ZIAUDDIN UNIVERSITY
EXAMINATION BOARD

Higher Secondary School Certificate
(HSSC)

Examination syllabus

Physics
XI

Based on Provincial Revised Curriculum (Sindh)

You can approach us:

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PREFACE

The Ziauddin University Examination Board (ZUEB) was established under **Sindh ACT XLI 2018**, with the primary objective of enhancing the quality of education in Sindh. ZUEB is responsible for administering examinations for the **Secondary School Certificate (SSC)** and **Higher Secondary School Certificate (HSSC)** in alignment with the most recent revisions to the **National Curriculum**, as outlined by the **Directorate of Curriculum Assessment and Research (DCAR), Sindh**. Through its ordinance, ZUEB is mandated to provide examination services for both English, Urdu, and Sindhi medium candidates from private schools across Sindh. This examination syllabus reflects ZUEB's dedication to achieving the educational goals set by the provincial authorities.

In collaboration with subject professors, ZUEB has developed a comprehensive syllabus for each subject. It is important to distinguish between the syllabus and the curriculum. The syllabus serves as a guide for both teachers and students, outlining the key areas of focus within the subject. It provides students with a clear understanding of what is expected of them in their studies and helps them prepare effectively for their exams.

This examination syllabus incorporates all cognitive outcomes derived from the **Provincial Curriculum Statement**, ensuring that assessments are both valid and reliable. While the focus is primarily on the cognitive domain, significant emphasis is placed on the application of knowledge and understanding.

The syllabus is made available to all stakeholders via the ZUEB website to assist affiliated schools in planning their teaching. It is crucial to note that the syllabus, rather than the prescribed textbook, forms the foundation of ZUEB examinations. Additionally, this syllabus supports the development of learning materials for both students and teachers. ZUEB remains committed to supporting students undertaking the SSC and HSSC courses by facilitating their learning outcomes through this detailed syllabus document.

To further assist in the learning process, ZUEB provides a dedicated **e-resource tab** on its website, offering both text-based and video content on various subjects. These 15-20 minute instructional videos, created around key subject concepts, allow students to learn at their own pace and convenience. The videos can be used as a reinforcement tool to revisit lessons already taught or as pre-lesson material. This initiative is an ongoing effort, and new videos will continue to be uploaded.

We encourage all students and educators to make the most of these resources for a more enriched and flexible learning experience.

Sincerely,
Shahbaz Nasim
Head – Measurement & Testing
Ziauddin University Examination Board

Reviewed by:
Sana Anwer Ali
Manager Sciences
Ziauddin University Examination Board
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Rationale For The Reviewed Provincial Curriculum

The process of revising the National Curriculum 2006 began in August 2004, when the newly elected government of Pakistan initiated education reforms across the country. These reforms included the introduction of a new National Education Policy, a National Education Census, and a revision of curricula (Ministry of Education, 2009).

In practice, the overhaul of the secondary school curriculum began in 2006, leading to a review of the scheme of studies for classes I to XII and the revision of curricula for 25 compulsory subjects.

The 18th Amendment to the Constitution of Pakistan, enacted in 2010, significantly altered the federal- provincial relationship by abolishing the "concurrent legislative list." This amendment granted provinces greater legislative and financial autonomy in sectors such as education and health. The most notable implication of the 18th Amendment for education was the transfer of responsibility for curriculum development, syllabus planning, policy formation, and educational standards to the provinces, marking a significant step forward for education.

In Sindh, the School Education Department tasked a Curriculum Review Team with revising the National Curriculum 2006 for all subjects. The goal was to create a curriculum better suited to the needs of students and teachers while aligning with the principles of the 18th Amendment. Subject-specific curriculum review committees were established to critically examine and align the curriculum's content, both contextually and textually, ensuring coherence across various subjects. The Bureau of Curriculum (BoC) played a crucial role in organizing workshops and meetings in Hyderabad to facilitate the completion of this task. The support of numerous educationists, researchers, and teachers was invaluable in successfully revising the curriculum.

The revised National Curriculum, along with the original version, is available on the DCAR website at https://dcar.gos.pk/Sindh-Curriculum/Physics%20Curriculum%20Grades%20XI%20-XII,%20Notified%2025-11-2019.pdf for easy access.

The Ziauddin University Examination Board (ZUEB) SSC and HSSC syllabi are developed in accordance with the Sindh Revised Curriculum. To date, textbooks for various subjects have been developed based on the revised curriculum.

