



**GOA BOARD OF SECONDARY AND HIGHER SECONDARY EDUCATION**  
(A Corporate Statutory Body Constituted by an Act of the State Legislature)  
**ALTO BETIM – GOA 403 521**

Website: www.gbshse.gov.in email: goaboard@dataone.in  
Phone (0832) 2417593

=====

**GBSHSE/ACAD/BOS-POL.SCI-SOC/**

**27/07/2009.**

**Circular No. 36**

To,  
The Heads of all  
Recognized Higher Secondary Schools  
within the jurisdiction of this Board.

- Sub: (1) Design of the Question Paper/Model Question Paper  
for Std. XII in Political Science & Sociology  
(2) Practical portion in respect of Std. XII Geography  
(3) Revised syllabus in Physics for Std. XI.

Sir/Madam,

Please find enclosed herewith the following:

1. Model Question Paper and Design of the Question Paper for Std. XII in Political Science & Sociology.
2. A copy of chapter-wise distribution of marks and periods, practical syllabus, model question paper and marking scheme in respect of Std. XII Geography subject.
3. The revised syllabus in Physics for Std. XI.

It may be further noted that the students of Std. XIth (Science Stream) are required to compulsorily undertake an investigatory project in Physics during the year and the final evaluation of practical work in the subject will necessarily include the evaluation of this investigatory project.

The above is for implementation w.e.f. academic year 2009 – 2010.

Kindly acknowledge the receipt of the circular and the same is to be brought to the notice of all concerned.

( D.R. Bhagat )  
Secretary

Copy for information to:

1. The Chairman
2. All Heads of the Sections.

## DESIGN OF THE QUESTION PAPER

**Class: XII**

**Subject: POLITICAL SCIENCE**

Time: 03 Hrs

Max. Marks: 100

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows:

### 1. Weightage to Learning Outcomes

Sr.No	Learning Outcomes	Percentage / Marks
1	Knowledge	30% to 35%
2	Understanding	40% to 45%
3	Application	20% to 30%
4	Skill	-

### 2. Weightage to Content / Subject Units

Sr.No	Units	Marks
Book-I 1	The Cold War Era	10
	2	
3	US Hegemony in World Politics	10
4	Alternative Centres of Power	
5	Contemporary South Asia	10
6	International Organisations	10
7	Security in the Contemporary World	
8	Environment And Natural Resources	10
9	Globalisation	
Book-II 1	Challenges of Nation Building	10
	2	
3	Politics of Planned Development	10
4	India's External Relations	10
5	Challenges to and Restorations of the Congress System	10
6	The Crisis of Democratic Order	
7	Rise of Popular Movements	10
8	Regional Aspirations	
9	Recent Developments in Indian Politics	
	Total	100

P.T.O

### 3. Weightage to Forms of Questions

Sr.No	Form of Questions	Marks for each question	Number of questions	Total Marks
1	Long Answer Type (LA)	4	10	40
2	Short Answer Type (SA-I)	2	10	20
3	Short Answer Type (SA-II)	3	10	30
4	Very Short Answer Type (VSA)	1	10	10
	Total	10	40	100

The expected time for different types of questions would be as follows:

Sr.No	Form of Question	Approx. time for each Question (minutes)
1	Long Answer Type (LA)	8 min x 10 = 80 min
2	Short Answer Type (SA-I)	3 min x 10 = 30 min
3	Short Answer Type (SA-II)	5 min x 10 = 50 min
4	Very Short Answer Type (VSA)	2 min x 10 = 20 min

As the total time is calculated on the basis of the number of questions required to be answered and the length of their anticipated answers, it would, therefore, be advisable for the candidates to budget their time properly by cutting out the superfluous words and be within the expected time limits.

### 4. Scheme of Option

There will be no overall choice. However, there is an internal choice in 01 out of 10 SA-II question of 03 marks category and in 03 out of 10 LA questions of 04 marks category.

### 5. Weightage to Difficulty level of questions:

Sr.No	Estimated difficulty level of questions	Percentage
1	Easy	20%
2	Average	40%
3	Difficult	20%

A question may vary in difficulty level from individual to individual. As such, the assessment in respect of each question will be made by the paper setter on the basis of general anticipation from the group as a whole taking the examination. This provision is only to make the paper balanced in its weightage, rather than to determine the pattern of marking at any stage.

MODEL QUESTION PAPER  
(New Pattern from June, 2009)

**Instructions:**

- (i) All questions are compulsory.
- (ii) Answer each question on a fresh page.
- (iii) Write the number of each question and sub-question clearly.
- (iv) Figures to the right indicate marks allotted to each question.
- (v) There is no overall choice. However internal choice is provided in question No. 1(D), Q 2(D), Q 7(C) and Q10(D).
- (vi) 'A' part of every question is a Multiple Choice Question. 'B' part of every question should be answered in about 30 words. 'C' part in about 60 words and 'D' part in about 100 words.

