UNIVERSITY OF FORT HARE

GENERAL INTRODUCTION TO ANIMAL BIOLOGY ZOO 111

DEGREE MAIN EXAMINATIONS

JUNE

2017

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Time:	**3HRS**
Subject:	**ZOO 111**
Marks:	**150**

This paper consists of 20 pages including the cover page

Internal Examiners

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INSTRUCTIONS

Answer all questions in Section A and Section B.
Answer Section A in the Multiple Choice Answer Sheet.
Answer Section B in the Examination Answer Book.
Submit this question paper together with the Multiple Choice Answer Sheet and your Examination Answer Book.

Section A [75 Marks – Answer on the Multiple Choice Answer Sheet]

1) Prokaryotes have _____.
   a) no membrane bound ribosomes
   b) no membrane bound nucleus
   c) no membrane bound golgi apparatus
   d) no membrane bound lysosome
   e) no membrane bound centrioles

2) In a hypotonic solution a cell swells. A cell that swells can rupture, a process called _____.
   a) hyposmotic
   b) rapture
   c) crenation
   d) hypertonic
   e) lysis

3) The cell cycle is divided into two halfs; _____ and _____.
   a) Interphase; G_0 phase
   b) Interphase; G_1 phase
   c) Interphase; G_2 phase
   d) Interphase; M phase
   e) Interphase; S phase

4) Osmotic pressure is a function of the _____ of the solution.
   a) tonic
   b) movement
   c) particles
   d) concentration
   e) osmosis

5) In _____ cells are recovering from an earlier cell division and are synthesizing components cell growth and DNA synthesis.
   a) G_0 phase
   b) G_1 phase
   c) G_2 phase
   d) M phase
   e) S phase

6) Cytokinesis usually occurs between late _____and end of _____.
   a) Anaphase; Interphase
   b) Anaphase; Prophase
   c) Anaphase; Metaphase
   d) Anaphase; Telophase
   e) Anaphase; Prometaphase

7) Ribosomes are found within the _____ of the _____ and attached to _____.
   a) cytoplasm; cytosol; external membranes
   b) cytosol; cytoplasm; external membranes
   c) cell; cytoplasm; internal membranes
   d) cytosol; cytoplasm; internal membranes
   e) cell; cytosol; internal membranes

8) The following are the main parts of the endomembrane system .
   a) lysosomes; nucleus; ribosomes
   b) lysosomes; endoplasmic reticulum; golgi apparatus
   c) lysosomes; nucleolus; nucleus
   d) lysosomes; cilia; flagella
   e) lysosomes; nucleus; bacteria

9) Movement through plasma membrane occurs in 4 ways; namely _____.
   a) passive transport; active transport; pinocytosis and exocytosis
   b) passive transport; active transport; phagocytosis and pinocytosis
   c) diffusion; osmosis; endocytosis and exocytosis
   d) passive transport; active transport; endocytosis and exocytosis
   e) passive transport; active transport; no energy transport and energy transport

10) The following are the 4 *basic* Tissues types you have studied in Cell Biology Class.
   a) Epithelium; Tendon, Muscle and Nervous Tissues
   b) Epithelium; Bone; Muscle and Nervous Tissues
   c) Epithelium; Blood; Muscle and Nervous Tissues
   d) Epithelium; Cartilage; Muscle and Nervous Tissues
   e) Epithelium; Connective; Muscle and Nervous Tissues

11) Which of the following led to the discovery of cells?
   a) Electricity
   b) Computers
   c) Microscopes
   d) Internet
   e) Cellphones

12) The functions of the cytoskeleton are to _____.
   a) support the shape of the cell; keeps organelles floating in cytoplasm and helps build materials within the cell
   b) support the shape of the cell; keeps the nucleus in the centre of the cell and helps with storing materials within the cell
   c) support the shape of the cell; keeps organelles in fixed locations and helps to digest materials within the cell
   d) supports the shape of the cell; keeps organelles in fixed locations and helps to manufacture materials within the cell
   e) support the shape of the cell; keeps organelles in fixed locations and helps move materials within the cell

