KANDULA SRINIVASA REDDY MEMORIAL COLLEGE OF ENGINEERING
(AUTONOMOUS)

KADAPA-516003. AP

(Approved by AICTE, Affiliated to JNTUA, Ananthapuramu, Accredited by NAAC)

(An ISO 9001-2008 Certified Institution)

DEPARTMENT OF HUMANITIES & SCIENCES

CERTIFICATE COURSE

ON

"SOLID STATE PHYSICS"

Resource Persons : Mr. D.Mallikarjuna Reddy, Assistant Professor, Dept. of H&S, KSRMCE

Mr. G.C.V.Subbaiah, Assistant Professor, Dept. of H&S, KSRMCE

Mr. Y.Ramana Reddy, Assistant Professor, Dept. of H&S, KSRMCE

Course Coordinator:Mr. D.Mallikarjuna Reddy, Assistant Professor, Dept. of H&S, KSRMCE

Duration: 01/02/2020 to 13/03/2020

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Lr./KSRMCE/H&S/2019-20/ Date:20-01-2020

To

The principal,

KSRMCE,

Kadapa.

Respected Sir,

Sub: Permission to Conduct Certificate Course on "SOLID STATE PHYSICS"

01/02/2020 to 13/03/2020–Req- Reg.

The Department of Humanities & sciences is planning to offer a Certificate Course on "SOLID STATE PHYSICS" to B. Tech. students. The course will be conducted from **01/02/2020 to 13/03/2020**. In this regard, I kindly request you to grant permission to conduct Certificate Course.

Thanking you sir,

Yours faithfully

D.Mallikarjuna Reddy,
Asst.Professor in H&S Department.

Forwarded to Principal sir

Dept of H&S.

Permitted

V. S. S. Murty

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Cr./KSRMCE/H&S/2019-20/ Date: 21/01/2020

Circular

The Department of Humanities and Sciences is offering a Certificate Course on "SOLID STATE PHYSICS" from **01/02/2020 to 13/03/2020** to B.Tech students. In this regard, interested students are requested to register their names for the Certificate Course with Course Coordinator.

For further information contact Course Coordinator.

Course Coordinator: Mr. D.Mallikarjuna Reddy, Asst.professor, Dept. of H&S.-KSRMCE.
Contact No: 9490406646

HOD

Dept. of H&S

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Cc to:

IQAC-KSRMCE

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Date:23/01/2020

DEPARTMENT OF HUMANITIES AND SCIENCES

REGISTRATION FORM

Certificate Course

On

"Solid State Physics" **From 01/02/2020 to 13/03/2020**

S.No	Full Name	Roll Number	Branch	Semester	Signature

Coordinator:

HOD H&S

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Date: 23.01.2020

Name of the event: - Certificate course on Solid State Physics

Venue: CE-308

Registration Form

S.NO	Name	Branch	Roll Number	Signature
1	M. MySoorReddy	ME	199Y1A0326	mySoorReddy
2	S. Nayeemur Rahman	M.E	199Y1A0349	
3.	C.Abdul Sobahan	M.E	199Y1A0306	C.A.Sobahan
4.	S.Abhilash Kumar Reddy	ME	199Y1A0352	S.Abhilash.
5.	G. Mani Sagar	ME	199Y5A0311	G. Mani
6.	M. Joshua.	ME	199Y5A0327	M. Joshua
7.	S. Zabeevulla	ME	199Y1A0350	
8.	M-Charan Reddy	ME	199Y1A0330	
9	P.Vamsidhar Reddy	ME	199Y1A0334	P.Vamsi
10	D. Bharathsuha	ME	199Y1A0307	D.B.S.R
11	D. Sai Srujan kumar	ME	199Y1A0308	
12.	M. Sreekanth Reddy	ME	199Y1A0329	
13.	R. Veera Tejaswar Reddy	ME	199Y1A0338	Teja
14.	P. Bheemaiah	ME	199Y1A0337	P.bhemmi
15.	C.Sunil Kumar Reddy	ME	199Y1A0304	C
16.	C. Amathya	ME	199Y1A0305	
17.	B. Shiva Reddy	ME	199Y1A0303	
18.	B. Srinidhi sai	ME	199Y1A0302	B.Sai
19	S. Shoaib	ME	199Y1A0348	S.Shoaib
20	S. Md. Mansoor	ME	199Y1A0345	S.md
21.	K. Manjunath	ME	199Y1A0320	K.Manjunath
22.	M. Kiran kumar	ME	199Y1A0327	