1. (A) The eastern alliance led by the Soviet Union was known as 1
- a) N.A.T.O.
  - b) WARSAW PACT
  - c) C.E.N.T.O
  - d) C.I.S.
- (B) Explain the significance of the cold war. 2
- (C) Describe the features of shock therapy. 3
- (D) Illustrate the role of India in the Non-aligned movement. 4

OR

Illustrate the main consequences of the disintegration of the Soviet Union.

2. (A) Hard power hegemony relates to the 1
- a) supremacy of Political Power
  - b) distinct culture
  - c) supremacy of military
  - d) world economy
- (B) Explain the relationship between India and U.S.A. 2
- (C) Describe the features of the New World order. 3
- (D) Analyse the rise of China as an economic power. 4

OR

Analyse the functions of ASEAN Economic Community.

Contd...

3. (A) The head quarters of SAARC are located in 1  
 a) Dhaka  
 b) Katmandu  
 c) Colombo  
 d) Islamabad
- (B) Mention any two main principles of the United Nations. 2  
 (C) List the reasons for the need of International Organisations. 3  
 (D) Describe the relations between India and Bangladesh. 4
4. (A) In the traditional conception of security the greatest danger to a country is from 1  
 a) Human rights violation  
 b) Terrorism  
 c) Global poverty  
 d) Military threat
- (B) Analyse India's claim over permanent membership of the U.N. 2  
 (C) Explain why UN is unable to serve as a balance against the U.S.dominance. 3  
 (D) Discuss Terrorism and Global Poverty as the new sources of threats. 4
5. (A) Cultural homogenization means 1  
 a) imposition of western culture.  
 b) rise of an uniform culture.  
 c) making our culture different and distinct.  
 d) protecting our culture.
- (B) What is the most significant features of '1997 Kyoto protocol' signed by India? 2  
 (C) Explain the Political Consequences of contemporary processes of globalization. 3  
 (D) Discuss any four environmental concerns in global politics. 4
6. (A) The Home Minister of the Indian Union instrumental in the merger of the princely states in the Indian Union was. 1  
 a) Pt. Jawaharlal Nehru.  
 b) Sardar Vallabhbhai Patel.  
 c) Dadabhai Navroji  
 d) Mahatma Gandhi.

Contd..

- (B) What made India's election of 1952 a landmark in the history of democracy? 2
- (C) Explain how effective were the opposition parties in India after the first general election? 3
- (D) Explain any four consequences of the partition of India and Pakistan. 4
7. (A) The 'Bombay Plan' wanted 1
- a) freedom from state control in the flow of capital.
- b) the state to take major initiatives in industrial and economic investments.
- c) to take over planned development of Bombay.
- d) to make Bombay the financial capital of India.
- (B) What were the criticisms leveled against the mixed economy model? 2
- (C) State the features of the first five year plan. 3
- OR
- State the features of the second five year plan.
- (D) Explain the consequences of Green Revolution. 4
8. (A) The Afro-Asian conference was held in the city of 1
- a) Belgrade
- b) New Delhi
- c) Bandung
- d) Shimla
- (B) What was Pandit Nehru's role in India's foreign policy. 2
- (C) Explain the impact of China's attack on India? 3
- (D) Explain the factors responsible for the Bangladesh war of 1971. 4
9. (A) Who among the following former Prime Ministers of India is credited with the slogan 'garibi hatao' 1
- a) Jawaharlal Nehru
- b) Indira Gandhi
- c) Moraji Dessai
- d) Atal Behari Vajpayee
- (B) Explain the special powers provided by the constitution of India to the government once an emergency is declared. 2
- (C) Examine the negative effects pointed out by the critics of Emergency. 3
- (D) Explain the role of the syndicate which led to the split in Congress. 4

Contd....

10. (A) Name the movement which began in Uttarakhand when the forest department refused permission to the villagers to fell ash trees to make agricultural tools. 1
- a) Naxalite Movement
  - b) Uttarakhand Bachao Aandolan
  - c) Chipko Movement
  - d) Narmada Bachao Aandolan
- (B) State any two reasons for the movement against outsiders in Assam. 2
- (C) Explain why anti-arrack movement is considered as a women's movement. 3
- (D) Analyse the recent developments witnessed in our country which made a long-lasting impact on our politics. 4
- OR
- Analyse the development of an era of coalition governments at the centre.

