GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION

ALTO BETIM, BARDEZ – GOA

Syllabus For the Academic Year 2025 - 2026

Subject : Physics Subject Code : 4702

Class : XII

Following table gives the section wise content which have been deleted for the Academic Year 2025 – 2026

Sections are as per the NCERT books, PHYSICS Part I and II Published by the Goa Board of Secondary and Higher Secondary Education, Print Edition – 2020 (Reprint -2024)

Chapter	Page No.	Remarks
Chapter 1: Electric Charges and Fields	**1 -7**	**1.2 Electric Charge (delete only activity with paper strips and making electroscope)**
		1.3 Conductors and Insulators (delete only concept of earthing)
		1.4 Charging by induction (delete)
	47 – 50	**Exercises 1.13, 1.25 – 1.34 (delete)**
Chapter 2: Electrostatic Potential and Capacitance	**55 – 58**	**2.4 Potential due to an Electric Dipole (delete only derivation)** **2.5 Potential due to a System of Charges (delete only derivation)**
	80	**2.15 Energy Stored in a Capacitor (delete only derivation)**
	87 - 92	**Exercises 2.12 – 2.36 (delete)**
Chapter 3: Current Electricity	**97 - 99**	**3.5 Drift of Electrons and the Origin of Resistivity (delete only derivation)**
	101 – 103	**3.7 Resistivity of various materials (delete Tables 3.1 and 3.2 and Carbon code for carbon resistor)**

	107 – 109	**3.10 Combinations of Resistors – Series and Parallel (delete only derivation)**
	120 – 123	**3.15 Meter Bridge (delete)** **3.16 Potentiometer (delete)**
	127 - 131	**Exercises 3.10, 3.12, 3.14 – 3.23 (delete)**
Chapter 4: **Moving Charges and Magnetism**	**135**	**Table 4.1(delete)**
	140 – 142	**4.4.1 Velocity Selector (delete)** **4.4.2 Cyclotron (delete)**
	152 - 153	**4.8.2 The Toroid (delete)**
	162 -163	**4.10.3 The magnetic Dipole Moment of a Revolving Electron (delete)**
	170 - 172	**Exercises 4.14 – 4.28 (delete)**
Chapter 5: **Magnetism and Matter**	**176 – 179**	**5.2.2 Bar magnet as an equivalent Solenoid (delete only derivation)** **5.2.3 Dipole in a Uniform Magnetic Field (delete only derivation)**
	180	**Example 5.4 (delete)**
	185 – 188	**5.4 Earth's Magnetism (delete)** **5.4.1 Magnetic Declination and Dip (delete)**
	189 – 190	**5.5 Magnetisation and Magnetic Intensity (delete only derivation)**
	191	**Table 5.2 (delete)**
	192 – 196	**5.6.2 Paramagnetism (delete only Curie's Law)** **5.6.3 Ferromagnetism (delete only Curie's temperature; and Hysterises)** **5.7 Permanent Magnets and Electromagnets (delete)**
	200 - 203	**Exercises 5.1, 5.2, 5.9 – 5.11, 5.13 – 5.25 (delete)**
Chapter 6: **Electromagnetic Induction**	**215 – 219**	**6.7 Energy Consideration : A Quantitative study (delete)** **6.8 Eddy Currents (delete)**

