KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2025 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 1: PHYSICAL SCIENCES

Weeks		Knowledge Area	Concepts for week	Page in CAPS doc	Date completed	SMT Member Signature	% Curriculum Coverage	
							Per Term	Annual
Week 1 **15 – 17 Jan** **(3 hrs)**		**MECHANICS:** **Momentum &** Impulse	• Define & calculate the momentum of a moving object: p = mv • Describe the vector nature of momentum & draw vector diagrams. • State Newton's second law in terms of momentum: $F_{net} = \frac{\Delta p}{\Delta t}$ • Calculate the change in momentum when a resultant force acts on an object. • Define impulse • Use the impulse momentum theorem ($F_{net}\Delta t = m\Delta v$) in calculations for a variety of situations (1-D).	**99**			**8.6**	**3,1**
Week 2 **20 – 24 Jan** **(4 hrs)**		**MECHANICS:** **Momentum &** **Impulse**	• Impulse and safety considerations. • State the principle of conservation of linear momentum. • Explain what is meant by an isolated system, internal and external forces. • **Prescribed Experiment (Formal)** Verify the conservation of linear momentum • Apply conservation of momentum to collisions of two objects (one dimension). Distinguish between elastic and inelastic collisions by calculation.	**100 - 101**			**20**	**7,2**
Week 3 **27 – 31 Jan** **(4 hrs)**		**MECHANICS:** **Vertical projectile motion**	• Explain what a projectile means. • Use equations of motion to determine the position, velocity and displacement of a projectile at any given time. • Sketch y vs t, v vs t and a vs t graphs for a free falling object, an object thrown vertically upwards, an object thrown vertically downwards & bouncing objects.	**102**			**31,4**	**11,3**
Week 4 **03 – 07 Feb** **(4 hrs)**		**MECHANICS:** **Vertical projectile motion**	• For given y vs t, v vs t or a vs t graphs, determine position, displacement and velocity or acceleration at any time t. • For given y vs t, v vs t or a vs t graphs, describe the motion of an object bouncing, thrown vertically upwards & thrown vertically downward. **Recommended Experiment:** (Informal) Investigate the motion of a falling body. Draw a graph of position vs time and velocity vs time for a free falling object and use the data to determine the acceleration due to gravity	**102 - 103**			**42,9**	**15,5**
Week 5 **10 – 14 Feb** **(4 hrs)**		**MATTER & MATERIALS:** **Organic molecules**	• Define organic molecules, functional group, hydrocarbon, homologous series, saturated and unsaturated compounds, and structural isomers. • Write condensed, structural & molecular formulae (max 8 C atoms, 1 functional group per molecule) for alkanes (no rings), alkenes (no rings), alkynes, alcohols, haloalkanes (no rings), carboxylic acids, aldehydes, ketones and esters. • Write IUPAC names for structural / condensed structural formulae for compounds from above series.	**104**			**54,3**	**19,6**
Week 6 **17 – 21 Feb** **(4 hrs)**		**MATTER & MATERIALS:** **Organic molecules**	• Write IUPAC names from structural or condensed structural formulae for compounds listed (one functional group per molecule, max. two functional groups for haloalkanes). • Identify alkyl substituents (methyl- and ethyl-); max. THREE alkyl substituents. • Identify compounds that are saturated, unsaturated, structural isomers (chain, positional and functional). • Physical properties: boiling point, melting point, vapour pressure	**104 - 108**			**65,7**	**23,7**

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 1: PHYSICAL SCIENCES

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Week 7 24 – 28 Feb (4 hrs)		**MATTER & MATERIALS: Organic molecules**	• Relationship between physical properties and strength of IMF, type of functional group, chain length and branching • Combustion of alkanes in excess O_2 and use as fuels. • Equation & reaction conditions for the formation of an ester and IUPAC names for reactant and products. • Classify reactions as elimination, addition or substitution. • Equations and reaction conditions for addition reactions of alkenes.	**106**			**77**	**27,8**
Week 8 03 – 07 March (4 hrs)		**MATTER & MATERIALS: Organic molecules**	• Equations and reaction conditions for elimination reactions: dehydrohalogenation of haloalkanes, cracking of alkanes, dehydration of alcohols • Equations and reaction conditions for substitution reactions: hydrolysis of haloalkanes, halogenation of alkanes	**107 – 117**			**88,6**	**32**
Week 9 10 – 14 March (4 hrs)		**MECHANICS: Newton's Laws Work Done by a Fore**	• Revision: Newton's Laws (Grade 11) • Define the work done on an object. • Draw force diagrams & free body diagrams. • Calculate the net work done on an object. • Distinguish between positive work and negative net work done on a system.	**117 - 118**			**100**	**36**
Week 10 17 – 20 March (3 hrs)		**CONTROLLED TEST (2 Hours)**	**ONE PAPER (100 Marks)** • Newton's laws of motion • Momentum and impulse • Vertical projectile motion • Organic molecules					
Week 11 24 – 28 March (4 hrs)		**CONTROLLED TEST (2 Hours)**						