13) In 1665 an English Scientist, _____, discovered cells while looking at a thin slice of cork.
   a) Matthias Schleiden
   b) Anton van Leuwenhoek
   c) Robert Hooke
   d) Theodor Schwann
   e) Rudolf Virchow

14) Flattened stacks of interconnected membranes represent _____.
   a) Nucleus
   b) Plasma membrane
   c) Lysosomes
   d) Golgi apparatus
   e) Ribosomes

15) Key proteins associated with replication are made in ____.
   a) G_1 phase
   b) S phase
   c) G_2 phase
   d) G_3 phase
   e) G_0 phase

16) Eukaryotes include:
   a) protists; bacteria; plants; animals
   b) protists; fungi; plants; animals
   c) protists; fungi; archaebacteria; animals
   d) protists; fungi; plants; archaebacteria
   e) protists; archaebacteria; plants; animals

17) In plasma membrane, the phosphate end of the molecule is polar (charged) and _____.
   a) hypotonic
   b) hypertonic
   c) isotonic
   d) hydrophobic
   e) hydrophilic

18) Eukaryotes cells have a real _____.
   a) cytoskeleton
   b) cytoplasm
   c) nucleus
   d) nucleoid region
   e) nuclear envelope

19) _____ is the unique tissue found only in the walls of the heart.
   a) Connective tissue
   b) Epithelial tissue
   c) Cardiac muscle tissue
   d) Nervous tissue
   e) Striated muscle tissue

20) Which of the following is not an animal dietary habit?
   a) Herbivory
   b) Carnivory
   c) Saprophagy
   d) Chemotropy
   e) Omnivory

21) Which of the following are involved in the voluntary process of digestion?
   a) Teeth
   b) Cheeks
   c) Tongue
   d) All of the above
   e) None of the above

22) Which of the following is NOT an accessory organ of the human digestive system?
   a) Liver
   b) Pancreas
   c) Gallbladder
   d) All of the above
   e) None of the above

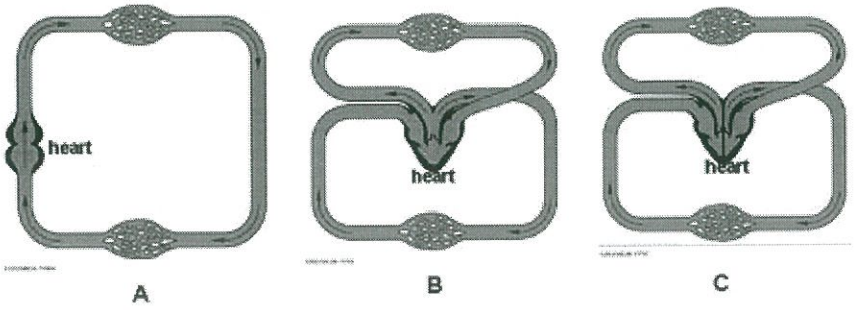
23) High stomach acidity _____.
   a) creates ideal conditions for carbohydrate digestion
   b) promotes emulsification of fats
   c) favours protein digestion
   d) blocks the release of histamine, thereby favouring production of peptic ulcers
   e) converts lipases into their active forms

24) Which of the following enzymes is not secreted by the pancreas?
   a) Trypsin
   b) Pepsin
   c) Chymotrypsin
   d) Carboxypeptidase
   e) Nucleases

25) Maltose is digested into
   a) Glucose + glucose
   b) Glucose + fructose
   c) Fructose + fructose
   d) Glucose + galactose
   e) Galactose + fructose

26) Extracellular fluid is subdivided into blood plasma and _____.
   a) Blood proteins
   b) Interstitial fluid
   c) Bacteria
   d) Acid
   e) None of the above

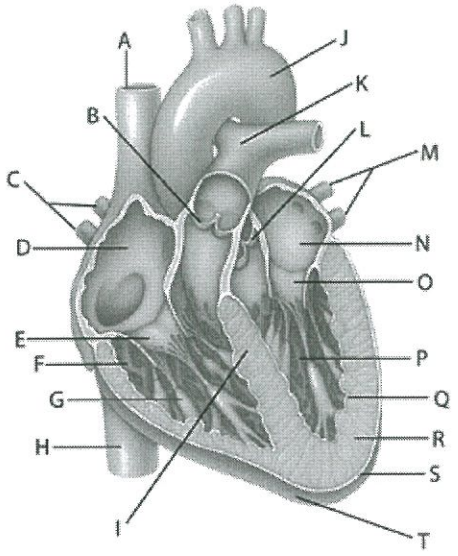
Use the figure below to answer questions 27 and 28.