## DESIGN OF THE QUESTION PAPER

**Class: XII**

Time: 03 Hrs

Subject: SOCIOLOGY

Max. Marks: 100

The weightage or the distribution of marks over different dimensions of the question paper shall be as follows:

### 1. Weightage to Learning Outcomes

Sr.No	Learning Outcomes	Percentage / Marks
1	Knowledge	30% to 35%
2	Understanding	40% to 45%
3	Application	20% to 30%
4	Skill	---

### 2. Weightage to Content / Subject Units

Sr.No	Units	Marks
<b>Book I</b>		
1	Introducing Indian Society	10
2	Demographic Structure of the Indian Society	
3	Social Institutions: Continuity and Change	10
4	The Market as a Social Institution	
5	Patterns of Social Inequality and Exclusion	10
6	The Challenges of Cultural Diversity	10
7	Suggestions for Project Work	
<b>Book II</b>		
1	Structural Change	10
2	Cultural Change	
3	The Story of Indian Democracy	10
4	Change and Development in Rural Society	10
5	Change and Development in Industrial Society	10
6	Globalisation and Social change	10
7	Mass Media and Communications	
8	Social Movements	10
	<b>Total Marks</b>	<b>100</b>

P.T.O



### 3. Weightage to Forms of Questions

Sr.No	Form of Questions	Marks for each question	Number of questions	Total Marks
1	Long Answer Type (LA)	4	10	40
2	Short Answer Type (SA-I)	2	10	20
3	Short Answer Type (SA-II)	3	10	30
4	Very Short Answer Type (VSA)	1	10	10
	Total	10	40	100

The expected time for different types of questions would be as follows:

Sr.No	Form of Question	Approx. time for each Question (minutes)
1	Long Answer Type (LA)	8 min x 10 = 80 min
2	Short Answer Type (SA-I)	3 min x 10 = 30 min
3	Short Answer Type (SA-II)	5 min x 10 = 50 min
4	Very Short Answer Type (VSA)	2 min x 10 = 20 min

As the total time is calculated on the basis of the number of questions required to be answered and the length of their anticipated answers, it would, therefore, be advisable for the candidates to budget their time properly by cutting out the superfluous words and be within the expected time limits.

### 4. Scheme of Option

There will be no overall choice. However, there is an internal choice in 01 out of 10 SA-II questions of 03 marks category and in 03 out of 10 LA questions of 04 marks category.

### 5. Weightage to Difficulty level of questions:

Sr.No	Estimated difficulty level of questions	Percentage
1	Easy	20%
2	Average	40%
3	Difficult	20%

A question may vary in difficulty level from individual to individual. As such, the assessment in respect of each question will be made by the paper setter on the basis of general anticipation from the group as a whole taking the examination. This provision is only to make the paper balanced in its weightage, rather than to determine the pattern of marking at any stage.

**MODEL QUESTION PAPER**  
( New Pattern from June, 2009)

Std: XII

Marks : 100

- Instructions:** (1) Answer each question on a fresh page.  
 (2) Write the number of each question and sub-question clearly.  
 (3) All questions are compulsory.  
 (4) Figures to the right indicate marks allotted to each question.  
 (5) There is no overall choice. However internal choice is provided in question No.1 (D) , Q.2 (D), Q. 7 ( C),and Q.10 (D)  
 (6) 'A' part of every question is a Multiple Choice Question.  
 'B' part of every question should be answered in about 30 words,  
 'C' part in about 60 words and 'D' part in about 100 words.

- Q. 1 (A) Indian nationalism took shape under British colonialism mainly because 1
- (a) the western educated middle class challenged the British.  
 (b) the British directly inspired the Indians.  
 (c) there is animosity of one religious community towards another.  
 (d) The British exploitation and domination scarred Indian Society.
- (B) State two reasons why the sex ratio is in favour of females . 2
- ( C) Explain the theory of demographic transition. 3
- (D) Explain the reasons responsible for declining sex ratio in India. 4

**OR**

Explain the national population policy of India.