LIST OF SECTIONS GRADE – XI

SECTION	UNITS
GENERAL PHYSICS	1. Physics and Measurements
MECHANICS	2. Kinematics 3. Dynamics 4. Rotational & Circular Motion 5. Work, Energy and Power 6. Fluid Statics 7. Fluid Dynamics
ELECTRICITY	8. Electric Fields 9. Capacitors 10. D.C. Circuits
WAVES AND COMMUNICATIONS	11. Oscillations 12. Acoustics 13. Physical Optics 14. Communication

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 1 Physics and Measurements	**1.1 Scope of Physics**	1.1.1 Describe Physics. 1.1.2 Describe the scope of Physics in science, technology and society.	**A** **U**
	1.2 S. I Base, Supplementary and derived units	1.2.1 State SI base units, derive units, and supplementary units for various measurements. 1.2.2 Express derived units as products or quotients of the base units. 1.2.3 State the conventions for indicating units as set out in the SI units. 1.2.4 Measure, using appropriate techniques, the length, mass, time, temperature and electrical quantities by making use of both analogue scales and digital displays particularly short time interval by ticker timer and by C.R.O.	**K** **U** **K** **A**
	1.3 Dimensionality	1.3.1 Check the homogeneity of physical equations by using dimensionality and base units. 1.3.2 Derive formulae in simple cases using dimensions.	**A** **A**
	1.4 Errors and uncertainty	1.4.1 Why all measurements contain some uncertainty. 1.4.2 Distinguish between systematic errors (including zero errors) and random errors. 1.4.3 Measure the diameters of a few ball bearings of different sizes and estimate their volumes. Mention the uncertainty in each result. 1.4.4 Analyze and evaluate the above experiment and suggest improvements. 1.4.5 Assess the uncertainty in a derived quantity by simple addition of actual, fractional or percentage uncertainties.	**U** **U** **A** **A** **A**
	1.5 Graphs	1.5.1 Identify dependent and independent variables. 1.5.2 Draw line of best fit and error bar.	**A** **U**