23.	K. Vamsidhar Reddy	ME	19941A0319	K. Vamsidhar Reddy
24.	P. Ravi Kumar	ME	19941A0335	P. Ravi Kumar
25.	S. Abdul Rasheed	ME	19941A0341	S. Rasheed
26.	S. Aslam	ME	19941A0354	S. Aslam
27	G. Venkata prathap	ME	19941A0310	G. V. prathap
28.	L. M. Vinay Kumar	ME	19941A0322	L. M. Vinay
29.	S. Ghouse Basha	ME	19941A0343	S. Ghouse
30.	K. karthik	ME	19941A0318	K. karthik

Coordinator

HOD/H&S

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

Principal

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516 003. (A.P.)

Syllabus of Certificate Course

Course Name: SOLID STATE PHYSICS

COURSE OBJECTIVES:

1. To enlighten the periodic arrangement of atoms in crystals.
2. To give an impetus on the subtle mechanism of superconductors using the concept of BCS theory and their fascinating applications.
3. To enlighten the concepts of Quantum Mechanics and to provide fundamentals of de-Broglie waves, quantum mechanical wave equation and its applications, the importance of free electron theory.
4. To explain the significant concepts of magnetic materials that leads to potential applications in the emerging micro devices.
5. To introduce various co-ordinate system and review of Maxwell's equations.

COURSE OUTCOMES:

1. **Classify** various crystal systems.
2. **Elaborate** the physical properties exhibited by materials through the understanding of properties of semiconductors and superconductors.
3. **Interpret** the concepts of classical and quantum free electron theories.
4. **Understands** the response of magnetic materials to the applied magnetic fields.
5. **Solve** the numerical based on the various concepts of electromagnetic field theory.

UNIT - I

CRYSTALLOGRAPHY

Introduction – Space lattice –Unit cell – Lattice parameters –Bravias lattice –Crystal systems – Packing fractions of SC, BCC and FCC - Directions and planes in crystals – Miller indices – Inter planar spacing in cubic crystals.

UNIT - II

SUPERCONDUCTIVITY

Introduction – Meissner effect - Properties of superconductors- Penetration Depth-Flux Quantization- Differences between Type -I and type- II superconductors- ac and dc Josephson effects -BCS theory (qualitative) –Applications of superconductors.

UNIT – III

FREE ELECTRON THEORY

Classical free electron theory (Merits and demerits only) – Quantum free electron theory – Equation for electrical conductivity based on quantum free electron theory – Fermi-Dirac distribution – Density of states – Fermi energy.

UNIT – IV

MAGNETIC MATERIALS

Magnetic dipole moment - Magnetic moments -- Magnetic permeability and susceptibility - Origin of magnetic moments-Hysteresis – Soft and Hard magnetic materials – Classification of Magnetic materials-Applications of Magnetic materials.

UNIT - V

ELECTROMAGNETIC THEORY

Divergence and Curl of Electric and Magnetic Fields- Gauss' theorem for divergence and Stokes' theorem for curl- Maxwell's Equations (Quantitative)- Electromagnetic wave propagation (non-conducting medium).

Reference Books:

1. Engineering Physics – Dr. M.N. Avadhanulu & Dr. P.G. Kshirsagar, S. Chand and Company
2. Engineering Physics – B.K. Pandey and S. Chaturvedi, Cengage Learning.
4. Engineering Physics – Shatendra Sharma, Jyotsna Sharma, Pearson Education, 2018
4. Engineering Physics – K. Thyagarajan, McGraw Hill Publishers
5. Engineering Physics - Sanjay D. Jain, D. Sahasrambudhe and Girish, University Press

SCHEDULE

Department of humanities and sciences

Certificate Course
On
"Solid State Physics" From 01/02/2020 to 13/03/2020

Date	Timing	Resource Person	Topic to be covered
01-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	**Unit-1**: **CRYSTALLOGRAPHY -** Introduction – Space lattice –Unit cell – Lattice parameters
03-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Bravias lattice,
04-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Crystal systems
05-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Packing fractions of SC, BCC and FCC
06-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Directions and planes in crystals
07-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Miller indices
10-02-2020	4.00 pm – 5.00 pm	Y.Ramana Reddy	Inter planar spacing in cubic crystals
11-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	**Unit-2**: Introduction – Meissner effect - Properties of superconductors-

