



**ZIAUDDIN UNIVERSITY**  
EXAMINATION BOARD

**Higher Secondary School  
Certificate (HSC)**

**Examination Syllabus  
&  
Model Paper**

**PHYSICS-XI**

**Based on Provincial revised curriculum (Sindh)**

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## PREFACE

Ziauddin University Examination Board (ZUEB) was established by the Sindh ACT XLI 2018, with the aim of improving the quality of education. The Board administers examinations for the Secondary School Certificate (SSC) and Higher Secondary School Certificate (HSSC) based on the latest Reviewed National Curriculum by Directorate Curriculum Assessment and Research (DCAR) Sindh. ZUEB has a mandate by Ordinance to offer such examination services to English /Urdu and Sindhi medium candidates for SSC and HSSC from private schools in Sindh. This examination syllabus exemplifies ZUEB's commitment to provincial educational goals

The Examination Board has prepared with the help of subject professors, subject wise syllabus. It is important to make the difference between syllabus and curriculum. The syllabus of a subject is considered as a guide for the subject teacher as well as the students. It helps the students understand the subject in detail. It also helps students to anticipate what is expected from them while preparing for the exams.

This examination syllabus brings together all those cognitive outcomes of the Provincial Curriculum statement which can be reliably and validly assessed. While the focus is on the cognitive domain, particular emphasis is given to the application of knowledge and understanding.

The examination syllabus is uploaded on the ZUEB website. This is done to help affiliated schools in planning their teaching. It is the syllabus, not the prescribed textbook which is the basis of the ZUEB examinations. In addition, the ZUEB examination syllabus is used to develop learning support materials for students and teachers. The examination board stand committed to all students who have embarked upon the SSC, and HSSC courses in facilitating their learning outcomes. Our examination syllabus document ensures all possible support.

On the Ziauddin University Examination Board website a tab e –resource is made available which provides resource material in all subjects both in text form in line with the curriculum and also videos on topics to give students access to learn at their own pace and own time. These 15 to 20 minutes videos are prepared around subject concept / topics. These videos are available to the students for revisiting a lesson taught by their teacher or watch it prior to the lesson and as a reinforcement strategy. The work on videos is in progress and new titles will be uploaded.

*Please look out for the videos on the given website*



Humbly Yours;

**Shahbaz Nasim**  
**Academic Head**

## **Rationale For The Reviewed Provincial Currciulum**

The process of revising the National Curriculum 2006 was initiated in August 2004 when newly elected government of Pakistan decided to introduce education reform in the country. The education reform process included the announcement of new National Education Policy. National Education Census and changing the curricula (Ministry of Education, 2009)

In reality, change in secondary school curriculum was initiated in 2006 and as result, scheme of studies for classes I to XII was reviewed and curriculum of 25 compulsory subjects.

The 18th Amendment to the constitution of Pakistan has reconfigured the federal and provincial relationship by abolishing the “concurrent legislative list”. The Act (2010) provides the provinces with strong legislative and financial autonomy in education, health, and other social sectors. Major implication of the 18th Amendment for education is that the curriculum, syllabus, planning, policy, centers of excellence and standards of education will fall under the purview of the provinces. This was a big step forward for education.

In Sindh the Curriculum review team was assigned a task by the School Education Department, Government of Sindh to review the National Curriculum 2006 for all subjects and prepare a revised version that best suits the needs of the students’ teachers and meets the spirit of the 18<sup>th</sup> amendment.

Subject wise curriculum review committees were formed. Curriculum review team critically examined the contextual and textual parts and aligned the different sections horizontally and vertically of the Curriculum. The Bureau of Curriculum (BOC) played vital role in organizing the workshops and meetings at Hyderabad for the completion of task. The positive support from a number of educationists, researchers and teachers helped in completing the mammoth task of curriculum revision.

On the DCAR website [http://dcar.gos.pk/BoC\\_Other\\_Pages/curriculum\\_dev.html](http://dcar.gos.pk/BoC_Other_Pages/curriculum_dev.html) the national curriculum as well as the revised curriculums are all placed for easy reference.

The Ziauddin University Examination Board Examination syllabi for SSC and HSSC are prepared with the Sindh Revised curriculum. Up till now following subject text books have been developed as per the revised curriculum.

## **AIMS AND OBJECTIVES:**

### **VISION STATEMENT**

Promotion of process skills, problem solving abilities and application of concepts, useful in real life situation for making physics learning more relevant, meaningful and stimulating.

### **AIMS**

The Aims of Physics at higher secondary level are to enable student to:

- Develop among the students the habit of scientific and rational thinking and an attitude to search for order and symmetry in diverse phenomena of nature and thereby to appreciate the supreme wisdom and creative powers of the creator.
- Become lifelong learner, effective problem solver, responsible and productive citizens in a technological world.
- Strengthen the concepts developed at the secondary level to lay firm foundation for further learning of physics at the tertiary level, in engineering or in other physics dependent and vocational courses.
- Develop process skills and experimental, observational, manipulative, decision making and investigatory skills in the students.
- Understand and interpret scientific information presented in verbal, mathematical or graphical form and to translate such information from one form to another.
- Understand and appreciate the inter relationship and balance that exists in nature, the problems associated with the over exploitation of the environmental resources and disturbance because of the human activities in the ecological balance, thus taking care of the environment.