	220 - 224	**6.9.1 Mutual Inductance (delete only derivation)** **6.9.2 Self Inductance (delete only derivation)**
	230 - 232	**Exercises 6.6, 6.10 – 6.17 (delete)**
Chapter 7: **Alternating Current**	**240**	**Figure 7.7 Magnetisation and Demagnetisation of an inductor (delete)**
	243	**Figure 7.10 Charging and discharging of a capacitor(delete)**
	246 – 247	**7.6.2 Analytical Solution (delete)**
	248 – 251	**7.6.3 Resonance (delete only Sharpness of Resonance)**
	255 – 259	**7.8 LC Oscillations (delete)**
	266 - 268	**Exercises 7.6, 7.8, 7.10, 7.12 – 7.26 (delete)**
Chapter 8: **Electromagnetic Waves**	**270 -272**	**8.2 Displacement Current (delete only derivation)**
	273 – 274	**Example 8.1 (delete)**
	275 - 277	**8.3.2 Nature of Electromagnetic Waves (delete only about ether and page 277)**
	279 - 280	**Example 8.4 and 8.5 (delete)**
	287	**Exercises 8.11 – 8.15 (delete)**
Chapter 9: **Ray Optics and Optical Instruments**	**314**	**9.3 Refraction (delete only advanced sunrise and delayed sunset)**
	319 – 320	**9.4.1(i) Mirage (delete)** **9.4.2 (ii) Diamond (delete)**
	330 – 332	**9.7 Some Natural Phenomena due to Sunlight (delete)** **9.7.1 The Rainbow (delete)**
	333- 339	**9.7.2 Scattering of light (delete)** **9.8.1 The Microscope (delete only derivation)** **9.8.2 Telescope (delete only derivation)**
	344	**Exercise 9.18 (delete)**
Chapter 10: **Wave Optics**	**354 – 355**	**10.3.4 The Doppler Effect (delete)**
	355	**Example 10.1(delete)**

	358 – 362	**10.5 Interference of Light Waves and Young's Experiment (retain the final expression for dark and bright fringes but delete the derivation; delete expression for fringe width)**
	363 – 367	**10.6.1 The single Slit (delete the derivation)**
	368 – 371	**10.6.3 Resolving Power of Optical Instruments (delete)** **10.6.4 The Validity of ray Optics (delete)**
	375 – 377	**10.7.1 Polarisation by Scattering (delete)** **10.7.2 Polarisation by Reflection (delete)**
	379 - 381	**Exercises 10.7 – 10.21**
Chapter 11: **Dual Nature of Matter and Radiation**	**384**	**Table 11.1 (delete)**
	384 – 385	**11.3.1 Hertz's Observations (only qualitative treatment)** **11.3.2 Hallwachs' and Lenard's Observations (only qualitative treatment)**
	393	**Example 11.3 (delete)**
	394 – 400	**11.8 Wave Nature of Matter (delete only derivation for de Broglie wavelength of accelerated electrons; and Heisenberg's Uncertainty Principle)** **11.9 Davisson and Germer Experiment (delete)**
	403 – 407	**Exercises 11.5, 11.7, 11.12 – 11.14, 11.16, 11.17, 11.19 -11.37 (delete)**
	408 - 409	**Appendix 11.1 The History of Wave – Particle Flip – Flop (delete)**
Chapter 12: **Atoms**	**417 – 418**	**12.3.1 Spectral Series (delete)**
	418 – 422	**12.4 Bohr model of the Hydrogen Atom (retain only the expression for radius of n^{th} possible orbit but delete its derivation)**
	424 – 426	**12.5 The Line Spectra of the Hydrogen Atom (retain only qualitative treatment)**
	426	**Example 12.6 (delete)**
	432 - 433	**Exercises 12.3, 12.11 – 12.17 (delete)**

Chapter 13: **Nuclei**	**442 – 447** **448 – 451** **458 - 462**	**13.6.1 Law of Radioactive Decay (delete)** **13.6.2 Alpha Decay (delete)** **13.6.3 Beta Decay (delete)** **13.6.4 Gamma Decay (delete)** **13.7.2 Nuclear Reactor (delete)** **Exercises 13.1, 13.2, 13.6 – 13.10, 13.12 – 13.14, 13.18, 13.22 – 13.31 (delete)**
Chapter 14: **Semiconductor Electronics :** **Materials, Devices and simple circuits**	**481 - 486** **493 - 494**	**14.8 Special Purpose p-n Junction Diodes (delete)** **Exercises 14.7 – 14.10 (delete)**

Topic – Wise Weightage

Sr. No.	Chapter	Marks Allotted for		
		Mid - Term	First Term	Final Board Examination
1	Electric Charges and Fields	04	06	06
2	Electrostatic Potential and Capacitance	04	05	06
3	Current Electricity	06	06	07
4	Moving Charges and Magnetism	----	08	06
5	Magnetism and Matter	----	05	03
6	Electromagnetic Induction	----	06	04
7	Alternating Current	----	08	05
8	Electromagnetic Waves	----	03	03
9	Ray Optics and Optical Instruments	06	05	08
10	Wave Optics	----	---	05
11	Dual Nature of Matter and Radiation	----	---	04
12	Atoms	----	----	03
13	Nuclei	----	----	03
14	Semiconductor Electronics : Materials, Devices and simple circuits	----	08	07
	Total	20	60	70