- Q. 2 (A) When the newly married couple stays with women's parents, it is called 1
- (a) matrilocal family  
 (b) nuclear family  
 (c) patrilocal family  
 (d) neolocal family

- (B) Explain the trading network which existed in precolonial India. 2
- (C) In what ways is a weekly village market a social institution? 3
- (D) Describe the features of 'Dominant Caste'. 4
- OR**
- Describe the features of 'Sanskritisation'.
- Q. 3** (A) A pre-conceived opinion or attitude held by members of one group towards another is 1
- (a) social exclusion.
- (b) discrimination.
- (c) prejudice.
- (d) stereotype.
- (B) Explain the social dimensions of disability. 2
- (C) Explain the key principles of social stratification. 3
- (D) Analyse the laws enacted by the government for the enhancement of Scheduled Castes and Scheduled Tribes. 4
- Q. 4** (A) Which of the following words refer to aggressive chauvinism based on religious identity? 1
- (a) communalism
- (b) secularism
- (c) nationalism
- (d) hinduism
- (B) Explain the survey method used in sociological studies. 2
- (C) State the different senses in which 'secularism' has been understood in India. 3
- (D) Explain the cultural diversity of the Indian nation - state. 4
- Q. 5** (A) Who coined the term sanskritisation for the process of imitaion of lifestyle of the upper castes by the lower castes? 1
- (a) K. Gandhi.
- (b) B. G. Tilak.
- (c) M. N. Srinivas.
- (d) G. S. Ghurye.

- (B) Mention two sectors in which deindustrialisation occurred due to the impact of British industrialisation in India. 2
- (C) Examine the three different situations of urban impact after independence according to sociologist M.S.A Rao. 3
- (D) Explain the changes brought about in the Indian society due to Westernisation. 4
- Q. 6 (A) The British introduced western education to create a western educated Indian middle class that would 1
- (a) help the colonial rulers to continue their rule.
- (b) increase the literacy level in the society.
- (c) prepare the students for higher studies.
- (d) facilitate various stages of social development.
- (B) State any two basic objectives laid down in the Indian Constitution. 2
- (C) Explain the powers and responsibilities of Panchayats. 3
- (D) Examine the role of political parties and pressure groups in democratic politics. 4
- Q. 7 (A) A system of tax collection in colonial India in which the government settled the revenue directly with cultivators is called 1
- (a) zamindari system.
- (b) raiyotwari system.
- (c) panchayati system.
- (d) farming system.
- (B) Mention the major land reform laws introduced after independence. 2
- (C) Explain the negative social effects of the Green Revolution in India. 3
- OR*
- Explain the negative effects of the 'Contract Farming System'.
- (D) Explain the transformation in the rural society after Independence. 4
- Q. 8 (A) A trade union leader, who led the famous Bombay strike of 1982, that affected thousands of workers and families is 1
- (a) Jayprakash Bhilare.
- (b) Dr. Datta Samant.
- (c) Kisan Salunke.
- (d) Datta Iswalkar.

- (B) Show how industrialisation in India is different from other countries. 2
- (C) Explain the dangerous working conditions of underground mines. 3
- (D) Discuss the liberalisation and change in Indian industry. 4
- Q. 9 (A) An economy in which much of the work force is involved in the design, development, technology, marketing, sale and servicing, also known as weightless economy is 1
- (a) electronic economy.
- (b) knowledge economy.
- (c) agro-economy.
- (d) globalised economy.
- (B) Globalisation has brought about political change. Explain 2
- (C) Analyse the growth of mass-media in India during the British Raj. 3
- (D) Globalisation has brought about changes on the print media. Explain 4
- Q. 10 (A) A social worker and member of the 'Theosophical Society' who established the first trade union in Madras is 1
- (a) S. A. Dange.
- (b) M. N. Roy.
- (c) M. Goshi.
- (d) B. P. Wadia.
- (B) Distinguish between the New Social Movement and the Old Social Movements. 2
- (C) Analyse the theories of Social Movements. 3
- (D) Social Movements have distinct features. Explain 4

**OR**

Social Movements of Dalits show a particular character. Explain

**Std XII Arts, Com & Science**  
**Geography Practical Syllabus 2009**  
**Chapter wise distribution of marks and periods**

UNIT	CHAPTER	TOPICS	PERIODS	MARKS
I	1	i)Source of data	3	1
		ii)Tabulation of data	3	1
	2	i)Mean	3	5
		ii)Medium	3	
		iii)Mode	3	
		iv)Standard Deviation	3	
		v)Rank Correlation(graphical)	3	
		vi)Spearmam's Rank correlation	3	
	3	i)Bar Graph - Simple	3	6
		ii)Bar Graph - Muliple	3	
		iii)Bar Graph - Compound	3	
		iv)Circulae Diagram(pie)	3	
		v)Flow Chart	3	
		vi)Dot Map	3	
vii)Choropleth Map		3		
viii)Isopleth Map		3		
4	i)Hardware Configuration and Software Requirement	3	1	
	ii)Computer Assisted Mapping	3		1
II	5	Field Surveys*	17	
		a)Need of Field Survey and field Survey Procedure		
		b)Topics for Field Survey		
		i)Ground Water Change		
		ii)Environmental Pollution		
		iii)Soil Degradition		
		iv)Poverty		
		v)Droughts and Floods		
		vi)Energy Issue		
		vii)Land use Surrey and change detection		
III		i)Journal Work(3+2 for Viva)		5
		ii)Projoect report(4+2 for Viva)		10
		TOTAL	65	30

- Note:

1) Any one topic of the local concern shall be selected by each student for field survey study. The observation of study area, Questionnaire survey method shall be adopted for data collection. The collected data shall be tabulated and quantified with quantitative methods and the result may be analyzed with diagrams, graphs, and maps. Further, a field report shall be prepared using all the above mentioned materials.