27) A fish circulatory system is indicated by
   a) A
   b) B
   c) C
   d) Both A and B
   e) None of these

28) A circulatory system that allows some mixing of oxygenated and oxygen-poor blood is indicated by
   a) A
   b) B
   c) C
   d) Both B and C
   e) All of the above

Use the figure below to answer questions 29–31.



29) The anatomical structure identified with the letter "H" in the figure above is the

_____

a) myocardium
b) pulmonary veins
c) inferior vena cava
d) right atrium
e) heart apex

30) The anatomical structure identified with the letter "D" in the figure above is the

_____

a) myocardium
b) left atrium
c) inferior vena cava
d) right atrium
e) right ventricle

31) The anatomical structure identified with the letter "O" in the figure above is the

_____

a) Left atrioventricular valve
b) Right atrioventricular valve
c) Pulmonary semilunar valve
d) Aortic semilunar valve
e) Cardiac valve

32) Which of the following living organisms does not respire?
a) Humans
b) Bacteria
c) Protists
d) All of the above
e) None of the above

33) _____respiration is the exchange of gases between the organism and its surrounding environment.
a) Internal
b) Extant
c) External
d) Intensive
e) Extensive

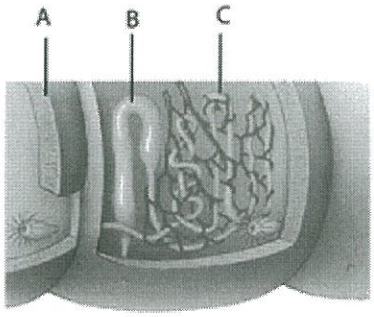
34) Which organism uses external gills for respiration? (Choose the most accurate)
a) Amphibians
b) Fish
c) Polychaete worms
d) Both a) and c)
e) All of the above

35) What is the proper sequence in the flow of air in mammals?
a) nasal cavities, larynx, pharynx, bronchi, trachea
b) nasal cavities, pharynx, bronchi, larynx, trachea
c) nasal cavities, pharynx, larynx, trachea, bronchi
d) nasal cavities, larynx, pharynx, trachea, bronchi
e) nasal cavities, bronchi, larynx, trachea, pharynx

36) The tough thin layer of epithelium covering the inner chest walls is called _____.
a) Epipleural tissue
b) Visceral pleura
c) Paternal pleura
d) Parietal pleura
e) Viscous pleura

37) Which of the following transports the highest concentration of carbon dioxide?
a) Blood plasma
b) Red blood cells (bicarbonate & hydrogen ions)
c) Carbaminohemoglobin
d) None of the above
e) All of the above

38) The exchange of gases in the human lungs occurs through the _____.
a) bronchi
b) tracheas
c) alveoli
d) glottis
e) bronchioles



39) Consider the above diagram. The letter "C" from the above diagram represents which of the following structures in an earthworm?
a) the excretory pore
b) loops where blood vessels take up solutes from the blood
c) sexual reproductive organ of the earthworm
d) cilia which flick to draw fluid into the earthworm
e) none of these

40) Which of the following solutes would NOT leave the vertebrate body under normal conditions?
a) uric acid
b) ammonia
c) urea
d) carbon dioxide
e) glucose

41) The subunit of a kidney that purifies blood and restores solute and water balance is the _____.
a) Glomerulus
b) loop of Henle
c) nephron
d) ureter
e) peritubular capillary