12-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Penetration depth-Flux Quantization
13-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Diifferences between Type -I and type- II superconductors
14-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	ac and dc Josephson effects
15-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	BCS theory (qualitative)
17-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Applications of superconductors.
18-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	**Unit-3:** Classical free electron theory (Merits and demerits only)
19-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Quantum free electron theory
20-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Equation for electrical conductivity based on quantum free electron theory.
22-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Fermi-Dirac distribution
24-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Density of states
25-02-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Fermi energy.
26-02-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	**Unit-4:** Basic definitions
02-03-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Magnetic dipole moment - Magnetic moments, Magnetic permeability and susceptibility
03-03-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Origin of magnetic moments
04-03-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Hysteresis – Soft and Hard magnetic

			materials
05-03-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Classification of Magnetic materials
06-03-2020	4.00 pm – 5.00 pm	D.Mallikarjuna Reddy	Applications of Magnetic materials
07-03-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	**Unit-5:** Basic definitions
09-03-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Divergence and Curl of Electric and Magnetic Fields
11-03-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Gauss' theorem for divergence and Stokes' theorem for curl
12-03-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Maxwell's Equations (Quantitative)
13-03-2020	4.00 pm – 5.00 pm	G.C.V.Subbaiah	Electromagnetic wave propagation (Non-conducting medium).

Resource Person(s) 1). 2). 3).

Coordinator(s)

HODH&S
Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of Humanities & Sciences

Certification Course on "Solid State Physics"

Attendance Sheet

S. No	Name of the student	Roll No	1 Feb	3 Feb	4 Feb	5 Feb	6 Feb	7 Feb	10 Feb	11 Feb	12 Feb	13 Feb	14 Feb	15 Feb	17 Feb	18 Feb	19 Feb	20 Feb	22 Feb	24 Feb	25 Feb	26 Feb	2 Mar	3 Mar	4 Mar	5 Mar	6 Mar	7 Mar	9 Mar	11 MAr	12 MAr	13 Mar
1	M. My Sooraj Reddy	199Y1A0326							Ab																							
2	S. Nayeemur Rahman	199Y1A0349																														
3	C. Abdul Subahan	199Y1A0306																														
4	S. Abhilash Kumar Reddy	199Y1A0352																														
5	M. Joshua	199Y5A0323							Ab																							
6	G. Mani Sagar	199Y5A0311																														
7	M. Sreekanth Reddy	199Y1A0329																														
8	R. Veera Tejaswar Reddy	199Y1A0338										Ab							Ab													
9	P. Bheemaiah	199Y1A0337																														
10	C. Sunil Kumar Reddy	199Y1A0304																					Ab			Ab		Ab				
11	M. Charan Reddy	199Y1A0330																														
12	P. Vamsidhar Reddy	199Y1A0334																								Ab						
13	D. Bhavarth Simha Reddy	199Y1A0307							Ab																							
14	D. Sai Srujan Kumar	199Y1A0308																												Ab		
15	C. Amathya	199Y1A0305																								Ab						
16	K. Manjunath	199Y1A0320							Ab			Ab																				
17	M. Sreeko B. Shiva Reddy	199Y1A0303																														
18	B. Srinidhi Sai	199Y1A0302																	Ab													
19	K. Vamsidhar Reddy	199Y1A0319										Ab																				
20	P. Ravi	199Y1A0335																														
21	S. Md. Mansoor	199Y1A0345																				Ab				Ab						
22	S. Shoaib	199Y1A0348								Ab																						
23	M. Kiran Kumar	199Y1A0327																														

24	S. Zabeeulla	199Y1A0350																														
25	S. Abdul Rasheed	199Y1A0341																														
26	S. Aslam	199Y1A0354																														
27	G. Venkata prathap	199Y1A0310																														
28	K. M. Vinay Kumar	199Y1A0322																														
29	[illegible]	199Y1A0318																														
30	S. Ghouse Basha	199Y1A0343																														

