



"Dissemination of Education for Knowledge, Science and Culture"
-Shikshan Maharshi Dr. Bapuji Salunkhe
Shri Swami Vivekanand Shikshan Sanstha, Kolhapur's



**Dattajirao Kadam Arts, Science & Commerce
College, Ichalkaranji.**

Department of Physics

B. Sc. III Seminar (Semester-V)

Date: 10/09/2025

Notice

All students of B.Sc. III (Physics) are here by informed that their **Seminars of Semester-V** will be conducted. The topic of seminars is as per given table. It is compulsory to all students to attend the same.

Sr. No.	Roll No.	Name of students	Topic of Seminar
1	5501	Chavan Digambar Sagar	Normalized and orthogonal wave functions
2	5502	Khot Pragati Ramchandra	Particle in one dimensional Rigid Box
3	5503	Khot Priya Arun	Michelson-Morley Experiments
4	5504	Malage Gayatri Vijay	Conditions for the Physical Acceptable wavefunctions
5	5505	Nimbalkar Atharv Sunil	Atwood's machine
6	5506	Pawar Ragini Sanjay	Cathode Ray Oscilloscope (CRO)
7	5507	Pedaneekar Prasad Dhananjay	Biot-Savart's law and Amperes law
8	5508	Salunkhe Ojas Ganesh	Basic Logic Gates
9	5509	Singh Ashwini Manoj	Inertial and non-inertial frame of reference
10			

Date: 27th September 2025

Venue: B. Sc. III Classroom

(Dr. V. V. Ganbavle)

HEAD,

Department of Physics
Dattajirao Kadam A.S.C. College,
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College, Ichalkaranji.



Department of Physics

B. Sc. III Seminar Attendance Sheet 2025-2026 (Semester V)

Sr. No.	Roll No.	Name of students	Signature
1	5501	Chavan Digambar Sagar	<i>Chas.</i>
2	5502	Khot Pragati Ramchandra	<i>Pragati</i>
3	5503	Khot Priya Arun	<i>Priya</i>
4	5504	Malage Gayatri Vijay	<i>Gayatri</i>
5	5505	Nimbalkar Atharv Sunil	<i>Atharv</i>
6	5506	Pawar Ragini Sanjay	<i>Ragini</i>
7	5507	Pedaneekar Prasad Dhananjay	<i>Ab</i>
8	5508	Salunkhe Ojas Ganesh	<i>Ojas</i>
9	5509	Singh Ashwini Manoj	<i>Ashwini</i>
10			

Head
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Department of Physics
Dattajirao Kadam A.S.C. College,
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Department of Physics

B. Sc. III Seminar Evaluation Report 2025-2026 (Semester V)

Sr. No.	Roll No.	Name of students	Content of Knowledge (02Marks)	Presentation Skills (02Marks)	Engagement (02Marks)	Critical Thinking (02Marks)	Time Management (02Marks)	Total Marks (10Marks)
1	5501	Chavan Digambar Sagar	2	2	2	1	1	8
2	5502	Khot Pragati Ramchandra	02	02	02	02	02	10
3	5503	Khot Priya Arun	02	02	02	02	02	10
4	5504	Malage Gayatri Vijay	1	2	1	1	2	7
5	5505	Nimbalkar Atharv Sunil	2	1	2	2	1	8
6	5506	Pawar Ragini Sanjay	2	2	2	2	2	10
7	5507	Pedaneekar Prasad Dhananjay	1	2	AB	2	2	10
8	5508	Salunkhe Ojas Ganesh	2	2	2	2	2	10
9	5509	Singh Ashwini Manoj	2	2	2	2	2	10
10								

3) P. Manwade
(Mr. P. V. Manwade)

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S.V. Pathan

1) Dr. V. S. Pawar
(Dr. V. S. Pawar)

2) Dr. S. S. Kumbhar
(Dr. S. S. Kumbhar)

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Department of Physics
Dattajirao Kadam A.S.C. College,
Ichalkaranji

"B. Sc. III Seminars, Semester-V (2025-26)"

"Miss. Ragini delivering a seminar on Cathode Ray Oscilloscope (CRO)"



"Mr. Tejas presenting a seminar on Logic Gates and their role in digital electronics."



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Department of Physics
Dattajirao Kadam A.S.C. College,
Ichalkaranji.

"Miss. Ashwini explaining the concept of Inertial Frame of Reference during her seminar"



"Mr. Digamber presenting a seminar on Quantum Mechanics and discussing its fundamental principles."