42) The antidiuretic hormone (ADH):
a) promotes processes that lead to an increase in the volume of urine
b) promotes processes that lead to a decrease in the volume of urine
c) acts on the proximal tubules of nephrons in the kidney
d) is produced by the adrenal cortex
e) fits all of these descriptions

43) The urinary system helps to maintain the extracellular fluid pH by:
   a) synthesizing buffers
   b) retaining carbon dioxide in the filtrate
   c) excreting excess hydrogen ions
   d) combining hydrogen ions with urea
   e) signaling the respiratory system to adjust breathing rate

44) Which of the following is NOT part of the initial response to cold temperature?
   a) vasodilation of peripheral blood vessels
   b) shivering
   c) muscle contractions
   d) shunting of the blood to the core regions of the body
   e) increased metabolism

45) An excess of estrogen-like molecules can have which of the following effects on males?
   a) lower sperm production
   b) increase hair growth
   c) tumor growth on the surface of the testes
   d) increased reproduction
   e) all of these

46) Hormones are distributed throughout the body by the _____ system.
   a) Exocrine
   b) Lymphatic
   c) Nervous
   d) Circulatory
   e) Integumentary

47) Which of these is true for most water-soluble hormones?
   a) They must be transported by specific carriers in the blood
   b) They have no trouble entering their target cells
   c) They find and react with surface receptor molecules
   d) They never elicit the production of a second messenger
   e) They trigger gene transcription

48) Which endocrine gland is the main center for control of the internal environment?
   a) pineal and thymus
   b) hypothalamus
   c) thyroid and parathyroids
   d) adrenal cortex and adrenal medulla
   e) pancreas and gonads

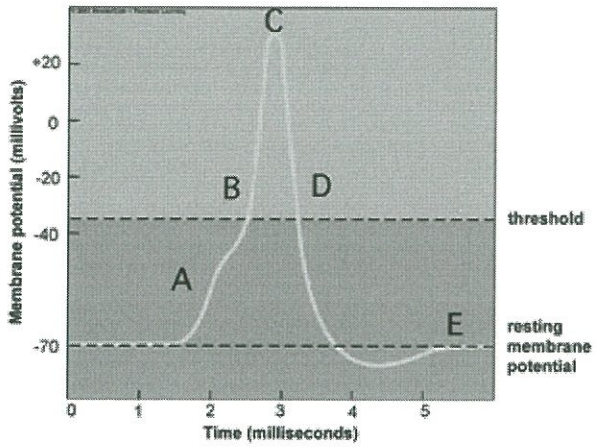
49) Which gland is associated with daily biorhythms?
   a) Pineal
   b) Parathyroid
   c) Thymus
   d) Pituitary
   e) Thyroid

50) Which of the following is true of type 1 diabetes?
   a) Insulin levels are near normal
   b) Target cells do not respond normally to insulin
   c) It is the more common form of diabetes
   d) It is thought to be an autoimmune disease
   e) It usually occurs in middle-aged people

51) Cephalization refers to:
   a) a type of symmetry
   b) a type of segmentation characteristic of lower forms of life
   c) a group of protective cells found in the tentacles of a polyp
   d) a transitional state in the life cycle of a jellyfish
   e) none of these

52) The two major divisions of the vertebrate nervous system are the:
   a) autonomic and peripheral systems
   b) sympathetic and parasympathetic systems
   c) cranial and spinal nerves
   d) central and peripheral nervous systems
   e) brain and spinal cord

53) What happens first following a neuron stimulation?
   a) Sodium ions enter the cell
   b) Sodium ions leave the cell
   c) Potassium ions enter the cell
   d) Potassium ions leave the cell
   e) Potassium ions are involved in positive feedback



54) According to the diagram above, the point at which this neuron will be able to generate another action potential is indicated by:
a) A
b) B
c) C
d) D
e) E

55) Somatic system fibers in nerves carry information:
a) to and from receptors
b) to and from effectors
c) from receptors in skin, tendons, and skeletal muscles
d) to skeletal muscles
e) from receptors in skin, tendons, and skeletal muscle and to skeletal muscles