The field report should be strictly prepared by students only. The writing work, graphs, maps and diagrams should be written and prepared by students with their hand only. Any kind of computer works and Xeroxed materials are not allowed in the field report.

2) i) Practical Examination in Geography is of 3 hours duration and each batch of Geography practical Examination should have only 16 students.

ii) There should be only 20 students in a batch of practical class.

iii) The duration of regular practical will be equivalent to three theory periods or two hours of duration.

iv) A tutorial period can be added to the practicals.

STD.XII GEOGRAPHY PRACTICAL SYLLABUS

QUANTITATIVE METHODS  
Measures Of Dispersion And Concentration

i.e. STANDARD DEVIATION

It is a method of measuring dispersion which is based on all the values in a distribution. Here, we first find out the sum of the squares of the deviations from the mean and then divide it by the number of observations. The resultant is called the variance and its positive square root is defined as the STANDARD DEVIATION.

The formula to calculate the standard deviation for ungrouped data.(found in the old NCERT practical book for std. xii ).

$$S D = \sqrt{\frac{\sum (x - \bar{x})^2}{N}}$$

Short cut method to calculate standard deviation,

$$S D = \sqrt{\frac{\sum X^2}{N} - \left(\frac{\sum X}{N}\right)^2}$$

Example : Calculate mean and standard deviation for the given data.

Year	Rain fall	X-X̄	(X-X̄) <sup>2</sup>
1.	6.4	-6.62	43.82
2.	27.4	14.38	206.78
3.	8.1	-4.92	24.21
4.	16.1	3.08	9.48
5.	19.0	5.98	35.76
6.	7.2	-5.82	33.87
7.	10.0	-3.02	9.12
8.	4.7	-8.32	69.22
9.	12.4	-0.62	0.38
10.	18.9	-5.88	34.57
	-----		-----
	130.20		E = 467.22

$$\text{Mean } \bar{X} = \frac{\sum X}{N} = \frac{130.2}{10} = 13.02$$

$$S D = \sqrt{\frac{\sum (X - \bar{X})^2}{N}} = \sqrt{\frac{467.22}{10}} = \sqrt{46.722} = 6.83.$$



Formula for calculating the standard deviation for the given grouped data.  
 ( This formula is collected from Prof. Aanand Masur, Department of Maths,  
 Smt. Parwatibai Chowgule college of Arts & Science – Margoa , Goa.)

Class	Fi(frequency)	Xi(mid value)	Yi = $\frac{Xi - 35}{10}$	Fi Yi	Fi Yi <sup>2</sup>
10-20	3	15	-2	-6	12
20-30	2	25	-1	-2	2
30-40	1	35	0	0	0
40-50	0	45	1	0	0
50-60	1	55	2	2	4
				- 6	18

a = 35 (assumed mean)  
 n = total of frequency.  
 c.i = class interval.

$$\text{Therefore; } SD_y = \frac{\sqrt{\frac{\sum f_i y_i^2 - (\sum f_i y_i)^2}{n = \sum f_i}}}{7} = \frac{\sqrt{\frac{18 - (-6)^2}{7}}}{7} = \frac{\sqrt{\frac{18 + 36}{7}}}{7}$$

$$= \frac{\sqrt{54}}{7} = 7.43$$

$$\text{Therefore; } SD_x = (c.i) \sqrt{(SD_y)^2} = (10) \sqrt{(7.43)^2} = 743$$

Therefore; SD =  $\sqrt{743} = 27.317$ .

NOTE: E – in the formula stands for summation sign. & V – stand for square root sign.

\*\*\*\*\*

# Geography practical model Question paper

Date:

marks:

Time:

Duration:

INSTRUCTION: 1: Attempt both section on fresh paper.  
2: Calculator is not allowed.

## SECTION-I

Q.I.A. Answer the following in 10 words each: 2

- Define the field survey.
- Name any two field survey procedure.

B. Answer the following in 40-50 words: 2

- Mention any four objectives of your project report.

