

Grade 12 June exam

Marks: 150

Duration: 2hours 30minutes

TOPIC	SUBTOPIC	KEY INFORMATION
DNA – THE CODE OF LIFE	Structure of DNA and RNA	<ul style="list-style-type: none"> Identify using diagrams with emphasis on the natural shape of each and the arrangement of nucleotides
	Differences between DNA & RNA	<ul style="list-style-type: none"> Distinguish when asked only nucleotides or the complete structure
	DNA replication	<ul style="list-style-type: none"> Describe in the correct sequence
	Protein synthesis	<ul style="list-style-type: none"> Role of DNA & RNA in protein synthesis: <ul style="list-style-type: none"> ✓ Transcription and ✓ Translation as stipulated in Examination Guidelines
	DNA profiling	<ul style="list-style-type: none"> Interpretation of diagrams of DNA profiling Refer to DNA profile bars or DNA bars and NOT just black bars or just DNA <p>E.g., DNA profile bars of suspect A compare with the DNA profile bars of the blood on the glass</p>
MEIOSIS	Why, where, when and how it occurs	<ul style="list-style-type: none"> Identify the MAIN characteristics of each phase Explain crossing over - homologous chromosomes form bivalent and NOT chromosomes only The process using diagrams with labels
	Significance of meiosis	<ul style="list-style-type: none"> Production of haploid gametes The halving effect of meiosis overcomes the doubling effect of fertilisation, thus maintaining a constant chromosome number from one generation to the next Mechanism to introduce genetic variation through crossing over and random arrangement of chromosomes on the equator
	Differences between meiosis I and meiosis II	<ul style="list-style-type: none"> Especially in the different phases. <p>E.g. In metaphase I chromosome pairs align and in metaphase II single chromosomes align</p>
	Abnormal meiosis: Non-disjunction & Down syndrome	<ul style="list-style-type: none"> Non-disjunction of chromosomes at position 21 during Anaphase in humans to form abnormal gametes with an extra copy of chromosome 21
REPRODUCTION IN VERTEBRATES	Diversity in reproductive strategies	<ul style="list-style-type: none"> Focus on strategies given in the 2021 Examination Guidelines
HUMAN REPRODUCTION	Male reproductive system	<ul style="list-style-type: none"> Structure of the male reproductive system, using a diagram, with labels and functions (only parts given in Examination Guidelines)
	Female reproductive system	<ul style="list-style-type: none"> Structure of the female reproductive system, using a diagram with labels and functions (only parts given in Examination Guidelines)
	Puberty	<ul style="list-style-type: none"> Main characteristics/changes (male & female)

	Spermatogenesis & oogenesis	<ul style="list-style-type: none"> Exactly as stated in the Examination Guidelines
	Ovarian & Menstrual cycles (incl. hormones & negative feedback)	<ul style="list-style-type: none"> Refer to Mind the Gap (MTG) for the structure of the ovary, using a diagram/graph, showing the primary follicles, the Graafian follicle and the corpus luteum Includes the uterine and ovarian cycles and days per month + endometrium changes The role of FSH, oestrogen, progesterone & LH in these processes Negative feedback between progesterone and FSH
	Development of the zygote to a blastocyst (blastula)	<ul style="list-style-type: none"> Order in the development of structures as well as difference between a morula and a blastocyst
	Development of the foetus during gestation	<ul style="list-style-type: none"> Structure of the developing foetus in the uterus, using a diagram Functions of the: <ul style="list-style-type: none"> ✓ Chorion and chorionic villi ✓ Amnion, amniotic cavity and amniotic fluid ✓ Umbilical cord (including umbilical artery and umbilical vein) ✓ Placenta
GENETICS AND INHERITANCE	Genetic terms	<ul style="list-style-type: none"> ALL GENETIC TERMS must be known well
	Complete dominance Incomplete dominance Co-dominance	<ul style="list-style-type: none"> As stated in Exam Guidelines State the Law of Dominance (see Examination Guidelines)
	Monohybrid crossing	<ul style="list-style-type: none"> Understand and use the template Position of meiosis and fertilization as well as P₁ and F₁ on the template Answer the question at the end (usually for a compulsory mark) Proportion and ratio of genotypes and phenotypes State the Principle of Segregation (see Examination Guidelines)
	Inheritance of sex	<ul style="list-style-type: none"> Differentiate between sex chromosomes (gonosomes) and autosomes (body cells) in the karyotypes of human males and females
	Sex-linked characteristics & disorders	<ul style="list-style-type: none"> The correct way of writing it Also in pedigree diagrams
	Blood groups	<ul style="list-style-type: none"> Difference between genotype and phenotype of each blood group Correct way of writing genotypes: e.g. I^Ai, I^Bi or ii or I^AI^B
	Dihybrid crossing	<ul style="list-style-type: none"> Correct way of writing: Genotype: e.g. GGRR or GgRr Gametes: e.g. GR, Gr, gR, gr Distinguish between dominant phenotype and dominant allele