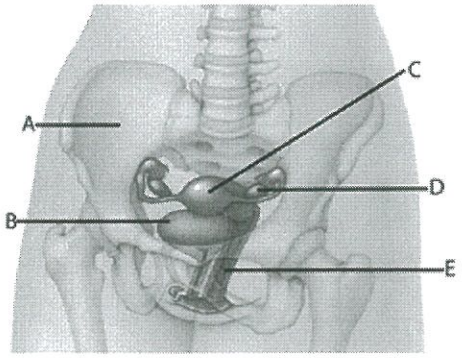
56) The part of the brain that controls the basic responses necessary to maintain life (such as breathing and heartbeat) is the:
a) medulla oblongata
b) corpus callosum
c) pineal gland
d) cerebellum
e) cerebral cortex

57) Sperm are produced in the
a) testes
b) vas deferens
c) epididymis
d) prostate gland
e) penis

58) Semen components are produced by
a) the prostate gland
b) the seminal vesicles
c) the testes
d) the urinary bladder
e) all except "the urinary bladder"

59) Which of the following is the site where mature sperm are stored?
a) ureter
b) urethra
c) vas deferens
d) bulbourethral gland
e) epididymis

60) The release of testosterone requires
a) GnRH
b) luteinizing hormone
c) Sertoli cells
d) GnRH and luteinizing hormone
e) GnRH, luteinizing hormone, and Sertoli cells



Use the figure above to answer questions 61 and 62

61) The letter "C" above represents
a) uterus
b) ovary
c) vagina
d) urinary bladder
e) pelvic girdle

62) The letter "E" above represents
a) uterus
b) ovary
c) vagina
d) urinary bladder
e) pelvic girdle

63) Fertilization in mammals normally occurs in the
a) ovary
b) uterus
c) vagina
d) oviduct
e) follicle

64) Homeotic genes
a) cause lethal mutations
b) regulate development of specific body parts
c) are found only in fruit flies, where they are responsible for odd placement of appendages
d) produce "fate maps"
e) form as blocks of genes in cells randomly distributed throughout the body

65) Which stage of development involves initial cellular reorganization?
a) gamete formation
b) fertilization
c) gastrulation
d) organ formation
e) tissue specialization

66) Which of the following is NOT true regarding apoptosis?
a) It is programmed cell death
b) It sculpts body parts
c) It primarily eliminates old, diseased cells
d) It involves cell self-destruction
e) The formation of the human hand is an example

67) Which of the following is the final stage of the prenatal period?
a) zygote
b) blastocyst
c) embryo
d) fetus
e) infant

68) A fetus born earlier than ___ weeks is considered premature.
a) 22
b) 26
c) 30
d) 33
e) 37

69) The extra-embryonic membrane that forms the majority of the placenta is the
a) amnion
b) allantois
c) chorion
d) yolk sac
e) umbilical cord

70) Which of the following does NOT occur in the first trimester during human development?
a) formation of a heart
b) disappearance of the tail
c) formation of internal organs
d) detection of movement of the fetus
e) segmentation and development of somites

71) By the eighth week in humans
a) the embryo looks distinctly human
b) the neural tube is complete
c) upper and lower limbs have formed, and individual fingers and toes have separated from each other
d) male or female reproductive structures are forming
e) all of these are true

72) The pea plant was an excellent choice for Mendel's experiments because
a) true-breeding varieties were available
b) the plant can self-fertilize
c) it can be cross-fertilized
d) true-breeding varieties were available, and it can be cross-fertilized
e) true-breeding varieties were available, the plant can self-fertilize, and it can be cross-fertilized

73) A gene locus is
a) a recessive gene
b) an unmatched allele
c) a sex chromosome
d) the location of an allele on a chromosome
e) a dominant gene

74) Various forms of a single gene at a given locus are called
a) kinetochores
b) alleles
c) autosomes
d) loci
e) chromatids

75) The most accurate description of an organism with genotype *AaBb* is
   a) homozygous dominant
   b) heterozygous
   c) heterozygous dominant
   d) homozygous recessive
   e) heterozygous recessive

Section B [75 Marks – Answer in the Examination Answer Book]

Question 1 (19 Marks)

1.1) Redraw the table below in your answer book. State the major structure and give at least one function for each of the cell components in the first column.