### **CURRICULUM DESIGN ON FOLLOWING OBJECTIVES**

- The curriculum is designed to emphasize on the understanding and application of physics concepts and principles to prepare the learners for rapidly changing technological as well social scenario of the world and requirements of the market and society.
- This approach has been adopted in recognition of the need for students to develop skills that will be of long-term value in an increasingly technological world.
- The curriculum framework is based on the standards and benchmarks framed by Provincial Curriculum Council. It comprises of eight main themes/sections.
- Each section is further divided into “units” showing their conceptual linkages.
- Each unit is furthermore divided into Students Learning Outcomes which not only covers the fundamental laws/principles of physics but also cutting-edge technological application used in our daily life.
- In order to specify the syllabus as precisely as possible and also to emphasize the importance of higher order abilities and skills other than recall, learning outcomes have been used throughout.

- Each unit of the syllabus is specified by content section/major concepts followed by detailed learning outcomes.
- The intended level and scope of treatment of a content is defined by the stated learning outcomes with easily recognizable domain of
  - (i) Recalling
  - (ii) Understanding
  - (iii) Applying
  - (iv) Analyzing
  - (v) Evaluating
  - (vi) And creating, under the subhead “skills” measuring, observing, manipulating, recording and interpreting /analyzing, predicting and communicatingabilities/ skills are expected to be developed through related investigations, activities And practical work.

**ZIAUDDIN UNIVERSITY EXAMINATION BORD**  
**SLOs CATEGORIZATION**  
**XI-PHYSICS**  
**Detailed Syllabus**

CHAPTER	TOPIC	Student learning outcomes
Chapter no 1 Scope of physics.	<ul style="list-style-type: none"> <li>• Introduction to physics</li> <li>• S. I Base, Supplementary and derived units</li> <li>• Dimensionality</li> <li>• Errors and uncertainty</li> <li>• Significant figures</li> <li>• Precision and accuracy</li> </ul>	<ul style="list-style-type: none"> <li>• Describe Physics.</li> <li>• Describe the scope of Physics in science, technology and society.</li> <li>• State SI base units, derive units, and supplementary units for various measurements.</li> <li>• Derive formulae in simple cases using dimensions.</li> <li>• Why all measurements contain some uncertainty.</li> <li>• Distinguish between systematic errors and random errors.</li> <li>• Write answers with correct scientific notation, number of significant figures and units in all numerical and practical work.</li> <li>• Identify that least count or resolution of a measuring instrument is the smallest increment measurable by it. Differentiate between precision and accuracy.</li> </ul>
Chapter no 2 Scalars and vectors.	<ul style="list-style-type: none"> <li>• Vectors</li> <li>• Addition by rectangular components system</li> <li>• Displacement / Distance with graphical representation</li> <li>• Speed and velocity with graphical representation</li> <li>• Acceleration, equations of uniformly accelerated motion</li> <li>• Projectile Motion</li> </ul>	<ul style="list-style-type: none"> <li>• Describe a vector and its representation</li> <li>• Describe the Cartesian coordinate system.</li> <li>• Resolve a vector into two perpendicular components.</li> <li>• Describe vector nature of displacement.</li> <li>• Analyze and interpret patterns of motion of objects using displacement-time graph, velocity-time graph acceleration-time graph</li> <li>• Determine the instantaneous velocity of an object moving along the same straight line by measuring the slope of displacement time graph.</li> <li>• Understand projectile motion</li> <li>• Calculate height, range and time of flight using equations of projectile motion</li> </ul>

Chapter no 3 Motion	<ul style="list-style-type: none"> <li>• Newton's Laws of Motion</li> <li>• Momentum and Impulse</li> <li>• Law of Conservation of Momentum</li> </ul>	<ul style="list-style-type: none"> <li>• Apply Newton's laws to explain motion of objects</li> <li>Define inertia</li> <li>• Describe and use of the concept of weight as the effect of a gravitational field on a mass. Apply Newton's laws of motion as the rate of change of momentum</li> <li>• Describe the Cartesian coordinate system.</li> <li>• Represent a vector into two perpendicular</li> <li>• Explain law of conservation of Momentum</li> <li>• Describe elastic and inelastic collision with examples Solve different problems of elastic and inelastic collisions between two bodies in one dimension by using law of conservation of momentum.</li> </ul>
Chapter no 4 Motion in two Dimension	<ul style="list-style-type: none"> <li>• Projectile Motion</li> <li>• Trajectory of projectile</li> <li>• Application</li> <li>• Uniform circular motion</li> <li>• Linear and circular motion</li> <li>• relation</li> </ul>	<ul style="list-style-type: none"> <li>• Define projectile motion</li> <li>• Relate components of projectile motion.</li> <li>• Maximum height Range and maximum time</li> <li>• Describe various applications of projectile motion.</li> <li>• Define angular displacement, angular velocity and angular acceleration and express angular displacement in radians. Solve problems by using <math>S = r\theta</math> and <math>v = r\omega</math></li> <li>• Describe qualitatively motion in a curved path due to a perpendicular force.</li> <li>• Derive and use centripetal acceleration <math>a = r\omega^2</math>, <math>a = v^2/r</math>. Solve problems using centripetal force <math>F = mr\omega^2</math>, <math>F = mv^2/r</math>.</li> <li>• Describe situations in which the centripetal acceleration is caused by a tension force, a frictional force, a gravitational force, or a normal force.</li> <li>• Describe the equation <math>\tan\theta = v^2/rg</math>, relating banking angle <math>\theta</math> to the speed <math>v</math> of the vehicle and the radius of curvature <math>r</math></li> </ul>
Chapter no 5 Torque Angular Momentum	<ul style="list-style-type: none"> <li>• Torque</li> <li>• Centre of mass and gravity</li> <li>• Equilibrium</li> <li>• Location of axis</li> <li>• Angular momentum</li> </ul>	<ul style="list-style-type: none"> <li>• Define torque.</li> <li>• Describe couple and its forces.</li> <li>• Determine how Centre of mass and gravity is calculated</li> <li>• Describe conditions of equilibrium.</li> <li>• Determining location of axis.</li> <li>• Describe angular momentum how it is calculated</li> </ul>
Chapter no 6 Gravitation	<ul style="list-style-type: none"> <li>• Gravitation Law</li> <li>• Density of earth</li> <li>• Artificial Gravity.</li> </ul>	<ul style="list-style-type: none"> <li>• State and explain newtons law of universal gravitation</li> <li>• Calculate value of <math>g</math> at altitude</li> <li>• Estimate value of <math>g</math> at depth.</li> </ul>