		1.5.3	Draw extrapolation.	**U**
	1.6 Significant figures	1.6.1	Write answers with correct scientific notation, number of significant figures and units in all numerical and practical work.	**U**
	1.7 Precision and accuracy	1.7.1	Identify that least count or resolution of a measuring instrument is the smallest increment measurable by it.	**U**
		1.7.2	Differentiate between precision and accuracy.	**U**
		1.7.3	Explain why it is important to use an instrument of smallest resolution.	**U**
		1.7.4	Explain the importance of increasing the number of readings in an experiment.	**U**
		1.7.5	Interpret the information from linear or nonlinear graphs/curves by measuring slopes and intercepts.	**A**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 2 Kinematics	**2.1 Vectors**	2.1.1 Describe a vector and its representation.	**U**
	2.2 Addition by rectangular components system	2.2.1 Describe the Cartesian coordinate system. 2.2.2 Resolve a vector into two perpendicular components.	**U** **U**
	2.3 Displacement / Distance with graphical representation	2.3.1 Describe vector nature of displacement. 2.3.2 Analyze and interpret patterns of motion of objects using displacement-time graph, velocity-time graph acceleration-time graph.	**U** **A**
	2.4 Speed and velocity with graphical representation	2.4.1 Determine the instantaneous velocity of an object moving along the same straight line by measuring the slope of displacement- time graph.	**A**
	2.5 Acceleration, equations of uniformly accelerated motion	2.5.1 Derive equation of uniformly accelerated motion. 2.5.2 Solve the problems.	**U** **A**
	2.6 Projectile Motion	2.6.1 Understand projectile motion 2.6.2 Calculate height, range and time of flight using equations of projectile motion	**U** **A**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 3 Dynamics	**3.1 Newton's Laws of Motion**	3.1.1 Apply Newton's laws to explain motion of objects.	**A**
		3.1.2 Define inertia (as the property of a body which resists change in motion).	**K**
		3.1.3 Describe and use of the concept of weight as the effect of a gravitational field on a mass.	**U**
		3.1.4 Apply Newton's laws of motion as the rate of change of momentum.	**A**
	3.2 Momentum and Impulse	3.2.1 Describe the Cartesian coordinate system.	**U**
		3.2.2 Represent a vector into two perpendicular components.	**U**
	3.3 Law of Conservation of Momentum	3.3.1 Explain law of conservation of Momentum.	**U**
		3.3.2 Describe elastic and inelastic collision with examples.	**U**
		3.3.3 Solve different problems of elastic and inelastic collisions between two bodies in one dimension by using law of conservation of momentum.	**A**
		3.3.4 Describe that momentum is conserved in all situations. (Rocket Situation)	**U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 4 Rotational and Circular Motion	**4.1 Kinematics of Angular Motion**	4.1.1 Define angular displacement, angular velocity and angular acceleration and express angular displacement in radians. 4.1.2 Solve problems by using S= r θ and v=r ω.	**K** **A**
	4.2 Centripetal Force and Centripetal Acceleration	4.2.1 Describe qualitatively motion in a curved path due to a perpendicular force. 4.2.2 Derive and use centripetal acceleration $a = r\omega^2$, $a = v^2/r$. 4.2.3 Solve problems using centripetal force $F = mr\omega^2$, $F = \frac{mv^2}{r}$. 4.2.4 Describe situations in which the centripetal acceleration is caused by a tension force, a frictional force, a gravitational force, or a normal force. 4.2.5 Explain when a vehicle travels round a banked curve at the specified speed for the banking angle, the horizontal component of the normal force on the vehicle causes the centripetal acceleration. 4.2.6 Describe the equation $\tan\theta = v^2/rg$, relating banking angle θ to the speed v of the vehicle and the radius of curvature r.	**U** **A** **A** **U** **U** **U**
	4.3 Orbital velocity	4.3.1 Define the term orbital velocity and derive relationship between orbital velocity, the gravitational constant, mass and the radius of the orbit.	**K**
	4.4 Moment of Inertia	4.4.1 Define moment of inertia 4.4.2 Use the formulae of moment of inertia of various bodies for solving problems.	**K** **A**
	4.5 Angular Momentum	4.5.1 Define angular momentum. 4.5.2 Explain the law of conservation of momentum.	**K** **U**
	4.6 Torque	4.6.1 Define torque as the cross product of force and moment arm. 4.6.2 Derive a relation between torque, moment of inertia and angular acceleration.	**K** **A**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 5 Work Energy And Power	**5.1 Work as Scalar Product of Force and Displacement**	5.1.1 Describe the concept of work in terms of the product of force F and displacement d in the direction of force (Work as scalar product of F and d). 5.1.2 Distinguish between positive, negative and zero work with suitable examples. 5.1.3 Calculate the work done from the force- displacement graph.	**U** **U** **A**
	5.2 Work done by a variable force graphical method	5.2.1. Define work by variable force. 5.2.2. Calculate the work done from the force- displacement graph.	**U** **A**
	5.3 Kinetic Energy	5.3.1 Recall the concept of K.E. 5.3.2 Derive the equation of K.E by using W = **F.d**	**K** **U**
	5.4 Potential Energy	5.4.1 Recall the concept of potential Energy. 5.4.2 Derive the equation of P.E from W = **F. d**	**K** **U**
	5.5 Work done against Gravitational Field	5.5.1 show that the work done in gravitational field is independent of path. 5.5.2 Calculate gravitational potential energy at a certain height due to work against gravity	**U** **A**
	5.6 Absolute Potential energy	5.6.1 Describe that the gravitational PE is measured from a reference level and can be positive or negative, to denote the orientation from the reference level. 5.6.2 Use equations of absolute potential energy to solve problems	**U** **A**
	5.7 Escape Velocity	5.7.1 Explain the concept of escape velocity in term of gravitational constant G, mass m and radius of planet r.	**U**
	5.8 Power	5.8.1 Express power as scalar product of force and velocity. 5.8.2 Explain that work done against friction is dissipated as heat in the environment.	**U** **U**
	5.9 Work Energy Theorem	5.9.1 State Work Energy theorem. 5.9.2 Utilize work – energy theorem in a resistive medium to solve problems.	**K** **A**

	5.10 Transformation of Energy	5.10.1 State law of conservation of energy. 5.10.2 Explain Law of conservation of energy with the help of suitable examples.	**K** **U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 6 Fluid Statics	**6.1 Pascal's Law**	6.1.1 Describe Pascal's Law. 6.1.2 Describe applications of Pascal's law.	**U** **U**
	6.2 Archimedes' Principal	6.2.1 State Archimedes' principal. 6.2.2 Derive the equation of up thrust acting on a body in fluid.	**K** **A**
	6.3 Buoyancy and Law of Floatation	6.3.1 Describe the basic concepts of buoyancy. 6.3.2 State law of floatation.	**U** **K**
	6.4 Surface Tension	6.4.1 Describe surface tension along with suitable examples.	**U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 7 Fluid Dynamics	**7.1 Fluid Friction**	7.1.1 Describe that real fluids are viscous fluids. 7.1.2 Describe that viscous forces in a fluid cause a retarding force on an object moving through it. 7.1.3 Explain how does the magnitude of the viscous force on an object moving in fluid depend on the size and velocity of the object.	**U** **U** **U**
	7.2 Terminal Velocity	7.2.1 Apply Stokes' law to derive an expression for terminal velocity of spherical body falling through a viscous fluid. 7.2.2 Use the equation of terminal velocity to solve problems.	**A** **A**
	7.3Streamline and Turbulent Flow	7.3.1. Define the terms: steady (streamline or laminar) flow, incompressible flow and non-viscous flow as applied to the motion of an ideal fluid.	**K**