(10 marks)

Cell component	Structure	Function
Cytoplasm		
Mitochondrion		
Nucleus		
Plasma membrane		
Ribosomes		

1.2) Describe cytokinesis.

(5 marks)

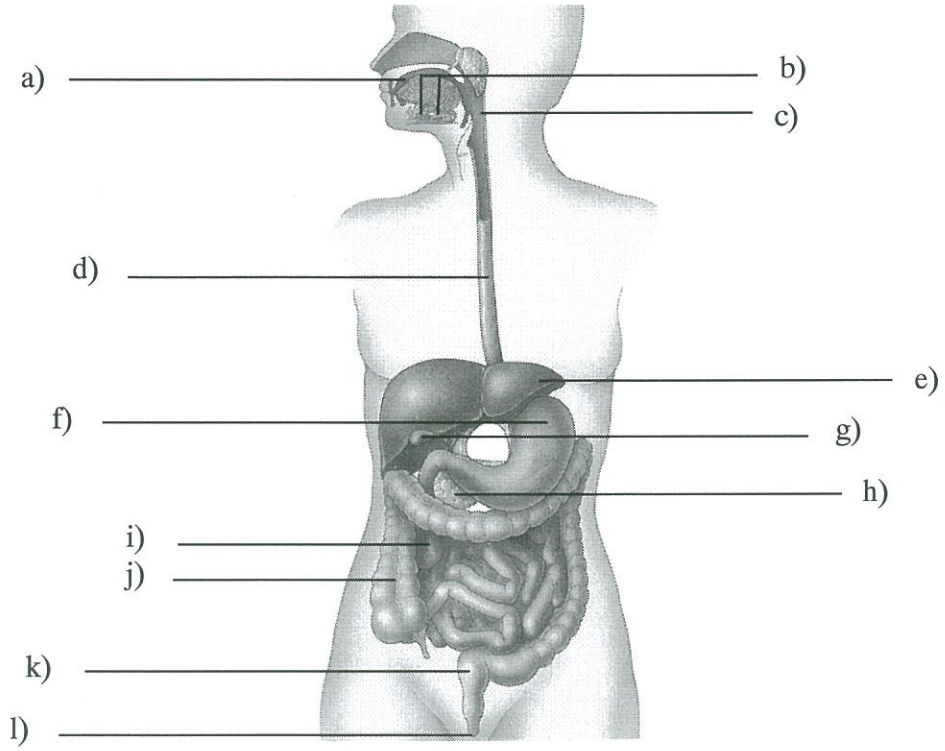
1.3) Name four main types of animal tissues.

(4 marks)

Question 2 (19 Marks)

2.1) Label the following figure in your answer book.

(12 marks)



2.2) Complete the following sentences:

a) _____ are not truly cells, but rather fragments of cells.
b) _____ are also known as red blood cells.
c) _____ are also known as white blood cells.
d) _____ include neutrophils, basophils, eosinophils, lymphocytes, and monocytes.

(4 marks)

2.3) Give three ways (and the related percentages) in which carbon dioxide can be transported by blood.

(3 marks)

Question 3 (19 Marks)

3.1) In terms of fluid homeostasis, what is the key internal adaptation that allowed vertebrates to adapt efficiently to life on dry land?