Pattern and Design of Theory Question Paper

for the Academic Year 2025 - 2026

Sr.No.		
1	Time Duration	180 Minutes
2	Maximum Marks	70
3	Weightage to Objective	Knowledge : 30 % Understanding : 50 % Application : 20 %
4	Weightage to the type of Questions	LA (4 marks) X 3 = 12 SAII (3 marks) X 8 = 24 SAI (2 marks) X 10 = 20 VSA (1 marks) X 14 = 14 (7 MCQ) Total 35 questions = 70
5	Scheme of options	Options in 3 LA Type + 1 SAII Type = 21%
6	Difficulty Level	Easy = 20% Average = 60% Difficult = 20 %
Additional Guidelines for paper setting		
7	Numericals	20% - 23% (14 – 16 Marks) (As far as possible avoid/ minimize the use of Logarithmic tables)
8	Derivations	20% - 23% (14 – 16 Marks) 2 qns from LA Type + 2 qns from SAII Type (= 20%) + 1 qn from SAI (total 23%)

Pattern and Design of Mid - Term Examinations 2025 - 2026

1	Time Duration	60 Minutes
2	Maximum Marks	20
3	Weightage to Objective	Knowledge : 30 % Understanding : 50 % Application : 20 %
4	Difficulty Level	Easy = 20% Average = 60% Difficult = 20 %
5	Weightage to the type of Questions	SA-II (3 marks) X 02 = 06 SA-I (2 marks) X 05 = 10 VSA (1 marks) X 04 = 04 (2 MCQs)
6	Scheme of options	Option in 1 SA- II Type question
7	Numericals	20% - 25% (04 – 05 Marks) (As far as possible avoid/ minimize the use of Logarithmic tables)

Pattern and Design of First - Term Examinations 2025 - 2026

1	Time Duration	150 Minutes
2	Maximum Marks	60
3	Weightage to Objective	Knowledge : 30 % Understanding : 50 % Application : 20 %
4	Difficulty Level	Easy = 20% Average = 60% Difficult = 20 %
5	Weightage to the type of Questions	LA (4 marks) X 2 qns = 08 SAII (3 marks) X 6 qns = 18 SAI (2 marks) X 10 qns = 20 VSA (1 marks) X 14 qns = 14 (7 MCQ) Total 32 questions
6	Scheme of options	Options in 2 LA Type + 1 SAII Type
7	Numericals	20% - 23% (12 – 14 Marks) (As far as possible avoid/ minimize the use of Logarithmic tables)

Evaluation Scheme for Board Practical Examination

for the Academic Year 2025 – 2026

1. Time duration : 180 minutes
2. Maximum Marks 20
3. Students would be required to perform two experiments,
   one from each section A and B 08 + 08 = 16

   Practical Record (Journal) = 02

   Viva – Voce on Experiments = 02

   Total = 20
4. External Examiner : One experiment (08) + Viva - Voce (02) = 10
5. Internal Examiner : One experiment (08) + Journal (02) = 10

PRACTICAL PORTION :

At least 12 Experiments [minimum 6 from each section] to be performed by the students during the academic year 2025 -2026].

List of Experiments

SECTION–A

1. To determine resistance per cm of a wire by plotting a graph for potential difference versus current.
2. To find resistance of a given wire using metre bridge and hence to determine the specific resistance of its material.
3. To verify the laws of combination (series) of resistances using a metre bridge.

   /OR/

   To verify the laws of combination (parallel) of resistances using a metre bridge.
4. To determine resistance of a galvanometer by half-deflection method and to find its figure of merit.

5. To convert the given galvanometer (of known resistance and figure of merit) into a voltmeter of desired range and to verify the same.

/OR/

To convert the given galvanometer (of known resistance and figure of merit) into an ammeter of desired range and to verify the same.

6. To find the frequency of AC mains with a sonometer.
7. To draw the I-V characteristic curve for a p-n junction diode in forward bias.