		7.3.2 Explain that at a sufficiently high velocity, the flow of viscous fluid undergoes a transition from laminar to turbulence conditions. 7.3.3 Describe that the majority of practical examples of fluid flow and resistance to motion in fluids involve turbulent rather than laminar conditions.	**U** **U**
	7.4 Equation of Continuity	7.4.1. Identify that the equation of continuity is a form of the principle of conservation of mass. 7.4.2 Solve problems by using the equation of continuity.	**A** **A**
	7.5 Bernoulli's Equation and its Application	7.5.1 Describe that the pressure difference can arise from different rates of flow of a fluid (Bernoulli Effect). 7.5.2 Interpret and apply Bernoulli Effect in the: filter pump, Venturi meter, in, atomizers, flow of air over an aerofoil and in blood physics.	**U** **U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 8 Electric Fields	**8.1 Force between Two charges**	8.1.1 Define Electrostatic force. 8.1.2 Explain Coulomb's law. 8.1.3 Describe the coulombs force in different mediums. 8.1.4 Solve problems using Columbus Law.	**K** **U** **U** **A**
	8.2 Electric Field	8.2.1 Describe the concept of an electric field as an example of a field of force. 8.2.2 Derive the expression. $E = 1/4\pi\varepsilon_o\ q/r^2$ for the magnitude of the electric field at a distance 'r' from a point charge 'q'. 8.2.3 Define electric field strength as force per unit positive charge. 8.2.4 Solve problems and analyze information using $E = F/q$. 8.2.5 Solve problems involving the use of the expression. $E = 1/4\pi\varepsilon_o\ q/r^2$	**U** **A** **K** **A** **A**
	8.3 Electric Field due to Dipole	8.3.1 Describe the concept of electric dipole. 8.3.2 Calculate the magnitude and direction of the electric field at a point due to two charges with the same or opposite signs. 8.3.3 Sketch the electric field lines for two-point charges of equal magnitude with same or opposite signs.	**U** **A** **U**
	8.4 Electric Flux	8.4.1 Describe electric flux. 8.4.2 Explain electric flux through a surface enclosing a charge.	**K** **U**

	8.5 Electric Potential	8.5.1 Define absolute electric potential and the unit of electric potential. 8.5.2 Define potential difference and its unit 8.5.3 Solve problems by using the expression V =W/q. 8.5.4 Calculate the potential in the field of a point charge using the equation $V = l/4\pi\varepsilon_o q/r$. 8.5.5 Show that the electric field at a point is given by the negative of potential gradient at that point. 8.5.6 Solve problems by using the expression E = - V/d. 8.5.7 Define electron volt.	**K** **K** **A** **A** **A** **A** **K**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 9 Capacitors	**9.1 Capacitor**	9.1.1 Explain capacitors as Charge storing Devices.	**U**
		9.1.2 Identify types of capacitors used in different field.	**K**
		9.1.3 Identify factors affecting the capacitance of a parallel plate capacitor and use equations $\varepsilon_r = C/C_o$; $C = \varepsilon_o\varepsilon_r A/d$.	**A**
		9.1.4 Calculate combined capacitance of capacitors in series and in parallel.	**U**
	9.2 Energy stored in a Capacitor	9.2.1 Demonstrate charging and discharging of a capacitor through a resistance.	**U**
		9.2.2 Prove that energy stored in a capacitor is $W = \frac{1}{2}QV$ and hence $E = \frac{1}{2}CV^2$	**U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 10 D.C Circuits	**10.1 Resistors and its Types**	10.1.1 Recall concept of resistance. 10.1.2 Indicate the value of resistance by reading color code on it.	**K** **K**
	10.2 Resistivity, and its Dependence upon Temperature	10.2.1 Define resistivity and explain its dependence upon temperature and also derive the mathematical relationship between them. 10.2.2 Define conductance and conductivity of conductor. 10.2.3 Solve problems using the equations of resistivity.	**U** **K** **A**
	10.3 Internal Resistance	10.3.1 Understand the effects of the internal resistance of a source of e.m.f. on the terminal potential difference. 10.3.2 Distinguish between e.m.f. and p.d. using the energy considerations. 10.3.3 Explain the internal resistance of sources and its consequences for external circuits. 10.3.4 Describe some sources of e.m.f.	**U** **A** **U** **U**
	10.4 Power Dissipation in Resistors	10.4.1 Describe the conditions for maximum power transfer.	**U**
	10.5 Thermoelectricity	10.5.1 Describe thermocouple and its function. 10.5.2 Explain variation of thermoelectric e.m.f. with temperature. 10.5.3 Identify the function of thermistor in fire alarms and thermostats that control temperature.	**K** **U** **A**