<p>Chapter no 7 Work Power Energy</p>	<ul style="list-style-type: none"> <li>• Work as Scalar Product of Force and Displacement</li> <li>• Work done by a variable force graphical method</li> <li>• Kinetic Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Find out how to create gravity artificially.</li> <li>• Describe the concept of work in terms of the product of force <math>F</math> and displacement <math>d</math> in the direction of force</li> <li>• Distinguish between positive, negative and zero work with suitable examples.</li> <li>• Calculate the work done from the force displacement graph.</li> <li>• Define work by variable force. Calculate the work done from the force displacement graph.</li> <li>• Recall the concept of K.E Derive the equation of K.E by using <math>W = f \cdot d</math></li> </ul>
	<ul style="list-style-type: none"> <li>• Potential Energy</li> <li>• Work done against Gravitational Field</li> <li>• Absolute Potential energy</li> <li>• Escape Velocity</li> <li>• Power</li> <li>• Work Energy Theorem</li> <li>• Transformation of Energy</li> </ul>	<ul style="list-style-type: none"> <li>• Recall the concept of potential Energy</li> <li>• Derive the equation of P.E from <math>W = F \cdot d</math></li> <li>• Show that the work done in gravitational field is independent of path</li> <li>• Calculate gravitational potential energy at a certain height due to work against gravity</li> <li>• 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</li> <li>• Explain the concept of escape velocity in term of gravitational constant <math>G</math>, mass <math>m</math> and radius of planet <math>r</math>.</li> <li>• Express power as scalar product of force and velocity. Explain that work done against friction is dissipated as heat in the environment.</li> <li>• State Work Energy Theorem Utilize work – energy theorem in a resistive medium to solve problems.</li> <li>• State law of conservation of energy</li> <li>• Explain Law of conservation of energy with the help of suitable examples</li> </ul>

<p>Chapter no 8 Wave motion and sound</p>	<ul style="list-style-type: none"> <li>• Simple harmonic Motion (SHM)</li> <li>• Uniform Circular Motion and SHM</li> <li>• . Practical SHM Systems Mass Spring &amp; Simple Pendulum</li> <li>• . Energy Conservation in SHM</li> <li>• Speed of Sound in Air</li> <li>• Superposition of Sound Waves</li> <li>• Doppler Effect of Sound</li> </ul>	<ul style="list-style-type: none"> <li>• Describe necessary conditions for execution of simple harmonic motion. Investigate the motion of an oscillator using experimental and graphical method</li> <li>• Describe necessary conditions for execution of simple harmonic motions.</li> <li>• Describe that when an object moves in a circle, the motion of its projection on the diameter of the circles is SHM.</li> <li>• Define the terms amplitude, period, frequency, angular frequency and phase Identify and use the equation; <math>a = -\omega^2 x</math> as the defining equation of SHM.</li> <li>• Prove that the motion of mass attached to a spring is SHM. Analyze the motion of a simple pendulum is SHM and calculate its time period. Interpret time of the simple pendulum varies with its length</li> <li>• Describe the interchanging between kinetic energy and potential energy during SHM.</li> <li>• Explain that speed of sound depends on the properties of medium</li> <li>• Identify the factors on which speed of sound in air depends. Solve problems using the formula <math>V = \sqrt{T/\mu}</math></li> <li>• Describe the principle of superposition of two waves from coherent sources.</li> <li>• Describe modes of vibration of strings. Describe formation of stationary waves in vibrating air columns</li> <li>• Explain the observed change in frequency of a mechanical wave coming from a moving object as it approaches and moves away Recall the applications of Doppler Effect such as radar, sonar, astronomy, satellite, and radar speed traps.</li> <li>• Outline some cardiac problems that can be detected using the Doppler's effect.</li> </ul>
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<p>Chapter no 9 Nature of light</p>	<ul style="list-style-type: none"> <li>• Nature of Light</li> <li>• Wave Fronts</li> <li>• Huygen's Principle</li> <li>• Interference of Light</li> <li>• Diffraction</li> </ul>	<ul style="list-style-type: none"> <li>• Understand electromagnetic spectrum</li> <li>• Recall that light is a part of a continuous spectrum of electromagnetic waves</li> <li>• Describe the concept of wave fronts and its types</li> <li>• State Huygens's Principle and use it to construct wave front after a time interval.</li> <li>• State the necessary conditions to observe interference of light.</li> <li>• Describe Young's double slit experiment and the evidence it provides to support the wave theory of light.</li> <li>• Describe interference pattern produced by Newton rings Describe the parts and working of Michelson Interferometer and its uses.</li> <li>• Explain diffraction and identify that interference occurs between waves that have been diffracted.</li> <li>• Describe and explain diffraction at a narrow slit. Describe the use of a diffraction grating to determine the wavelength of light and carry out calculations using <math>d\sin\theta = n\lambda</math>.</li> <li>• Describe the phenomena of diffraction of X-rays through crystals. Measure the slit separation/ grating element 'd' of a diffraction grating by using the known wavelength of laser light.</li> </ul>
<p>Chapter no 10 Geometrical optics.</p>	<ul style="list-style-type: none"> <li>• Lenses</li> <li>• Linear Magnification</li> <li>• Combination of Lenses</li> </ul>	<ul style="list-style-type: none"> <li>• Define types of lenses.</li> <li>• Describe image formation.</li> <li>• Derive thin Lense formula.</li> <li>• Defects of Lense.</li> <li>• Describe construction and working of compound microscope.</li> <li>• Describe magnification of astronomical and Galileans telescope.</li> </ul>