Q.II.a) Calculate mean with indirect method using the given data. 2.5

CLASS	FREQUENCY
0-10	2
10-20	3
20-30	4
30-40	6
40-50	7
50-60	3
60-70	5

b) Calculate standard deviation for the given data. 2.5

CLASS	FREQUENCY
10-20	3
20-30	2
30-40	1
40-50	0
50-60	1
60-70	2

Q.III. Examination of field report. 8

## SECTION-II

Q.IV.A. Answer the following in 10 words : 1

- What is meant by primary data?
- Name any two sources of published data.

B. Answer the following in 30-40 words : 1

- Explain the advantages of computer.

Q.V.A. Draw bar graph for the given data: 3

YEARS	FISH CATCH IN TONNE
2000	68133
2001	73135
2002	71247
2003	88039
2004	94328
2005	107287
2006	102546

B. Draw choropleth map for the given data:

3

TALUKAS	AREA UNDER FOREST IN GOA(SQ KM)
Tiswadi	1.71
Bardaz	--
Pernem	13.43
Bicholim	8.08
Satari	280.99
Ponda	50.12
Sanguem	569.25
Quepem	114.91
Canacona	185.82
Maromagao	--
salcete	--

Q.VI. Examination of journal.

5

\*\*\*\*\*

XII GEOGRAPHY PRACTICAL QUESTION PAPER

MARKING SCHEME FOR THE MODEL ANSWER PAPER

Q. NO.	Expected out line of the answer.	Marking scheme.	Marks.
Q. I. A.	i. correct word / phrase / sentence.	1	2
	ii. correct word / phrase / sentence.	1	
	B. i. Answer shall be of 4-5 points / sentence.	0.5	2
Q. II. A.	for mean, median and mode.		
	i. preparation of frequency distribution column.	0.5	
	ii. formula.	0.5	
	iii. replacement of values in the formulas.	0.5	2.5
	iv. calculation.	0.5	
	v. correct answer.	0.5	
	B. for calculation of standard deviation.		
	i. required column.	0.5	
	ii. formula for standard deviation.	0.5	
	iii. replacement of values.	0.5	2.5
	iv. calculation.	0.5	
	v. correct answer.	0.5	
Q. III. i.	viva on field report.	2	6
	ii. examination of field report.	4	
Q. IV. A.	correct word / phrase / statement.		2
	i. ,, ,, ,, ,,	1	
	ii. ,, ,, ,, ,,	1	
	B. Answer shall be in 4 points / sentence.	0.5	2
	i. ,, ,, ,, ,,		
Q. V. A.	Drawing of graph.		3
	i. writing correct title on the graphs / diagram.	0.5	
	ii. mentioning of the scale properly.	0.5	
	iii. for accuracy of diagram / graphs.	0.5	
	iv. stating the aspect selected on the axis / bars.	0.5	
	v. complet and correct graph / diagram.	1.0	
	B. Drawing of map / chart.		3
	i. for title on the map /chart.	0.5	
	ii. for mentioning of the scale properly.	0.5	
	iii. for preparing index.	0.5	
	iv. for accuracy.	0.5	
	v. for drawing correct map / chart.	1.0	
Q. VI.	Examination of journal and viva on journal.	3 & 2	5

\*\*\*\*\*

# PHYSICS

The Physics curriculum at the higher secondary stage attempts to:

- Strengthen the concepts developed at the secondary stage to provide firm ground work and foundation for further learning Physics at the tertiary level more effectively and learning the relationship with daily-life situations;
- Develop conceptual competence in the learners and make them realize and appreciate the interface of Physics with other disciplines;
- Expose the learners to different processes used in Physics-related industrial and technological applications;
- Develop process-skills and experimental, observational, manipulative, decision-making and investigatory skills in the learners;
- Promote problem-solving abilities and creative thinking to develop interest in the learners in the study of Physics as a discipline;
- Understand the relationship between nature and matter on scientific basis, develop positive scientific attitude, and appreciate the contribution of Physics towards the improvement of quality of life and human welfare;
- Physics teaching-learning at the higher secondary stage enables the learners to comprehend the contemporary knowledge and develop aesthetic sensibilities and process skills. The experimental skills and process-skills developed together with conceptual Physics knowledge prepare the learners for more meaningful learning experiences and contribute to the significant improvement of quality of life. The learners would also appreciate the role and impact of Physics and technology, and their linkages with overall national development.

## PHYSICS CLASS XI

### **Theory**

#### **Chapter 1: Physical World (Periods 2, Mks – Nil)**

*Physics:* Scope and excitement; nature of physical laws; Physics, technology and society.

