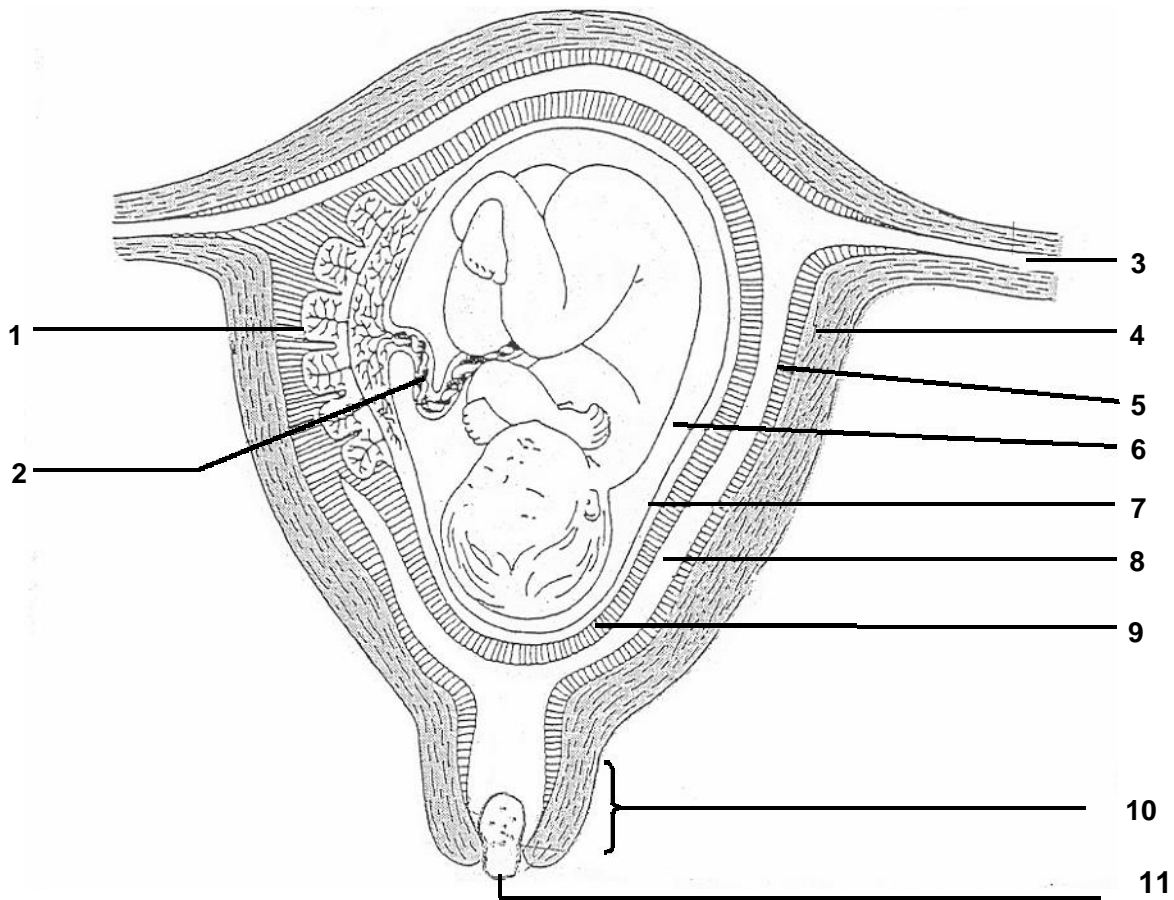
- 5.1 Study the following paragraph and answer the questions that follow.

***Contraception is the prevention of fertilization without destroying fertility by natural, mechanical or chemical means. Oral contraceptive is commonly used. The Pill most commonly used, contains a high concentration of progesterone and a low concentration of estrogen.***

*Adapted from: Tortora, G.J. Principles of Anatomy and Physiology, fifth edition, 1987*

- 5.1.1 Name the TWO hormones mentioned in the paragraph that play a role in the menstrual cycle. (2)
- 5.1.2 Explain how progesterone can prevent fertilization from taking place. (5)
- 5.1.3 Explain why “missing a period” is usually the first sign of pregnancy. (3)
- 5.1.4 Discuss FIVE functions of estrogen. (5)

5.2 Study the diagram of the developing foetus in the uterus and answer the questions that follow.



**Figure 5.2**  
**Embryonic development**

5.2.1 Give labels for numbers 1 to 10. (10)

5.2.2 Discuss the protective functions of the following structures:

- (a) No. 6 (5)
- (b) No. 1 (4)

5.2.3 Write down the NUMBER(S) of the structure(s) that

- (a) relax during birth.
- (b) contract during birth.
- (c) rupture when the “water breaks”.
- (d) comes out as part of the afterbirth.
- (e) is cut directly after birth.
- (f) protects the foetus against infections and pathogens from the outside.
- (g) comes out as the “show” indicating the start of labour. (9)



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5.2.4 Name FIVE substances that may be present in the blood of the umbilical cord vein. (5)

5.2.5 Name the hormones responsible for

- (a) contractions of the uterus during birth. (2)
- (b) relaxing the joints and ligaments during pregnancy. [50]

**TOTAL FOR SECTION B: [200]**

**TOTAL: 300**

**END**