SECTION-B

1. To find the value of v for different values of u in case of a concave mirror and to find the focal length.
2. To find the focal length of a convex mirror, using a convex lens.
3. To find the focal length of a convex lens by plotting graph between v and u.

/OR/

4. To find the focal length of a convex lens by plotting a graph between 1/v and 1/u.
5. To determine angle of minimum deviation for a given prism by plotting a graph between angle of deviation and angle of incidence.
6. To determine refractive index of a glass slab using a travelling microscope.
7. To find the refractive index of a liquid using convex lens and plane mirror.
8. To find the refractive index of a liquid using a concave mirror.

Internal Assessment Scheme 2025 – 2026

Areas for the internal assessment for XII standard students in the subject Physics, for the academic year 2025-26.

Students shall be assessed for 20 marks based on the two areas (10 marks each) during the academic year 2025 – 26.

1) Area 1

Students to perform any 5 activities from the listed 13 activities and to maintain the record in the Physics Journal.

Total marks : 10 (5 activities X 2 marks)

List of Activities:

1. To measure the resistance and impedance of an inductor with or without iron core.
2. To measure resistance, voltage (AC/DC), current (AC) and check continuity of a given circuit using multimeter.
3. To assemble a household circuit comprising three bulbs, three (on/off) switches, a fuse and a power source.
4. To assemble the components of a given electrical circuit.
5. To study the variation in potential drop with length of a wire for a steady current.
6. To draw the diagram of a given open circuit comprising at least a battery, resistor / rheostat, key, ammeter and voltmeter. Mark the components that are

not connected in proper order and correct the circuit and also the circuit diagram.

7. To identify a diode, an LED, a resistor and a capacitor from a mixed collection of such items.
8. Use of multimeter to see the unidirectional flow of current in case of a diode and an LED and check whether a given electronic component (e.g., diode) is in working order.
9. To study effect of intensity of light (by varying distance of the source) on an LDR.
10. To observe refraction and lateral deviation of a beam of light incident obliquely on a glass slab.
11. To observe diffraction of light due to a thin slit.
12. To study the nature and size of the image formed by a (i) convex lens, or (ii) concave

mirror, on a screen by using a candle and a screen (for different distances of the candle from the lens/mirror).

13. To obtain a lens combination with the specified focal length by using two lenses from the given set of lenses.

2) <u>Area 2</u>

For remaining 10 marks, students can select any one topic from the list provided. After completion of the selected area students are supposed to submit the report (individually) as per the guidelines given. Students can work as a group or can complete the task individually.

Distribution of 10 marks:

i) Report : 05 marks

ii) Presentation : Viva – voce : 03 marks

iii) Objective achieved from the selected topic of study : 02 marks

<u>Guidelines for report submission</u>

1. Title
2. Abstract
3. Table of content
4. Hypothesis / Objective
5. Background research / Theory
6. Material List
7. Experimental procedure
8. Data analysis
9. Conclusion
10. Ideas for future research
11. Acknowledgment
12. Bibliography

Suggested Topics for Area 2

1. Innovative Project
2. Physics in Sports

   Explaining the Physics principles involved in any two sports.
3. Conducting Science quiz (with demonstrations) for lower classes (XI or IX and X)
4. Field trip at any of the higher education institutes like, IIT (Goa), NIT (Goa), NIO, Goa university etc and to find out about the research work going on at the institute.
5. Physics in Kitchen

   To study 3-5 physics principle applied in the kitchen
6. Visit to Power (Electricity) Department and getting first hand information on the functioning of different departments. Interacting with the Engineers and lines man.
7. Visit to I.T.I. / Repair – Technician

   To learn the Physics involved in the functioning of different equipment/ machines , like Mixer – Grinder, Refrigerator, Electric Fan, Two – Wheeler etc.
8. Physics in Musical instruments

   Explaining the Physics principles involved in any two musical instruments (wind instruments/ string instruments/ percussion instruments…etc).
9. Physics principles in structural designs

   To study the application of Physics principles in structural design and construction of building and bridges by visiting a construction site with prior permission from the builder/ contractor/supervisor. Interacting with civil engineer and architect.
10. Physics principles in Ship building

    To study the application of Physics principles in designing, building and fabrication of boats, barges and ships by visiting a dockyard/ Goa Shipyard/ Ship building institute with prior permission from the authorities.