		<ul style="list-style-type: none"> • Mendel's Principle of Independent Assortment (See Examination Guidelines)
	Pedigree diagrams	<ul style="list-style-type: none"> • Interpretation of pedigree diagrams • Give the phenotype, genotype • State which allele is inherited from each parent • The examiner DOES NOT have to provide a key
	Mutations	<ul style="list-style-type: none"> • Different types of mutations: Gene and Chromosome mutations • Different effects of mutations: harmful, useful and harmless • Refer to Examination Guidelines
	Genetic engineering: Stem cells, genetic modification and cloning	<ul style="list-style-type: none"> • Sources and uses • Benefits (Advantages and disadvantages) • Brief outline of processes
	Paternity testing and DNA profiling	<ul style="list-style-type: none"> • Describe how paternity testing is done not only identifying the father in a diagram but describe how the mother, father and child's DNA bars plays a role
RESPONDING TO THE ENVIRONMENT HUMANS	Central nervous system: The brain & spinal cord	<ul style="list-style-type: none"> • Protection of the parts + diagrams with labels & functions of parts • Only parts given in Examination Guidelines
	Peripheral nervous system	<ul style="list-style-type: none"> • Location, structure and functions of different neurons • Only parts given in Examination Guidelines
	Autonomic nervous system	<ul style="list-style-type: none"> • Differentiate between sympathetic and parasympathetic actions
	Neurons, reflex actions and the reflex arc	<ul style="list-style-type: none"> • A reflex arc and the role of each part, using a diagram • Differences between a reflex action and a reflex arc
	Disorders of the CNS	<ul style="list-style-type: none"> • Causes and symptoms of: <ul style="list-style-type: none"> ✓ Alzheimer's disease ✓ Multiple sclerosis
	The eye	<ul style="list-style-type: none"> • Parts and functions using diagrams, binocular & stereoscopic vision
	Accommodation	<ul style="list-style-type: none"> • Interpret diagrams as well as identify and name the parts plus their roles involved in the process (for near and far vision) • Refer to MTG & Diagnostic report
	Pupillary mechanism	<ul style="list-style-type: none"> • Interpret diagrams as well as identify and name the parts plus their roles involved in the process (in dark and light environments) • Refer to MTG & Diagnostic report
	Visual defects	<ul style="list-style-type: none"> • Interpret diagrams and treatment of each of myopia, hypermetropia, astigmatism and cataracts
	The ear	<ul style="list-style-type: none"> • Parts and functions using diagrams • Emphasise the use of the correct scientific terms
	Hearing	<ul style="list-style-type: none"> • The whole process starting with the pinna to the Corti-organ and then to the cerebrum via the auditory nerve
	Balance	<ul style="list-style-type: none"> • The role of the macula, cristae and auditory nerve - to the cerebellum

	Hearing defects	<ul style="list-style-type: none"> Causes and treatment of middle ear infection and deafness
HUMAN ENDOCRINE SYSTEM & HOMEOSTASIS IN HUMANS Mark allocation unsure	Glands and the hormones they secrete + functions	<ul style="list-style-type: none"> Location of each of the following glands, using a diagram, the hormones they secrete and function(s) of each hormone: <ul style="list-style-type: none"> ✓ Hypothalamus (ADH) ✓ Pituitary (GH, TSH, FSH, LH, prolactin) ✓ Thyroid glands (thyroxin) ✓ Islets of Langerhans in the pancreas (insulin, glucagon) ✓ Adrenal glands (adrenalin, aldosterone) ✓ Ovary (oestrogen, progesterone) ✓ Testis (testosterone) Disorders: Diabetes mellitus & Goitre
	Negative feedback	<ul style="list-style-type: none"> Basic explanation of negative feedback when levels of the following are high/low and must return to normal: <ul style="list-style-type: none"> ✓ Glucose ✓ Thyroxin ✓ Carbon dioxide ✓ Water ✓ Salts
	Thermoregulation	<ul style="list-style-type: none"> The role of parts of the skin on hot and cold days Refer to the role of capillaries in the surface of the skin (vasodilation and vasoconstriction) <p>Emphasise:</p> <ul style="list-style-type: none"> <u>Blood</u> moves to the skin surface and NOT veins <u>Heat</u> is released by CAPILLARIES and SWEAT from sweat pores

Investigative skills required

Skill	Key point
Drawing a: Line graph Bar graph Histogram Pie chart	<ul style="list-style-type: none"> • The caption must have two variables • Scale: Equal spaces between units on axes which are in chronological order • Equal width of the bars and between bars • Pie graph must show calculations and a compass & protractor must be used
Drawing a: Table Diagram with labels	<ul style="list-style-type: none"> • Table must be drawn with clear columns and related items must be compared • Drawing must be in pencil with a definite heading/caption and label lines must point to the exact part and the labels written in pen
Answering: Scientific investigative questions	<ul style="list-style-type: none"> • Use the aim of the investigation to determine the dependent and independent variables which is not always the same as the labels on a graph or table • Reliability – repeat the investigation and increase the sample size must be linked to the investigation • Validity – keep the variables constant e.g., same age, gender, environmental conditions etc. the word same must be included • Control – to compare results and ensure that the results are due to the factor that is tested • Difference between the experiment and the control. With the control you eliminate the factor that you test. With the experiment you provide the factor you test
Do calculations	Simple calculations <ul style="list-style-type: none"> • Percentage • Average • Percentage increase or decrease formula Convert calculations to a description

Tips from A Ngubane

- Use reading time to plan how you will answer each question and manage your time wisely.
- Read the instructions of the question paper and follow them.
- Do not create a cover page, start answering from the first page of your answer book.

Exam tips

- All diagrams for each topic must be studied
- All activities given in the classroom must be studied
- Practice terminologies
- practice all topic tests
- show calculations even when not asked to

Use the link for [past papers](#)