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Shri Swami Vivekanand Shikshan Sanstha's

**DATTAJIRAO KADAM ARTS, SCIENCE AND
COMMERCE COLLEGE, ICHALKARANJI**

DEPARTMENT OF PHYSICS

SEMINAR REPORT

Name: Chavan Digambar Sagar

Class: BSC III

Roll No: 5501




Tour Incharge
(Signature)


Examiner
(Signature)


HEAD,
Department of Physics
Dattajirao (S.C.) College,
Ichalkaranji

Quantum Mechanics: Theory of Wave Functions

Physics Study Notes

1 The Wave Function (Ψ)

In quantum mechanics, a particle does not have a definite position or momentum. Instead, all information about a system is contained in the **wave function**, $\Psi(x, t)$.

1.1 The Born Interpretation

The wave function itself is a complex probability amplitude. Its physical significance lies in its square modulus, $|\Psi|^2$, which represents the **probability density**.

$$P(x, t) = \Psi^* \Psi = |\Psi(x, t)|^2 \quad (1)$$

Integrating this density over a specific volume gives the probability of finding the particle within that region.

1.2 Requirements for a Well-Behaved Wave Function

To represent a physical reality, Ψ must satisfy:

- **Finite:** Ψ must not be infinite anywhere.
- **Single-valued:** At any point x , there must be only one probability value.
- **Continuous:** Ψ and its first derivative $\frac{d\Psi}{dx}$ must be continuous to ensure momentum is defined.
- **Square-integrable:** The integral over all space must result in a finite number.

2 Normalization of the Wave Function

The law of total probability states that the particle must exist somewhere in the universe. Therefore, the sum of all probabilities over all space must equal 1.

2.1 The Normalization Condition

A wave function is said to be **normalized** if:

$$\int_{-\infty}^{+\infty} \Psi^* \Psi dx = 1 \quad (2)$$



2.2 Calculating the Normalization Constant (N)

If a wave function $\phi(x)$ is not normalized, we multiply it by a constant N : $\Psi(x) = N\phi(x)$. To find N , we set:

$$N^2 \int_{-\infty}^{+\infty} |\phi(x)|^2 dx = 1 \implies N = \frac{1}{\sqrt{\int_{-\infty}^{+\infty} |\phi(x)|^2 dx}} \quad (3)$$

3 Orthogonality and Orthonormality

3.1 Orthogonal Wave Functions

Two wave functions Ψ_m and Ψ_n are **orthogonal** if they do not overlap in a way that yields a net probability.

$$\int_{-\infty}^{+\infty} \Psi_m^* \Psi_n dx = 0 \quad (\text{for } m \neq n) \quad (4)$$

3.2 The Orthonormal Condition

A set is **orthonormal** if it is both normalized and mutually orthogonal. This is represented using the **Kronecker Delta** (δ_{mn}):

$$\int_{-\infty}^{+\infty} \Psi_m^* \Psi_n dx = \delta_{mn} \quad (5)$$

Where $\delta_{mn} = 1$ if $m = n$, and $\delta_{mn} = 0$ if $m \neq n$.

4 Summary Table

Concept	Mathematical Condition	Physical Meaning
Probability Density	$ \Psi ^2$	Likelihood of finding particle.
Normalization	$\int \Psi^* \Psi dx = 1$	Particle exists somewhere.
Orthogonality	$\int \Psi_m^* \Psi_n dx = 0$	States are independent.
Orthonormality	$\int \Psi_m^* \Psi_n dx = \delta_{mn}$	Standardized set of states.





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Department of Physics

B. Sc. III Seminar Report - Semester V (2025-2026)

Date: 30/09/2025

The Department of Physics organized seminars for B. Sc. III students during Semester V of the academic year 2025-2026. A total of 09 students delivered presentations on topics of their choice, each lasting 30 minutes. All students selected unique topics and confidently presented lectures on subjects from the academic syllabus, such as Classical Mechanics, Mathematical Physics, Digital Electronics, Quantum Mechanics and Atoms, Molecules and Astrophysics. This seminar activity aims to enhance students' confidence, improve their teaching skills and provide valuable teaching experience.

The seminar activity proved to be a valuable learning experience for B.Sc. III Physics students, contributing to both their personal and academic growth. The initiative succeeded in fostering a supportive environment for public speaking, critical thinking and peer learning. The department plans to continue organizing similar activities to further enhance students' skills and confidence in future semesters.



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