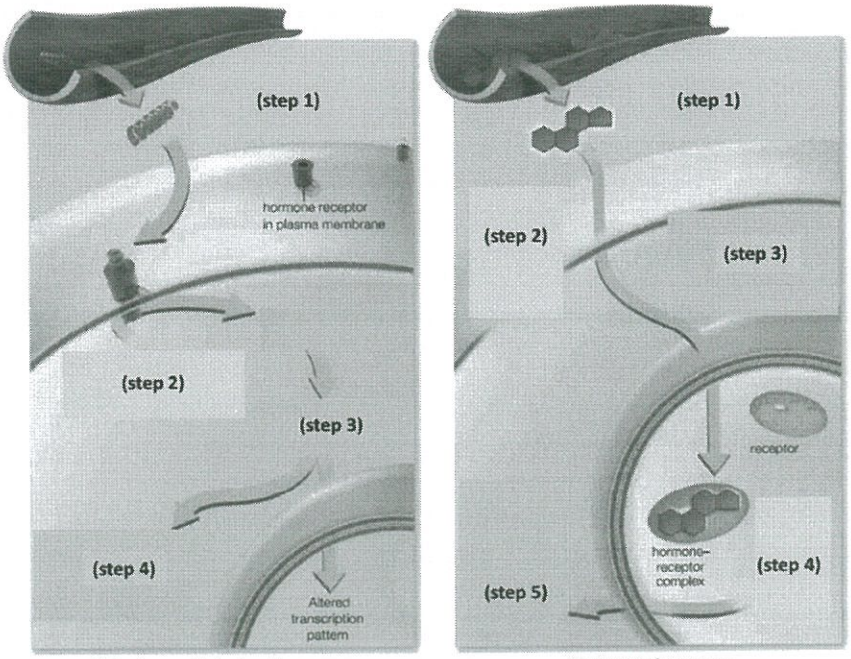
(2 marks)

3.2) List the key structures involved in the process of urine formation from the blood to the outside of the body in humans.

(8 marks)

3.3) Compare the route taken by amino-acid derived hormones versus steroid hormones (derived from cholesterol) in producing a cellular response, starting at their release from the blood to the final step of causing a response in a cell. Use the diagram below as a guide to your answer, explaining the numbered steps 1-4 for amino-acid hormones and steps 1-5 for steroid hormones.

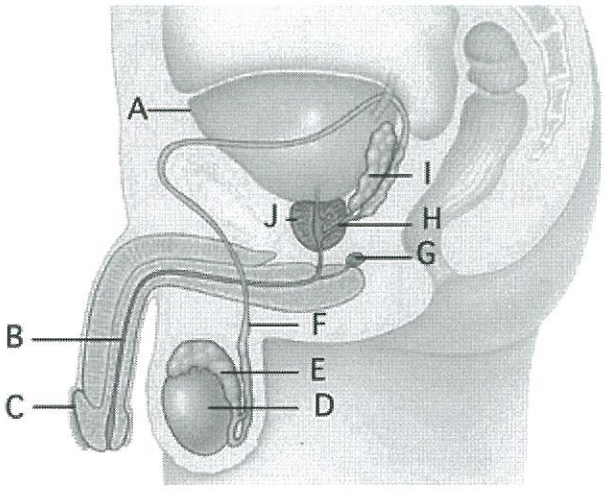
(9 marks)



A) Amino-acid derived hormone

B) Steroid hormone

Question 4 (18 Marks)



4.1) The above picture depicts the human male reproductive system. Identify the letter corresponding to each of the SIX labels below.

i. vas deferens
ii. epididymis
iii. seminal vesicle
iv. urethra
v. testis
vi. prostate gland

(6 marks)

4.2) Animals which produce eggs and sperm at the same time are called
(a) _____ hermaphrodites, or produce both at different times in their life
(b) _____ hermaphrodites

(2 marks)

4.3) In garden peas, one pair of alleles controls the height of the plant, and a second pair of alleles controls flower colour. The allele for tall (*D*) is dominant to the allele for dwarf (*d*), and the allele for purple (*P*) is dominant to the allele for white (*p*). A tall plant with purple flowers crossed with a dwarf plant with white flowers produces 1/2 tall with purple flowers and 1/2 tall with white flowers. What is the genotype of the parents?

(4 marks)

4.4) The allele for albinism (*c*) is recessive to the allele for normal pigmentation (*C*). A normally pigmented woman whose father is an albino marries an albino man whose parents are normal. They have three children, two normal and one albino. Give the genotypes for:-

a. Normal pigmented woman
b. Albino man (husband)

(4 marks)

4.5) State Mendel's theory of Segregation

(2 marks)

********END********