	10.6 Kirchhoff's Laws	10.6.1 State Kirchhoff's first law and appropriate the link to conservation of charge. 10.6.2 State Kirchhoff's second law and appropriate the link to conservation of energy. 10.6.3 Derive equations by using Kirchhoff's laws, a formula for the combined resistance of two or more resistors connected in series and parallel. 10.6.4 Solve problems by using Kirchhoff's laws for the combined resistance of two or more resistors in series and parallel.	**U** **U** **A** **A**
	10.7 Balanced Potential	10.7.1 Describe Wheatstone bridge and how it is used to find unknown resistance. 10.7.2 Describe the working of rheostat as a potential divider in circuit. 10.7.3 Describe the function of potentiometer to measure and compare potentials without drawing any current from the circuit.	**U** **U** **U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 11 Oscillations	**11.1 Simple harmonic Motion (SHM)**	11.1.1 Describe necessary conditions for execution of simple harmonic motion. 11.1.2 Investigate the motion of an oscillator using experimental and graphical methods.	**U** **A**
	11.2 Uniform Circular Motion and SHM	11.2.1 Describe necessary conditions for execution of simple harmonic motions. 11.2.2 Describe that when an object moves in a circle, the motion of its projection on the diameter of the circles is SHM. 11.2.3 Define the terms amplitude, period, frequency, angular frequency and phase. 11.2.4 Identify and use the equation; $a = -\omega^2 x$ as the defining equation of SHM.	**U** **U** **K** **A**
	11.3 Practical SHM Systems Mass-Spring & Simple Pendulum	11.3.1 Prove that the motion of mass attached to a spring is SHM. 11.3.2 Analyze the motion of a simple pendulum is SHM and calculate its time period. 11.3.3 Interpret time period of the simple pendulum varies with its length.	**A** **A** **A**
	1.4 Energy Conservation in SHM	11.4.1 Describe the interchanging between kinetic energy and potential energy During SHM.	**U**
	11.5 Free and Forced Oscillation	11.5.1 Describe practical examples of free and forced oscillations (resonance). 11.5.2 Describe graphically how the amplitude of a forced oscillation changes with frequency near to the natural frequency of the system. 11.5.3 Describe practical examples of damped oscillations with particular reference to the efforts of the degree of damping and the importance of critical damping in cases such as a car suspension system. 11.5.4 Describe qualitatively the factors which determine the frequency response and sharpness of the resonance.	**U** **A** **U** **U**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 12 Acoustics	**12.1 Speed of Sound in Air**	12.1.1 Explain that speed of sound depends on the properties of medium in which it propagates and describe Newton's formula of speed of waves.	**U**
		12.1.2 Describe the Laplace correction in Newton's formula for speed of sound in air.	**U**
		12.1.3 Identify the factors on which speed of sound in air depends.	**U**
		12.1.4 Solve problems using the formula $V = \sqrt{\frac{T}{273}}$	**A**
	12.2 Superposition of Sound Waves	12.2.1 Describe the principle of superposition of two waves from coherent sources.	**U**
		12.2.2 Describe the phenomenon of interference of sound waves.	**U**
		12.2.3 Describe the phenomenon of formation of beats due to interference of non-coherent sources.	**U**
		12.2.4 Explain the tuning of musical instruments by beats.	**U**
		12.2.5 Explain the formation of stationary waves using graphical method.	**U**
		12.2.6 Define the terms, node and antinodes.	**K**
		12.2.7 Describe modes of vibration of strings.	**U**
		12.2.8 Describe formation of stationary waves in vibrating air columns.	**U**
	12.3 Doppler Effect of Sound	12.3.1 Explain the observed change in frequency of a mechanical wave coming from a moving object as it approaches and moves away.	**U**
		12.3.2 Recall the applications of Doppler Effect such as radar, sonar, astronomy, satellite, and radar speed traps.	**K**
		12.3.3 Outline some cardiac problems that can be detected through the use of the Doppler's effect.	**K**