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 2: PHYSICAL SCIENCES

Weeks		Knowledge Area	Concepts for week	Page in CAPS doc	Date completed	SMT Member Signature	% Curriculum Coverage	
							Per Term	Annual
Week 1 08 – 11 April (3 hrs)			Discussion and corrections of March Controlled Test				8.6	39
		MECHANICS: Work, energy and power	• State the work-energy theorem. • Apply the work-energy theorem on horizontal, vertical and inclined planes. • Define conservative and non-conservative forces and give examples. • State the principle of conservation of mechanical energy. • Solve problems using the equation $W_{nc} = \Delta Ek + \Delta Ep$ Show that E_{mech} is conserved in absence of non-conservative forces	118				
Week 2 14 – 18 April (4 hrs)		MECHANICS: Work, energy and power	• Define power and calculate the power involved when work is done • Perform calculations using $P_{ave} = Fv_{ave}$ when an object moves at a constant speed along a rough horizontal surface or a rough inclined plane • Calculate the minimum power required of an electric motor to pump water from a borehole of a particular depth at a particular rate using $W_{nc} = \Delta Ek + \Delta Ep$ **Recommended practical investigation (**Informal**)** Perform simple experiments to determine the work done in walking up (or running up a flight of stairs). Record the time for the run or the walk and calculate the power in each case	117-120			20	43,3
Week 3 21 – 25 April (4 hrs)		WAVES, SOUND & LIGHT: Doppler Effect	• State the Doppler Effect and explain (using illustrations) the change in pitch observed when a source moves toward or away from a listener (sound and ultra sound). • State applications of the Doppler Effect. • Solve problems using the Doppler formula. • Solve problems using the Doppler formula. $f_L = \frac{v \pm v_L}{v \pm v_S} f_s$ when EITHER source or listener moves. • Calculations involving Doppler formula. • With light, explain 'red shifts' & use the Doppler Effect to explain why we conclude that the universe is expanding	117 - 120			31,4	47,4
Week 4 05 – 09 May (4 hrs)		CHEMICAL CHANGE: Rate and extent of reaction	• Rates of reaction and factors affecting rate (nature of reacting substances, concentration [pressure for gases], temperature and presence of a catalyst). • Explain in terms of the collision theory, how various factors affect the rate of chemical reactions. • Answer questions, and interpret data (graphs or tables) on different experimental techniques for measuring the rate of reaction.	121 - 122			42,9	51,5
Week 5 12 – 16 May (4 hrs)		CHEMICAL CHANGE: Rate and extent of reaction	• Define the term *catalyst* • Explain that a catalyst increases the rate of a reaction by providing an alternative path of lower activation energy. It therefore decreases the net activation energy. • Interpret graphs of distribution of molecular energiesto explain how a catalyst, temperature and concentration affect the reaction rate. • **Recommended experiment (Informal)** Rate of chemical reactions with sodium thiosulfate and hydrochloric acid	123-124			54,3	55,7