# Ziauddin University Examination Board

## Grade XI - PHYSICS

### Scheme of Assessment

Maximum marks: 85

Science (Pre-Engineering, Pre-Medical & Science General Groups)

#### Section 'A': Multiple Choice Questions (20%) 17 marks (1x17=17)

Multiple Choice Question must be covered complete Syllabus of Education

- Each MCQs carry 1 mark
- Given MCQs will be = 17 MCQs
- All MCQs to be answered

#### Section "B" (Constructed Response questions) (40%) 36 Marks (9x4=36)

- Short Answer Question must be given from the prescribed Syllabus all content is to be followed.
- Fourteen (14) Short Answer Questions may be given. Each Question having (4 Marks). In this Section Student shall attempt (9 Questions).

#### Section "C" (Extended Response Questions) (40%) 32 Marks (8x4=32)

- Three (03) Questions of (two parts like Question 3.(a)(b), 4.(a)(b) & 5. (a)(b) of 8,8 marks) may be given in this section and (02 Questions) are to be answered and each Question having (16 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?

	<ul style="list-style-type: none"> <li>• What does this mean?</li> <li>• What expectations are there?</li> <li>• What information can you infer from...?</li> <li>• What is the main idea of ...?</li> <li>• What restrictions would you add?</li> <li>• What seems likely?</li> <li>• What seems to be ...?</li> <li>• What would happen if ...?</li> <li>• What would happen if ...?</li> <li>• Which are the facts?</li> <li>• Which statements support ...?</li> </ul>
<p><b>Apply</b></p> <p>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.</p> <p><b>Question Stems</b></p> <ul style="list-style-type: none"> <li>• Can you group by characteristics such as ...?</li> <li>• Choose the best statements that apply</li> <li>• Clarify why ...</li> <li>• Do you know of another instance where ...?</li> <li>• Draw a story map</li> <li>• Explain why a character acted in the way that he did</li> <li>• From the information given, can you develop a set of instructions about ...?</li> <li>• How could you develop ...?</li> <li>• How would you change ...?</li> <li>• How would you demonstrate...?</li> <li>• How would you develop ... to present ?</li> <li>• How would you explain ...?</li> </ul>	<p><b>Analyse</b></p> <p>Analyzing 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.</p> <p><b>Question Stems</b></p> <ul style="list-style-type: none"> <li>• Can you distinguish between ...?</li> <li>• Can you explain what must have happened when ...?</li> <li>• Determine the point of view, bias, values, or intent underlying the presented material</li> <li>• Discuss the pros and cons of ...</li> <li>• How can you classify ... according to ...?</li> <li>• How can you compare the different parts?</li> <li>• How can you sort the different parts...?</li> <li>• How is ... connected to ...?</li> <li>• How is ... similar to ...?</li> <li>• How would you categorise...?</li> <li>• How would you explain ?</li> <li>• If ... happened, what might the ending have been?</li> <li>• State the point of view of ...</li> <li>• What are some of the problems of ...?</li> </ul>

- 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 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 ?

## BLOOMS TAXONOMY WITH EXAMPLES

### Conclusion

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

<b>Knowledge</b>	<b>Understand</b>	<b>Apply</b>	<b>Analyze</b>	<b>Evaluate</b>	<b>Create</b>
	 <small>UNDERSTAND</small>				
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				



**MODEL PAPER 2023**

SUBJECT: PHYSICS

GRADE: XI

MAX. MARKS: 85

TIME: 3 HOURS

**SECTION 'A' (COMPULSORY) MULTIPLE CHOICE QUESTIONS (MCQ's)**

**SECTION 'A' (COMPULSORY) MULTIPLE CHOICE QUESTIONS (MCQ'S)**

Time: 20minutes

Marks: 17

**Note:** (i). Attempt all Questions from this section.

(ii). Shade **ONE** letter for each question. Make sure you put your answer in line with the correct question number.