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 13 Physical Optics	**13.1 Nature of Light**	13.1.1 Understand electromagnetic spectrum (ranging from radio waves to γ-rays).	**U**
		13.1.2 Recall that light is a part of a continuous spectrum of electromagnetic waves.	**K**
	13.2 Wave Fronts	13.2.1 Describe the concept of wave fronts and its types	**K**
	13.3 Huygen's Principle	**13.3.1** State Huygens's Principle and use it to construct wave front after a time interval.	**K**
	13.4 Interference of Light	13.4.1 State the necessary conditions to observe interference of light.	**K**
		13.4.2 Describe Young's double slit experiment and the evidence it provides to support the wave theory of light.	**U**
		13.4.3 Use the equations of constructive and destructive interference to determine the position of bright and dark fringes also determine the fringe spacing.	**A** **K**
		13.4.4 Explain color pattern due to interference in thin films.	**U**
		13.4.5 Describe interference pattern produced by Newton rings.	**K**
		13.4.6 Describe the parts and working of Michelson Interferometer and its uses.	
	13.5 Diffraction	13.5.1 Explain diffraction and identify that interference occurs between waves that have been diffracted.	**U**
		13.5.2 Describe that diffraction of light is evidence that light behaves like waves.	**K**
		13.5.3 Describe and explain diffraction at a narrow slit.	**U**
		13.5.4 Describe the use of a diffraction grating to determine the wavelength of light and carry out calculations using $d\sin\theta=n\lambda$.	**U** **U**
		13.5.5 Describe the phenomena of diffraction of X-rays through crystals.	**A**
		13.5.6 Measure the slit separation/ grating element 'd' of a diffraction grating by using the known wavelength of laser light.	

Chapter	Contents	Students will be able to:	Cognitive level
Chapter 14 Communication	**14.1 Communication Channels**	14.1.1 describe how the information may be carried by a number of different channels, including wire-pairs, coaxial cables, radio and microwave links, optic fibers and Satellites. 14.1.2 Describe relative merits of channels of Communication.	**K** **K**
	14.2 Modulation	14.2.1 Describe that the information can be transmitted by radio waves. 14.2.2 Understand the term modulation and be able to distinguish between amplitude modulation (AM) and frequency modulation (FM). 14.2.3 Define the term bandwidth. 14.2.4 Demonstrate an awareness of the relative advantages of AM and FM transmissions.	**K** **A** **K** **K**
	14.3 Digital Communication	14.3.1 Understand the advantages of the transmission of data in digital form, compared with the transmission of data in analogue form. 14.3.2 understand that the digital transmission of speech or music involves analogue-to- digital conversion (ADC) before transmission and digital-to-analogue conversion (DAC) after reception.	**A** **U**

Ziauddin University Examination Board
Scheme of Assessment

Maximum marks: 100

Section "A"

Multiple Choice Questions (MCQs) **(17 x 1 = 17)**
Attempt 17 MCQs. Each MCQ carries equal marks.

Practical based Assessments (PBAs) **(15 x 1 = 15)**
Attempt 15 MCQs. Each MCQ carries equal marks.

Section "B"

Short Answer Questions **(9 x 4 = 36)**
Attempt any 9 out of 12 questions. Each question carries equal marks.

Section "C"

Detailed Answer Questions **(2 x 16 = 32)**
Attempt any 2 (with sub-parts) out of 3 questions.
Each question has 2 sub parts, each of 8 marks.

Ziauddin University Examination Board

Table of Specification [TOS]

S.No	Domains	Weightage in evaluation 100%	MCQs 1 mark each	PBAs 1 mark each	Short Answers 4 marks each	Detailed Answers 16 marks each
1	Physics and Measurements	12 %	2	3	1	–
2	Kinematics	8 %	2	–	1	1
3	Dynamics	8 %	1	2	–	1
4	Rotational & Circular Motion	4 %	1	–	1	–
5	Work, Energy and Power	8 %	2	1	1	–
6	Fluid Statics	6 %	1	–	1	1
7	Fluid Dynamics	6 %	1	–	1	1
8	Electric Fields	12 %	1	4	–	1
9	Capacitors	8 %	1	1	1	1
10	D.C. Circuits	6 %	1	1	1	–
11	Oscillations	8 %	1	2	1	–
12	Acoustics	6 %	1	1	1	–
13	Physical Optics	4 %	1	–	1	–
14	Communication	4 %	1	–	1	–
Total # of Questions asked			**17**	**15**	**12**	**3 (with 2 sub parts each of 8 and 8 marks)**
Total # of Questions to be attempted			**17**	**15**	**9**	**2**
Maximum marks attainable			**17 marks**	**15 marks**	**36 marks**	**32 marks**