Coordinator

HOD/H&S

Dr. I. SREEVANI M.Sc.,,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

K.S.R.M. COLLEGE OF ENGINEERING

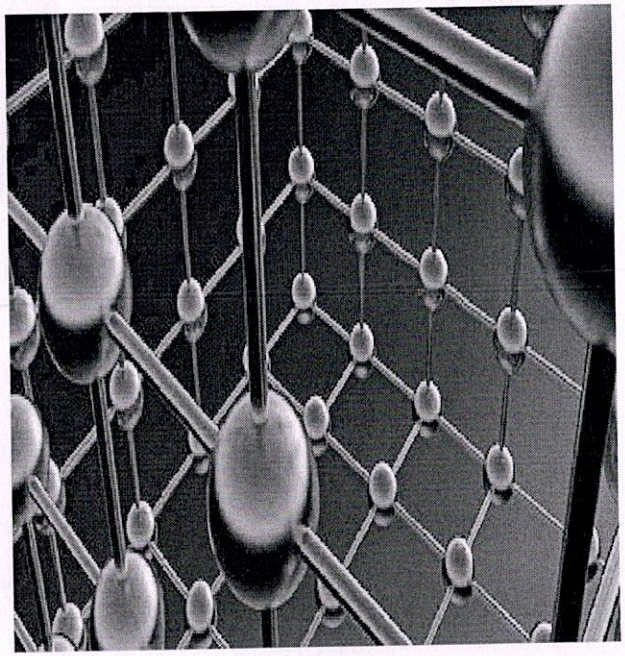
(UGC - Autonomous)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

DEPARTMENT OF HUMANITIES AND SCIENCES

Certificate Course on Solid State Physics



Eligibility : B.Tech Students

Date:01-02-2020 to 13-03-2020

Venue : CE-308

Course Coordinator: Sri.D.Mallikarjuna Reddy

Couse Instructors:

Sri. D. Mallikarjuna Reddy , Assistant Professor

Sri. G.C.V.Subbaiah , Assistant Professor

Sri. Y.Ramana Reddy , Assistant Professor

Dr. I. Sreevani (Convener & HOD H&S)	*Dr.V.S.S. Murthy* (Principal)	*Prof. A. Mohan* (Director)	*Sri K. Sivananda Reddy* (Correspondent)

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

ACTIVITY REPORT

Certification Course

On

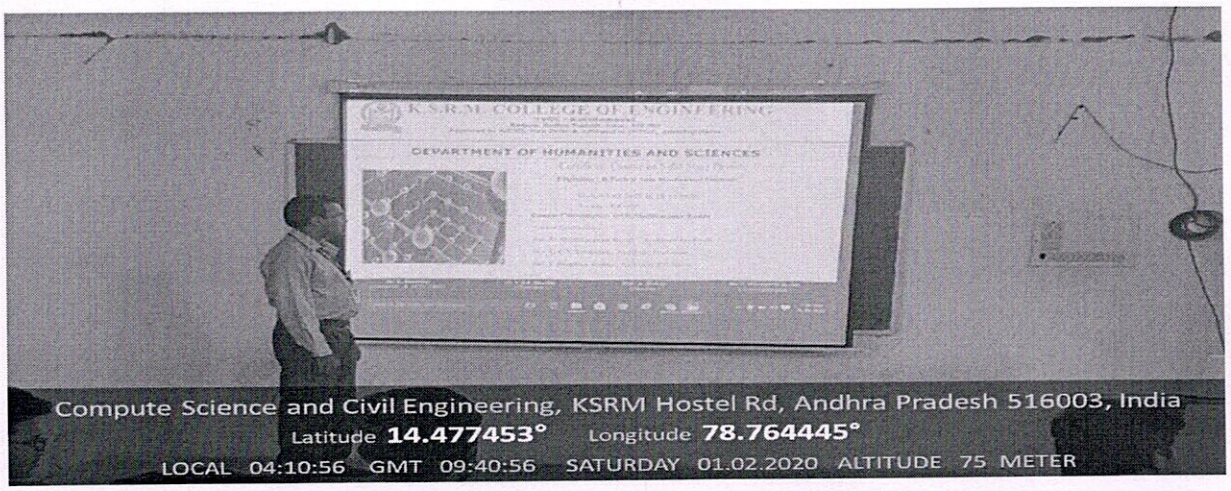
"Solid State Physics"