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 2: PHYSICAL SCIENCES

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Week 6 **19 – 23 May** **(4 hrs)**		**Chemical Change: Chemical Equilibrium**	• Explain: open & closed systems; reversiblereactions; dynamic equilibrium • List the factors that influence the position of an equilibrium. • State Le Chatelier's principle and use it to explain changes in equilibria • Interpret simple graphs illustrating equilibrium.	**123 - 124**			**65,7**	**59,8**
Week 7 **26 – 30 May** **(4 hrs)**		**CHEMICAL CHANGE: Chemical equilibrium**	• State the factor that influence the value of theequilibrium constant K_c. • Write an expression for the equilibrium constant from a given equation. • Perform calculations based on $K_c$values. • Explain the significance of high and low values of the equilibrium constant. • **Recommended experiment** (informal): Investigate equilibrium and the factors influencingequilibrium in the equilibrium of $CoCl_2$ and H_2O.	**124**			**77**	**63,9**
Week 8 **02 - 06 June** **(4 hrs)**		**CHEMICAL CHANGE: Acids & bases**	• Define acids and bases according to Arrhenius and Lowry-Brønsted. • Distinguish between strong and weak acids/bases with examples. • Distinguish between concentrated and dilute acids/bases. • Explain the pH scale and calculate pH values of strong acids and strong bases. • Identify conjugate acid-base pairs for given compounds. • Write neutralisation reactions of common laboratory acids and bases.	**125**			**88,6**	**68**
Week 9 **09 - 13 June** **(4 hrs)**		**CHEMICAL CHANGE: Acids & bases**	• **Prescribed experiment** (formal) How do you use the titration of oxalic acid against sodium hydroxide to determine the concentration of sodium hydroxide? • Perform calculations based on titration reactions & motivate the choice of an Indicator. • Determine the approximate pH of salts in salt hydrolysis. • Define the concept of Kw and explain the auto ionization of water. • Compare the Ka and Kb values of strong and weak acids and bases. • Compare strong and weak acids by looking at pH, conductivity & reaction rate.	**126 - 128**			**100**	**72,2**
Week 10 **16 - 20 June** **(4 hrs)**		**JUNE EXAMINATION 2hours Duration for each of papers 1 and 2**	**Paper 1 (150 Marks)** • Newton's laws of motion • Momentum and impulse • Vertical projectile motion • Work, energy and power • Doppler effect • Electrostatics (Grade 11) • Electric Circuits (Grade 11)					
Week 11 **23 - 27 June** **(4 hrs)**			**Paper 2 (100 Marks)** • Stoichiometry • Organic Molecules • Rate and Extent of Chemical Reactions • Chemical Equilibrium • Acids & Bases					

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 3: PHYSICAL SCIENCES

Weeks		Knowledge Area	Concepts for week	Page in CAPS doc	Date completed	SMT Member Signature	% Curriculum Coverage	
							Per Term	Annual
Week 1 **22 – 25 July** **(3 hrs)**		**ELECTRICITY & MAGNETISM: Electrostatics & Electric Circuits**	• Review and corrections of June Exams **Electrostatics:** • Coulomb's Law • Electric fields **Electric circuits** • Solve problems involving current, voltage and resistance for circuits containing arrangements of resistors (maximum four) in series and in parallel				**11**	**75,3**
Week 2 **28 Jul – 01 Aug** **(4 hrs)**		**ELECTRICITY & MAGNETISM: Electric Circuits**	• Explain the term internal resistance. • Solve circuit problems using • $\varepsilon = IR_{ext} + Ir$ or $\varepsilon = V_{load} + V_{int\ resistance}$. • Solve problems, with internal resistance, for circuits containing arrangements of resistors in series and in parallel (maximum four resistors). • **Recommended experiment** (informal): Determine the internal resistance of a battery.	**84 – 85**			**25,9**	**79,4**
Week 3 **04 -08 Aug** **(4 hrs)**		**ELECTRICITY & MAGNETISM: Electrodynamics**	• State the energy conversion in generators & use principle of electro-magnetic induction to explain how generators work. • Give examples of uses of AC & DC generators & functions of components. • State the energy conversion in motors & use motor effect to explain how motors work. • Explain the functions of components of motors and give examples of uses of motors. • State the advantages of alternating current over direct current. • Draw and interpret sketch graphs of voltage vs time and current vs time for AC and DC generators.				**40,7**	**83,5**
Week 4 **11 – 15 Aug** **(4 hrs)**		**ELECTRICITY & MAGNETISM: Electrodynamics**	• Define the term *rms* for an alternating voltage or an alternating current. • Solve problems using $I_{rms} = \frac{I_{max}}{\sqrt{2}}$; $R_{rms} = \frac{R_{max}}{\sqrt{2}}$; $P_{ave} = I_{rms}^2 R$; $P_{ave} = \frac{V_{rms}^2}{R}$ *and* $P_{ave} = \frac{1}{2} I_{rms} V_{rms}$	**130**			**55,5**	**87.6**
		M & M: Optical phenomena and properties of materials	**Optical phenomena and properties of materials** • Describe the photoelectric effect and state its significance. • Define threshold frequency, f_o. • Define work function, W_o.	**130**				
Week 5 **18 - 22 Aug** **(4 hrs)**		**MATTER & MATERIALS: Optical phenomena and properties of materials**	• Perform calculations using the photoelectric equation: $E = W_o + K_{max}$, where $E = hf$, $W_o = hf_o$ and $K_{max} = ½\ m(v_{max})^2$ • Explain the effect of intensity and frequency on the photoelectric effect. • Explain the formation of atomic spectra by referring to energy transitions. • Explain the difference between atomic absorption spectra and atomic emission spectra	**132**			**70,4**	**91,7**