DEFINITIONS OF COGNITIVE LEVELS

Remember

Remembering is the act of retrieving knowledge and can be used to produce things like definitions or lists. The student must be able to recall or recognise information and concepts. The teacher must present information about a subject to the student, ask questions that require the student to recall that information and provide written or verbal assessment that can be answered by remembering the information learnt.

Question Stems

- Can you name all the …?
- Describe what happens when …?
- How is (are) …?
- How would you define …?
- How would you identify …?
- How would you outline …?
- How would you recognise…?
- List the … in order.
- What do you remember about …?
- What does it mean?
- What happened after?
- What is (are) …?
- What is the best one?
- What would you choose …?
- When did …?
- Where is (are) …?
- Which one …?
- Who spoke to …?
- Who was …?
- Why did …?

Understand

The next level in the taxonomic structure is Understanding, which is defined as the construction of meaning and relationships. Here the student must understand the main idea of material heard, viewed, or read and interpret or summarise the ideas in their own words. The teacher must ask questions that the student can answer in their own words by identifying the main idea.

Question Stems

- Can you clarify…?
- Can you illustrate …?
- Condense this paragraph.
- Contrast …
- Does everyone think in the way that … does?
- Elaborate on …
- Explain why …
- Give an example
- How can you describe...?
- How would you clarify the meaning...?
- How would you compare …?
- How would you differentiate between …?
- How would you describe…?
- How would you generalise…?
- How would you identify …?
- Is it valid that …?
- Is this the same as …?
- Outline …
- Select the best definition...
- State in your own words...
- This represents …
- What are they saying?
- What can you infer from …?
- What can you say about …?
- What could have happened next?
- What did you observe?

	• What does this mean? • What expectations are there? • What information can you infer from…? • What is the main idea of …? • What restrictions would you add? • What seems likely? • What seems to be …? • What would happen if …? • What might happen if …? • Which are the facts? • Which statements support …?
Apply The third level in Bloom's taxonomy, Applying, marks a fundamental shift from the pre-Bloom's learning era because it involves remembering what has been learnt, having a good understanding of the knowledge, and applying it to real-world exercises, challenges or situations. Students must apply an abstract idea in a concrete case to solve a problem or relate it to prior experience. The teacher must provide opportunities for students to use theories and problem-solving techniques in new situations and review and check their work. Assessment questions should be provided that allow students to define and solve problems. **Question Stems** • Can you group by characteristics such as …? • Choose the best statements that apply... • Clarify why … • Do you know of another instance where …? • Draw a story map... • Explain why a character acted in the way that he did... • From the information given, can you develop a set of instructions about …? • How would you develop …? • How would you change …? • How would you demonstrate…?	**Analyse** Analysing is the cognitive level where students can take the knowledge they have remembered, understood and applied, then delve into that knowledge to make associations, discernments or comparisons. Students should break down a concept or idea into parts and show relationships between these parts. Teachers must give students time to examine concepts and their requisite elements. Students are required to explain why they chose a solution. **Question Stems** • Can you distinguish between …? • Can you explain what must have happened when …? • Determine the point of view, bias, values, or intent underlying the presented material... • Discuss the pros and cons of … • How can you classify … according to …? • How can you compare the different parts? • How can you sort the different parts…? • How is … connected to …? • How is … similar to …? • How would you categorise…? • How would you explain...?

• How would you develop? • How would you explain …? • How would you modify …? • How would you present…? • How would you solve … ? • Identify the results of … • Illustrate the … • Judge the effects of … What would result …? • Predict what would happen if … • Tell how much change there would be if … • Tell what would happen if … • What actions would you take to perform …? • What do you think could have happened next? • What examples can you find that ? • What other way would you choose to …? • What questions would you ask of …? • What was the main idea …? • What would the result be if …? • Which factors would you change if …? • Who do you think…? • Why does this work? • Write a brief outline … • Write in your own words …	• What could the ending have been if ... had taken place? • State the point of view of … • What are some of the problems of …? • What assumptions …? • What can you infer about…? • What can you point out about ? • What conclusions …? • What do you see as other possible outcomes? • What does the author assume? • What explanation do you have for …? • What ideas justify the conclusion? • What ideas validate…? • What is the analysis of …? • What is the function of …? • What is the problem with …? • What motive is there? • What persuasive technique is used? • What statement is relevant? • What was the turning point? • What were some of the motives behind …? • What's fact? Opinion? • What's the main idea? • What's the relationship between? • Which events could not have happened? • Why did … changes occur? • Why do you think ?