(iii). Write the code of your question paper in **bold letters** in the beginning of the answer script.

**Q1 Choose the correct answer for each from the given options:**

- i. **Power is a:**  
a. A scalar quantity      b. A vector quantity      c. A number      d) Sometime scalar some time vector quantity
- ii. **The trajectory of projectile is:**  
a. A straight line      b. A circle      c. Hyperbola      d. Parabola
- iii. **A point at which whole weight of the body acts is called :**  
a. Center of gravity      b. Center of mass      c. Center of the body      d. Axis of rotation
- iv. **Speed of sound waves does not depends upon :**  
a. Wind speed      b. Temperature      c. Pressure      d. Density of medium
- v. **The length of Astronomical telescope is equal to:**  
a.  $f_o + f_e$       b.  $f_e - f_o$       c.  $f_o - f_e$       d.  $f_o / f_e$
- vi. **According to second condition of equilibrium**  
a.  $\sum F_x = 0$       b.  $\sum F_y = 0$       c.  $\sum F_x$  and  $F_y = 0$       d.  $\sum F_x$  and  $F_y = 1$
- vii. **The expression for centripetal acceleration is given as:**  
a.  $v/r$       b.  $v^2/r$       c.  $r/v$       d.  $vr$
- viii. **Image formed by a concave mirror is virtual only when :**  
a. The object is at infinity      b. The object is at C      c. The object is at F      d. The object is between F and pole of mirror
- ix. **During the projectile motion the acceleration along the horizontal direction.**  
a. Decrease      b. Is zero      c. Increases      d. None of these
- x. **Magnification can be shown as :**  
a.  $p/q$       b.  $2q/p$       c.  $2 p /q$       d.  $q/p$

- xi. The rate of change of velocity is called:**  
a. Velocity                      b. Acceleration                      c. Retardation                      d. Displacement
- xii. The S.I. Unit of intensity level of sound is:**  
a. Watt                      b. Diopter                      c. Sone                      d. Decibel
- xiii. The no of significant figures in 3045 is:**  
a. 5                      b. 4                      c. 3                      d. 2
- xiv. Work will be maximum when angle between force and displacement will be :**  
a.  $360^\circ$                       b.  $0^\circ$                       c.  $90^\circ$                       d. None of these
- xv. The acceleration of a body moving down a frictionless inclined at 30 degree will be:**  
a.  $4.9\text{m/s}^2$                       b.  $9.8\text{m/s}^2$                       c.  $98\text{m/s}^2$                       d.  $10\text{m/s}^2$
- xvi. The laws of motion in the presence of constant acceleration are given by:**  
a. Kelvin                      b. Kepler                      c. Joules                      d. Newton
- xvii. Distance between two adjacent bright and dark fringe in interference pattern is called:**  
a. Fringe spacing                      b. Wave length                      c. distance                      d. Phase difference



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**Time: 2 ½ hrs.**

**Marks: 68**

**SECTION 'B' CONSTRUCTED RESPONSE QUESTIONS (CRQ'S) (4x9=36)**

**Q.2 Note: Answer any NINE (09) questions from this section. All questions carry equal marks.**

Q2. Define Distributive Law for Dot product.

Q3. A helicopter weighs 3920N. Calculate the force on it if it is ascending up at a rate of 2m/s.

Q4. In a double slit experiment eight fringes occupy 2.62 mm on a screen 145mm away from the slits. The wavelength is 545 nm. Find the slit separation?

Q5. What is a projectile? Derive the following expression for projectiles.

1- Maximum Height 2- Horizontal Range.

Q6 A truck starts from rest at the top of a slope which is 1 m high and 49 m long. Find its acceleration and speed at the bottom of the slope assuming that friction is negligible

Q7 State and prove law of angular momentum.

Q8 Two bodies of unequal masses are attached to the end of a string which passes over a frictionless pulley. If they are hung vertically derive the expression for the tension in string and the acceleration of the bodies when the mass string system is in motion.

Q9 A diver leaps from a tower with an initial horizontal velocity component of 7 m/s and upward velocity component of 3 m/s. Find the component of her position after 1 second?

Q10 What is the difference between static and dynamic equilibrium? State the conditions of equilibrium.

Q11 Define Simple Harmonic Motion and prove that for a small amplitude of vibration the motion of a simple

A pendulum is a simple harmonic.

Q12 Determine the value of g with Altitude.

Q13 Tarzan swings on a vine of length 4m in a vertical circle under the influence of gravity. When the vine makes an angle of 20 degree with vertical. Tarzan has speed of 5 m/s. Find tangential and centripetal acceleration.

Q14 A crane lifts a load of 6000 N through a vertical distance of 15 m in 30 sec.

What is the potential energy at the highest point of its operation?

Q15 Explain an inclined plane with the help of its mathematical relation.

**SECTION 'C' (DESCRIPTIVE ANSWER QUESTIONS) (Marks:8 x4= 32)**

Note: Answer any TWO (02) questions from this section. All questions carry equal marks.