#### **Chapter 2: Units and Measurements (Periods 6, Mks – 5)**

*Need for measurement:* Units of measurement; systems of units; SI units, fundamental and derived units. Length, mass and time measurements; accuracy and precision of measuring instruments; errors in measurement; significant figures.

Dimensions of physical quantities, dimensional analysis and its applications.

#### **Chapter 3: Motion in a Straight Line (Periods 8, Mks – 7)**

Frame of reference. Motion in a straight line: Position-time graph, speed and velocity. Uniform

and non-uniform motion, average speed and instantaneous velocity.

Uniformly accelerated motion, velocity-time and position-time graphs, relations for uniformly

accelerated motion (graphical treatment).

Elementary concepts of differentiation and integration for describing motion.

#### **Chapter 4: Motion in a Plane (Periods 12, Mks – 10)**

*Scalar and vector quantities:* Position and displacement vectors, general vectors and notation,

equality of vectors, multiplication of vectors by a real number; addition and subtraction of vectors. Unit vectors. Resolution of a vector in a plane – rectangular components. Motion in a plane. Relative velocity.

Cases of uniform velocity and uniform acceleration – projectile motion. Uniform circular motion.

**Chapter 5: Laws of Motion (Periods 10, Mks – 8)**

Intuitive concept of force. Inertia, Newton's first law of motion; momentum and Newton's second law of motion; impulse; Newton's third law of motion. Law of conservation of linear momentum and its applications.

Equilibrium of concurrent forces. Static and kinetic friction, laws of friction, rolling friction, lubrication.

*Dynamics of uniform circular motion:* Centripetal force, examples of circular motion (vehicle on level circular road, vehicle on banked road).

**Chapter 6: Work Power and Energy (Periods 12, Mks – 10)**

Scalar product of vectors. Work done by a constant force and a variable force; kinetic energy, work-energy theorem, power.

Notion of potential energy, potential energy of a spring, conservative forces; conservation of mechanical energy (kinetic and potential energies); non-conservative forces; elastic and inelastic collisions in one and two dimensions

**Chapter 7: System of Particles and Rotational Motion (Periods 14, Mks – 12)**

Centre of mass of a two-particle system, momentum conservation and centre of mass motion.

Centre of mass of a rigid body; centre of mass of circular ring, disc, rod and sphere.

Vector product of vectors; moment of a force, torque, angular momentum, conservation of angular momentum with some examples.

Equilibrium of rigid bodies, rigid body rotation and equation of rotational motion, comparison of linear and rotational motions; moment of inertia, radius of gyration. Values of M.I. for simple geometrical objects (no derivation). Statement of parallel and perpendicular axes theorems and their applications.

**Chapter 8: Gravitation (Periods 9, Mks – 8)**

Kepler's laws of planetary motion. The universal law of gravitation.

Acceleration due to gravity and its variation with altitude and depth.

Gravitational potential energy; gravitational potential. Escape speed, orbital velocity of a satellite. Geostationary satellites.

**Chapter 9: Mechanical Properties of Solids (Periods 5, Mks – 5)**

Elastic behaviour, Stress-strain relationship, Hooke's law, Young's modulus, bulk modulus, shear, modulus of rigidity.

**Chapter 10: Mechanical Properties of Fluids (Periods 12, Mks – 10)**

Pressure due to a fluid column; Pascal's law and its applications (hydraulic lift and hydraulic brakes). Effect of gravity on fluid pressure.

Viscosity, Stokes' law, terminal velocity, Reynold's number, streamline and turbulent flow.

Bernoulli's theorem and its applications.

Surface energy and surface tension, angle of contact, application of surface tension ideas to drops, bubbles and capillary rise.

**Chapter 11: Thermal Properties of Matter (Periods 9, Mks – 8)**

Heat, temperature, thermal expansion; specific heat capacity – calorimetry; change of state - latent heat.

Heat transfer – conduction, convection and radiation, thermal conductivity, Newton's law of cooling.

**Chapter 12: Thermodynamics (Periods 8, Mks – 7)**

Thermal equilibrium and definition of temperature (zeroth law of thermodynamics). Heat, work and internal energy. First law of thermodynamics. Second law of thermodynamics: Reversible and irreversible processes. Heat engines and refrigerators.

**Chapter13: Kinetic Theory (Periods 10, Mks – 8)**

Equation of state of a perfect gas, work done on compressing a gas. Kinetic theory of gases: Assumptions, concept of pressure. Kinetic energy and temperature; rms speed of gas molecules; degrees of freedom, law of equipartition of energy (statement only) and application to specific heat capacities of gases; concept of mean free path, Avogadro's number.