BLOOM'S TAXONOMY WITH EXAMPLES

If you are a teacher looking for ways to engage your students in learning, this LIST of questions might be interesting for your classroom practice. Bloom's Taxonomy question stems can help elicit higher-order thinking skills and promote critical thinking among learners at different taxonomy levels. These question stems can also encourage students to think about their knowledge through reflection before answering questions.

ACTION WORDS FOR COGNITIVE LEVELS

Knowledge	Understand	Apply	Analyze	Evaluate	Create
					
define	explain	solve	analyze	reframe	design
identify	describe	apply	appraise	criticize	compose
describe	interpret	illustrate	judge	evaluate	create
label	paraphrase	modify	support	order	plan
list	summarize	use	compare	compare	combine
name	classify	calculate	decide	classify	formulate
state	compare	change	discriminate	contrast	invent
match	differentiate	choose	recommend	distinguish	hypothesize
recognize	discuss	demonstrate	summarize	infer	substitute
select	distinguish	discover	assess	separate	write
examine	extend	experiment	choose	explain	compile
locate	predict	relate	convince	select	construct
memorize	associate	show	defend	categorize	develop
quote	contrast	sketch	estimate	connect	generalize
recall	convert	complete	grade	differentiate	integrate
reproduce	demonstrate	construct	measure	divide	modify
tabulate	estimate	dramatize	predict	order	organize
tell	express	interpret	rank	prioritize	prepare
Copy	identify	manipulate	score	survey	produce

discover	indicate	paint	select	calculate	rearrange
duplicate	infer	prepare	test	conclude	rewrite
enumerate	relate	teach	argue	correlate	adapt
listen	restate	act	conclude	deduce	anticipate
observe	select	collect	consider	devise	arrange
omit	translate	compute	critique	diagram	assemble
read	ask	explain	debate	dissect	choose
recite	cite	list	distinguish	estimate	collaborate
record	discover	operate	editorialize	evaluate	facilitate
repeat	generalize	practice	justify	experiment	imagine
retell	group	simulate	persuade	focus	intervene
visualize	illustrate	transfer	rate	illustrate	make
	judge	write	weigh	organize	manage
	observe			outline	originate
	order			plan	propose
	report			question	simulate
	represent			test	solve
	research				support
	review				test
	rewrite				validate
	show				

HSSC PART I EXAMINATION
MARKS BREAKUP GRID FOR EXAMINATION 2025

GROUP: PRE-MEDICAL

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
BIOLOGY	85	15	100
TOTAL	505	45	550

GROUP: PRE-ENGINEERING

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
MATHEMATICS	100	--	100
TOTAL	520	30	550

GROUP: GENERAL SCIENCE

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
PHYSICS	85	15	100
COMPUTER SCIENCE	75	25	100
MATHEMATICS	100	--	100
TOTAL	510	40	550

GROUP: COMMERCE

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
ECONOMICS	75	-	75
P.O.C	75	-	75
ACCOUNTING	100	--	100
BUSINESS MATHEMATICS	50		50
TOTAL	550	---	550

GROUP: HUMANITIES

(Any Three Electives)

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
COMPUTER SCIENCE	75	25	100
ISLAMIC STUDIES	100		100
MATHEMATICS	100	-	100
SOCIOLOGY	100	--	100
ECONOMICS	100		100
EDUCATION	100		100
CIVICS	100		100
NURSING	85	15	100
TOTAL	550	---	550

GROUP: MEDICAL TECHNOLOGY

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
MICROBIOLOGY	85	15	100
HEMATOLOGY & BLOOD BANKING	85	15	100
ANATOMY & PHYSIOLOGY	85	15	100
TOTAL	505	45	550

GROUP: PRE-NURSING

SUBJECT	THEORY	PBA	TOTAL
ENGLISH	100	-	100
URDU NORMAL / URDU EASY	100	-	100
ISLAMIYAT / ETHICS	50	-	50
BIO-CHEMISTRY	85	15	100
FUNDAMENTALS OF NURSING	85	15	100
ELEMENTARY ANATOMY & MICRO TECHNIQUE	85	15	100
TOTAL	505	45	550