01st February to 13th March - 2020

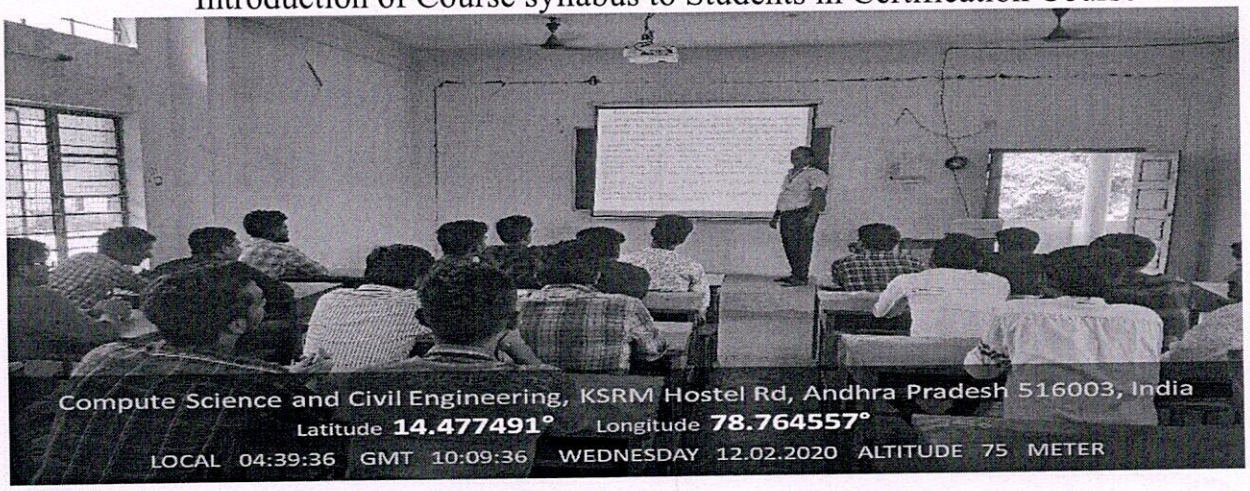
Target Group	**: Students**
Details of Participants	**: B.Tech. Students**
Coordinator	**: Mr.D.Mallikarjuna Reddy, Asst. Professor, Dept. of H&S**
Organizing Department	**: Department of Humanities & Sciences**
Venue	**: CE-308**

Description: Certification course on "Solid State Physics" was organized by Dept. of H&S from **01st February to 13th March 2020** . The Course instructors are **D.Mallikarjuna Reddy, G.C.V.Subbaiah & Y.Ramana Reddy.** The main aim of the course is to create awareness among students about this course of Solid State Physics applied in various fields like Engineering and Industrial applications to conserve environment. Course is completed and certificates are provided for the participants.

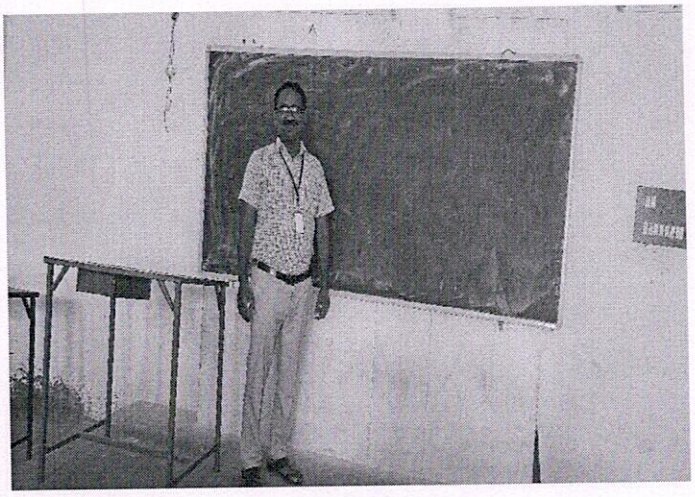
Photo :



Introduction of Course syllabus to Students in Certification Course



Students listening to Instructor



Sri.D.Mallikarjuna Reddy & Sri Y.Ramana Reddy addressing the students on "Solid State Physics"

Coordinator

HOD/H&S

Dr. I. SREEVANI M.Sc.,Ph.D.
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

K.S.R.M. COLLEGE OF ENGINEERING

(Autonomous)
Kadapa, Andhra Pradesh, India– 516 003
Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

ESTD : 1980

Certificate of Completion

This is to certify that Mr./Ms. ----------bearing Roll No.---------- has successfully completed his/her **Certification Course on Solid State Physics** organized from **01/02/2020 to 13/03/2020.**