**Chapter14: Oscillations (Periods 12, Mks – 10)**

Periodic motion – period, frequency, displacement as a function of time. Periodic functions. Simple harmonic motion (SHM) and its equation; phase; oscillations of a spring – restoring force and force constant; energy in SHM – kinetic and potential energies; simple pendulum – derivation of expression for its time period; free, forced and damped oscillations (qualitative ideas only), resonance.

**Chapter15: Oscillations (Periods 14, Mks – 12)**

Wave motion. Longitudinal and transverse waves, speed of wave motion. Displacement relation for a progressive wave. Principle of superposition of waves, reflection of waves, standing waves in strings and organ pipes, fundamental mode and harmonics. Beats. Doppler effect.

**Practicals****Section A****Experiments**

1. Use of Vernier Callipers
  - a. to measure diameter of a small spherical/cylindrical body.
  - b. to measure dimensions of a given regular body of known mass and hence find its density.
  - c. to measure internal diameter and depth of a given beaker/calorimeter and hence find its volume.
2. Use of screw gauge
  - a. to measure diameter of a given wire
  - b. to measure thickness of a given sheet
  - c. to measure volume of an irregular lamina
3. To determine radius of curvature of a given spherical surface by a spherometer.
4. To determine the mass of two different objects using a beam balance.
5. To find the weight of a given body using parallelogram law of vectors.
6. Using a simple pendulum, plot L-T and L-T<sup>2</sup> graphs. Hence find the effective length of a second's pendulum using appropriate graph.
7. To study the relationship between force of limiting friction and normal reaction and to find the coefficient of friction between a block and a horizontal surface.
8. To find the downward force, along an inclined plane, acting on a roller due to gravitational pull of the earth and study its relationship with the angle of inclination by plotting graph between force and  $\sin \theta$ .

**Activities**

1. To make a paper scale of given least count, e.g. 0.2 cm, 0.5 cm.
2. To determine mass of a given body using a metre scale by principle of moments.
3. To plot a graph for a given set of data, with proper choice of scales and error bars.
4. To measure the force of limiting friction for rolling of a roller on a horizontal plane.
5. To study the variation in the range of a jet of water with the angle of projection.
6. To study the conservation of energy of a ball rolling down on inclined plane (using a double inclined plane).
7. To study dissipation of energy of a simple pendulum by plotting a graph between square of amplitude and time.

## Section B

### Experiments

1. To determine Young's modulus of elasticity of the material of a given wire.
2. To find the force constant and effective mass of a helical spring by plotting  $T^2 - m$  graph using method of oscillations.
3. To study the variation in volume with pressure for a sample of air at constant temperature by plotting graphs between P and V, and between P and  $1/V$ .
4. To determine the surface tension of water by capillary rise method.
5. To determine the coefficient of viscosity of a given viscous liquid by measuring the terminal velocity of a given spherical body.
6. To study the relationship between the temperature of a hot body and time by plotting a cooling curve.
7. To study the relation between (i) frequency and length of a given wire under constant tension. (ii) the length of a given wire and tension for constant frequency using sonometer.
8. To find the speed of sound in air at room temperature using a resonance tube
9. To determine specific heat capacity of a given (i) solid (ii) liquid, by method of mixtures.

### Activities

1. To observe change of state and plot a cooling curve for molten wax.
2. To observe and explain the effect of heating on a bi-metallic strip.
3. To note the change in level of liquid in a container on heating and interpret the observations.
4. To study the effect of detergent on surface tension of water by observing capillary rise.
5. To study the factors affecting the rate of loss of heat of a liquid.
6. To study the effect of load on depression of a suitably clamped metre scale loaded
  - (i) at its end
  - (ii) in the middle.

## TERM-WISE DISTRIBUTION OF CHAPTERS

### THEORY

TERM	CHAPTERS TO BE COVERED	TOTAL MARKS
I	1, 2, 3, 4, 5, 9, 10, 11 & 12	60
II	6, 7, 8, 13, 14 & 15	60 + 10 Mks for Core Content of Topics covered during I term

### PRACTICALS

TERM	EXPTS/ACTIVITIES TO BE PERFORMED	EVALUATION	MARKS
I	6 (3 from each section) + 5 Activities	1 Expt (10 mks) Activities (10 mks) to be evaluated on a continuous basis during the term . The activities should be recorded in the Journal	20
II	6 (3 from each section) + 5 Activities	1 Expt (10 mks) Activities (10 mks) to be evaluated on a continuous basis during the term . The activities should be recorded in the Journal PROJECT (6 mks including viva) Journal (4 mks) Only for Expts	30

**NOTE:** The PROJECT should be based on any topic relevant to the syllabus of Std. XI.