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 3: PHYSICAL SCIENCES

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Week 6 25 - 29 Aug (4 hrs)		**CHEMICAL CHANGE: Electrochemical reactions**	• Define oxidation & reduction in terms of electron transfer & oxidation numbers. • Define oxidising & reducing agents in terms of oxidation and reduction. • Define an anode and cathode in terms of oxidation and reduction. • Define an *electrolyte* **Galvanic cells** • Define a galvanic cell. • State the function of a salt bridge. • Predict the movement of ions and the direction of electron flow in external circuit. • Write half-reactions at each electrode & the overall cell reaction. • Predict in which half-cell oxidation / reduction takes place. • Use cell notation or diagrams to represent a galvanic cell. • Calculate emf for a galvanic cell. • Explain that V_{cell} decreases as [product ions] increases and [reactant ions] decreases and $V_{cell} = 0$ when equilibrium is reached, (the cell is 'flat'). • State the standard conditions under which standard electrode potentials are determined.	**134 - 138**			**85.2**	**95,9**

Week 7 01 - 05 Sept (4 hrs)		**CHEMICAL CHANGE: Electrochemical reactions**	• Describe the standard hydrogen electrode and explain its role as the reference electrode.
			• Explain how standard electrode potentials can be determined using the reference electrode; state the convention regarding positive and negative values.
			
			Electrolytic cells
			• Define an electrolytic cell.
			• Describe the movement of ions in the solution.
			• State the direction of electron flow in the external circuit.
			• Write equations for the half-reactions at the anode and cathode.
			• Write down the overall cell reaction.
			• Describe, using half-reactions and the equation for the overall cell reaction as well as the layout of the particular cell using a schematic diagram, the following electrolytic processes:
			  • The decomposition of copper(II) chloride
			  • Electroplating, e.g. the electroplating of an iron spoon with silver/nickel
			  • Refining of copper
			• The electrolysis of a concentrated solution of sodium chloride.
				134			**100**	**100**

Week 8 08 - 12 Sept (4 hrs)		**Paper 2 Revision** **Paper 1 Revision**	**Paper 2** • Representing chemical change (Gr 10) • Intermolecular forces • Energy and chemical change **(Gr 11)** • Stoichiometry (application only) (Gr 11) • Chemical Change • Organic Chemistry **Paper 1** • Newton's laws (Gr 11) • Electrostatics (Gr 11) • Electric circuits (Gr 11) • Mechanics • Waves, Sound and light • Electricity and magnetism • Optical properties of Matter					

Week 9, 10 & 11 15 Sept – 03 Oct		**PREPARATORY EXAMINATION P1: 3 hrs P2: 3 hrs**	**PAPER 1: 150 marks** • Mechanics (65) • Waves, Sound and light (15) • Electricity and magnetism (55) • Matter & Materials (15) **PAPER 2: 150 marks** • Chemical Change (92) • Matter & Materials (58) The following **gr 10 and 11 topics** will form part the two papers:: **Paper 1** • Newton's laws (Gr 11) • Electrostatics (Gr 11) • Electric circuits (Gr 11) **Paper 2** • Representing chemical change (Gr 10) • Intermolecular forces • Energy and chemical change **(Gr 11)** • Stoichiometry (Gr 11)					

KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

2024 CUSTOMISED KZN Recovery ATP: Grade 12 – Term 4: PHYSICAL SCIENCES

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Week 1 13 – 17 Oct (4 hrs)		REVIEW: PREPARATORY EXAMINATIONS	Discussion and correction of errors in Preparatory Exams (P1 & P2)					
Week 2 20 - 24 Oct (4 hrs}		REVIEW: PREPARATORY EXAMINATIONS	Discussion and correction of errors in Preparatory Exams (P1 & P2)					
Week 3 27 – 31 Oct (4 hrs)		CONSOLIDATION AND REVISION	Preparation for final Exams					
FINAL EXAMS Week 4 - 7 3 – 28 Nov			**PAPER 1: 150 marks** • **Mechanics (65)** Momentum and impulse; Vertical projectile motion, Work, energy and power, Newton's laws (Gr 11) • **Waves, Sound and light (15)** Doppler effect • **Electricity and magnetism (55)** Electric circuits, Electrodynamics, Electrostatics (Gr11), Electric circuits (Gr 11) • **Matter & Materials (15)** Optical phenomena and properties of materials **PAPER 2: 150 marks** • **Chemical Change (92)** Rate and extent of reaction, Chemical equilibrium, Acids and bases, Representing chemical change (Gr 10), Energy and chemical change (Gr 11), Stoichiometry (application only) (Gr 11), Electrochemical reactions • **Matter & Materials (58)** Organic molecules, Intermolecular forces (Gr 11)					