Q16 a) What is a stationary wave ? A string of length "L" is stretched between two hooks. Find the frequency of stationary wave when it is vibrating in :

1- One loop 2- Two loops

b) Give Newton's formula for speed of sound. What corrections made by Laplace in it, Discuss.

Q17 a) With the help of a ray diagram. Derive relation for magnifying power of compound microscope.

b) Define artificial gravity. How is it created in an orbiting spacecraft?

Q18 a) What is diffraction grating? How can it be used to measure Wavelength of light?

b) What is Newton's ring? Derive an expression for wavelength of light in Newton's ring?

**HSC PART I EXAMINATION  
MARKS BREAKUP GRID FOR EXAMINATION 2023**

**GROUP: PRE-MEDICAL-I**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
BIOLOGY	85	15	100
<b>TOTAL</b>	<b>505</b>	<b>45</b>	<b>550</b>

**GROUP: PRE-ENGINEERING-I**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
CHEMISTRY	85	15	100
MATHEMATICS	100	--	100
<b>TOTAL</b>	<b>520</b>	<b>30</b>	<b>550</b>

**GROUP: COMPUTER SCIENCE-I**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
PHYSICS	85	15	100
COMPUTER SCIENCE	75	25	100
MATHEMATICS	100	--	100
<b>TOTAL</b>	<b>510</b>	<b>40</b>	<b>550</b>

## **GROUP: COMMERCE-I (Private/Regular)**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
ECONOMICS	75	-	75
P.O.C	75	-	75
ACCOUNTING	100	--	100
BUSINESS MATHEMATICS	50		50
<b>TOTAL</b>	<b>550</b>	<b>---</b>	<b>550</b>

## **GROUP: HUMANITIES-I (Private/Regular)**

**(Any Three Elective)**

<b>SUBJECT</b>	<b>THEORY</b>	<b>PRACTICAL</b>	<b>TOTAL</b>
ENGLISH	100	-	100
URDU NORMAL / SINDHI NORMAL	100	-	100
ISLAMIC EDUCATION /CIVICS	50	-	50
COMPUTER STUDIES	75	25	100
ISLAMIC STUDIES	100		100
MATHEMATICS	100	-	100
SOCIOLOGY	100	--	100
ECONOMICS	100		100
EDUCATION	100		100
CIVICS	100		100
<b>TOTAL</b>	<b>550</b>	<b>---</b>	<b>550</b>



Class: XI

MODEL PAPER FOR EXAMINATION 2024

Time Allowed: 20 minutes

SUBJECT: PHYSICS

Q1:

(SECTION "A")

Marks: 17

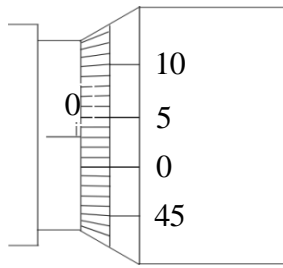
Note: Attempt all questions from section 'A'. Each question carries **ONE** mark.

- i) A bus of weight 30000N is moving with uniform velocity of 14m/s its acceleration is:  
A.  $14 \text{ m/s}^2$                       B. Zero                      C.  $7 \text{ m/s}^2$                       D.  $9.8 \text{ m/s}^2$
- ii) Colors in thin soap films are due to:  
A. Refraction of light                      B. Diffraction of light                      C. Interference of light                      D. Scattering of light
- iii) If an object is placed at principal focus „F“ of a converging lens, the image will be formed:  
A. at F                      B. between focus & optical Centre  
C. at-infinity                      D. at 2F
- iv) The magnifying power of a lens of focal length 1/2 m is:  
A. 50 Diopter                      B. 1 Diopter                      C. 2 Diopter                      D. 100 Diopter
- v) Beats are produced due to:  
A. Diffraction of wave in time                      B. Reflection of waves in time  
C. Polarization of waves in time                      D. Interference of wave in time
- vi) The point which describes the motion of the whole system of body is known as the:  
A. Centre of gravity                      B. Centre of mass                      C. Inertia                      D. Momentum of inertia
- vii) A projectile is thrown upward with a certain velocity. Its time of flight will be minimum, if it is launched at an angle of:  
A.  $30^\circ$                       B.  $45^\circ$                       C.  $60^\circ$                       D.  $75^\circ$
- viii) Two forces which are equal in magnitude but opposite in direction, not acting on the same line, constitute a:  
A. Couple                      B. Circle                      C. Power                      D. Force
- (ix) In the terrestrial telescope, the central lens is used to:  
A. Increase magnifying power                      B. Correct the image                      C. Both of these                      D. None of these
- x) The speed of sound in vacuum is:  
A. Zero                      B. 332 m/s                      C. 332 cm/s                      D. 43232 m/s
- xi) The magnitude of product  $k \cdot (j * i)$ :  
A. Zero                      B. 1                      C. -1                      D.  $|k|$
- xii) According to Maxwell theory, light travels in the form of:  
A. Transverse wave                      B. Longitudinal wave                      C. Mechanic wave                      D. Electromagnetic wave
- xiii) The dimension of energy and \_\_\_\_\_ are identical.  
A. Force                      B. Power                      C. Torque                      D. Angular
- xiv) Electron volt is the unit of:  
A. Power                      B. Voltage                      C. Energy                      D. Charge
- xv) A convex lens behave like  
A. Converging lens                      B. Diverging lens  
C. Both converging & diverging                      D. None of these
- xvi) Tides are formed due to gravitational attraction of \_\_\_\_\_  
A. Sun only                      B. Moon only                      C. Both sun & moon                      D. None of these
- xvii) At a distance equal to the radius of the earth above the surface of earth, the value of gravitational acceleration becomes:  
A. Half                      B. One forth                      C. Double                      D. Four times

END OF SECTION A



1. The given diagram shows two different scales on a screw gauge which is not currently in use.



The CORRECT value of zero error present in the given screw gauge is

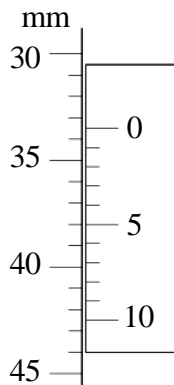
- A. - 0.03 mm.
  - B. - 0.3 mm.
  - C. 0.03 mm.
  - D. 0.3 mm.
2. Given is an observation table.

No. of Obs.	Reading on		No. of Complete Rotations	No. of Divisions	Thickness
	Cover Slip	Glass Plate			

This observation table will be used if the reading is taken from

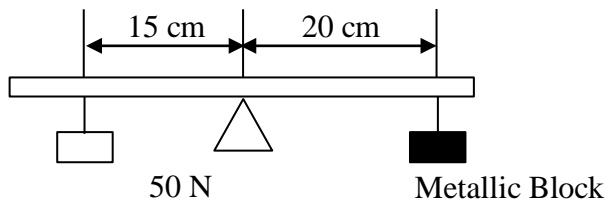
- A. metre rule.
- B. screw gauge.
- C. spherometre.
- D. Vernier callipers.

3. The given diagram shows parts of a pair of Vernier callipers.



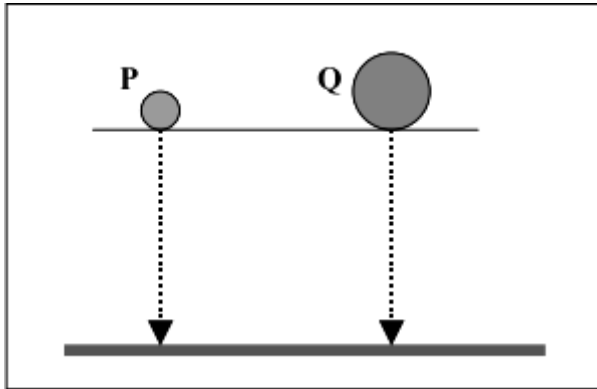
In the given situation, the CORRECT main scale reading is

- A. 30.5 mm.
  - B. 33 mm.
  - C. 33.5 mm.
  - D. 38 mm.
4. If the tail of a vector A coincides with the head of a vector B, the resultant vector of these two vectors will be the
- A. division of vectors.
  - B. addition of vectors.
  - C. subtraction of vectors.
  - D. multiplication of vectors.
5. The given diagram shows a uniform metre scale which is balanced at its mid-point.



The mass of the metallic block is

- A. 3.83 kg.
  - B. 6.80 kg.
  - C. 37.5 kg.
  - D. 66.67 kg.
6. The total distance covered by a free falling object in 2 s will be (**Note:** The acceleration due to gravity 'g' is  $9.8 \text{ m/s}^2$ .)
- A. 4.9 m
  - B. 19.6 m
  - C. 29.4 m
  - D. 39.2 m
7. Two different metallic spheres **P** and **Q** are dropped at the same time from the same height as shown in the given diagram.



In the given situation, which of the following would be the CORRECT observation and its cause?

(Note: Air resistance is considered negligible.)

	Observation	Cause
A	Both spheres reach the floor at the same time.	Air resistance is negligible on both the spheres.
B	Sphere P reaches the floor first.	The lighter sphere will fall faster than the heavier one.
C	Sphere Q reaches the floor first.	Gravitational acceleration is greater on the heavier sphere.
D	Both spheres reach the floor at the same time.	Gravitational acceleration is the same on both the spheres.

8. A bob, made of ice, is attached to a simple pendulum. During oscillations, the ice bob is constantly melting.

The time taken by the 1<sup>st</sup> oscillation, as compared to the 50<sup>th</sup> oscillation will be

- A. less.
- B. more.
- C. same.
- D. unpredictable.

9. If the length of a simple pendulum becomes four times of its original length, then its time period will increase

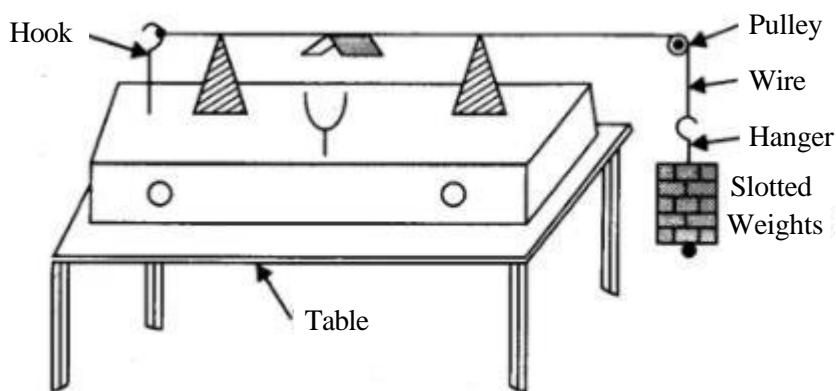
- A. two times.
- B. four times.
- C. six times.
- D. eight times.

10. If the frequency and velocity of a sound wave is 30 Hz and 330 m/sec respectively, then the wave length of the sound wave will be

- A. 11 m

- B. 300 m
- C. 360 m
- D. 9900 m

11. The given picture shows a lab setting of an electric sonometer at a school.



Which of the following factors will NOT cause an error during the experiment?

- A. Friction in the pulley
  - B. Acceleration of the slotted weights
  - C. Unstable frequency of tuning the fork
  - D. Uniform cross-sectional area of the wire
12. In the Melde's apparatus experiment, the frequency of the vibrating string depends on all of the following factors EXCEPT for the
- A. tension in the string.
  - B. length between the nodes.
  - C. mass placed in the scale pan.
  - D. cross-sectional area of the cotton thread.
13. The temperature of an iron ball is  $40^{\circ}\text{C}$ . It is dropped in a cylindrical calorimeter made of copper containing water. The temperature of the water is also  $40^{\circ}\text{C}$ .

After sometime, the temperature of the iron ball and the water will be

	Temperature of the Iron Ball	Temperature of the Water
A	$0^{\circ}\text{C}$	$80^{\circ}\text{C}$
B	$80^{\circ}\text{C}$	$0^{\circ}\text{C}$
C	$40^{\circ}\text{C}$	$40^{\circ}\text{C}$
D	$40^{\circ}\text{C}$	$80^{\circ}\text{C}$

14. Given is the formula to calculate a physical quantity.

$$\frac{J}{\text{m}} =$$

$$\frac{V}{I t m} \left( \frac{T_2}{T_1} \right)$$

Assuming that the magnitude of the denominator and 'J' is 36 and 20 respectively, then the magnitude of the numerator and the physical quantity represented by 'J' is

	Magnitude of the Numerator	Physical Quantity
A	720	Specific heat
B	1.8	Specific heat
C	720	Work done
D	1.8	Work done

15. If the mechanical equivalent of heat is determined as  $6x$  and its actual value is  $3x$ , then the percentage error will be
- A. 25%
  - B. 50%
  - C. 75%
  - D. 100%



Class: XI

Time: 2 hours 40 minutes

MODEL PAPER FOR EXAMINATION 2024

SUBJECT: PHYSICS (SECTION "B" AND SECTION "C")

SECTION "B" (SHORT ANSWER QUESTIONS)

Total Marks 68

36 Marks

Q.2. Attempt any **NINE** questions from this section.

- i) Define conservative field and prove that gravitational field is a conservative field.
- ii) A bullet having a mass of 0.005 kg is moving with a speed of 100 m/s. It penetrates into a bag of sand and is brought rest after moving 25cm into the bag. Find the decelerating force on the bullet. Also calculate the time in which it is brought to rest.
- iii) Two tugboats are towing a ship, each exerts a force of 6000N and the angle between the ropes is  $60^\circ$ . Calculate the resultant force on the ship?
- iv) Suppose a new planet „x“ is discovered which has a diameter 10 times bigger as compared to that of earth and a mass equal to 300 times that of earth. Compute the gravitational acceleration at the surface of the planet „x“.
- v) Define force with the help of Newton’s first law of motion prove that Force is the rate of change of momentum?
- vi) A sound wave of frequency 500Hz in air enters from a region of temperature  $25^\circ\text{C}$  to a region of temperature  $5^\circ\text{C}$ . Calculate the percent fractional change in wavelength.
- vii) State and prove law of conservation of angular momentum?
- viii) What is Interference of light? Give condition of interference
- ix) The magnifying power of a magnifying glass is 6. What is the power of the lens in dioptries? What is the best position of the object if a watch maker holds the same magnifying glass close to his eye to see the damaged spring of a watch?
- x) A projectile is fired with a horizontal velocity of 300m/s from the top of a cliff 100m high.
  - (i) How long will it take to reach the ground?
  - (ii) How far from the foot of the cliff will it strike the ground?
- xi) A standing wave is established in a 120 cm long string fixed at both ends. The string vibrates in four segments when driven at 120 Hz. Determine (i) the wavelength (ii) the fundamental frequency.

**SECTION "C" (DETAILED ANSWER QUESTIONS)**

**32 Marks**

**Note:** Attempt any **TWO** questions form this Sections.

- Q.3
  - (a) What is Diffraction of light? Define Diffraction grating and grating element. How can it be used to determine the wave length of monochromatic light? Derive the mathematical expression.
  - (b) What are the defects in lenses and how are they remove.
- Q.4
  - (a) Prove that motion of a simple pendulum is simple harmonic motion. When the angle of its swing is very small
  - (b) Define centripetal acceleration and derive its formula.
- Q.5
  - (a) Define scalar and vector product. Give example and property of each.
  - (b) State and explain Newton’s law of Gravitation?

**END OF PAPER**