D. Mallikarjuna Reddy	**Dr. I. Sreevani**	**Dr. V. S. S. Murthy**
Coordinator	**HOD**	**Principal**

K.S.R.M College Of Engineering
(Autonomous)

Kadapa, Andhra Pradesh, India -516003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu

Certificate of Completion

This is to certify that M. Mysora Reddy bearing Roll No. 199Y1A0326 has successfully completed his **Certification Course on Solid State Physics** organized by **Department of H&S, K.S.R.M.C.E,** Kadapa, A.P from **01-02-2020 to 13-03-2020.**

D.Mallikarjuna Reddy
Coordinator

Dr. I. Sreevani
HOD H&S

Dr. V.S.S.Murthy
Principal

K.S.R.M College Of Engineering
(Autonomous)

Kadapa, Andhra Pradesh, India -516003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu

Certificate of Completion

This is to certify that S. Nayeemar Rahman bearing Roll No. 19Y1A0349 has successfully completed his **Certification Course on Solid State Physics** organized by **Department of H&S, K.S.R.M.C.E,** Kadapa, A.P from **01-02-2020 to 13-03-2020.**

D.Mallikarjuna Reddy
Coordinator

Dr. I. Sreevani
HOD H&S

Dr. V.S.S.Murthy
Principal

K.S.R.M College Of Engineering
(Autonomous)

Kadapa, Andhra Pradesh, India -516003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu

Certificate of Completion

This is to certify that C. Abdul Sobahan bearing Roll No. 19Y1A0306 has successfully completed his **Certification Course on Solid State Physics** organized by **Department of H&S, K.S.R.M.C.E,** Kadapa, A.P from **01-02-2020 to 13-03-2020.**

D.Mallikarjuna Reddy
Coordinator

Dr. I. Sreevani
HOD H&S

V.S.S.Murthy

Dr. V.S.S.Murthy
Principal

K.S.R.M College Of Engineering
(Autonomous)

Kadapa, Andhra Pradesh, India -516003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Anantapuramu

Certificate of Completion

This is to certify that S. Abhilash kumar Reddy bearing Roll No. 199y1A0352 has successfully completed his **Certification Course on Solid State Physics** organized by **Department of H&S, K.S.R.M.C.E,** Kadapa, A.P from **01-02-2020 to 13-03-2020.**

D.Mallikarjuna Reddy
Coordinator

Dr. I. Sreevani
HOD H&S

Dr. V.S.S.Murthy
Principal

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of H&S

Course feedback on

Solid State Physics

Dates: 01/02/2020 to 13-03-2020 Venue: CE-308

The Design of the course:

1. Is the course content met your expectation. Y☐/N☐

2. Is the lecture sequence well planned?

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

3. The contents of the course is explained with neat diagrams and examples

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

4. Is the level of course high

☐ Low ☐ moderate ☐ high ☐ Very high

5. Is the course exposed you to the new knowledge and practices

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

6. Rate the knowledge of the speakers in providing you the expected outcome

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

7. Is the lecturer clear and easy to understand?

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

8. Rate the value of course in increasing your skills

☐ Strongly disagree ☐ disagree ☐ agree ☐ strongly agree

Suggestions if any: .....

Signature of the participant

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of H&S

Course feedback on

Solid State Physics

Dates: **01/02/2020 to 13-03-2020** Venue: **CE-308**

The Design of the course:

1. Is the course content met your expectation. Y [er] / N [ ]

2. Is the lecture sequence well planned?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

3. The contents of the course is explained with neat diagrams and examples

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

4. Is the level of course high

[ ] Low [ ] moderate [✓] high [ ] Very high

5. Is the course exposed you to the new knowledge and practices

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

6. Rate the knowledge of the speakers in providing you the expected outcome

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

7. Is the lecturer clear and easy to understand?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

8. Rate the value of course in increasing your skills

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

Suggestions if any: .....

M. Sreekanth Reddy.

Signature of the participant

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of H&S

Course feedback on

Solid State Physics

Dates: **01/02/2020 to 13-03-2020** Venue: **CE-308**

The Design of the course:

1. Is the course content met your expectation. Y [✓] N [ ]

2. Is the lecture sequence well planned?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

3. The contents of the course is explained with neat diagrams and examples

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

4. Is the level of course high

[ ] Low [ ] moderate [✓] high [ ] Very high

5. Is the course exposed you to the new knowledge and practices

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

6. Rate the knowledge of the speakers in providing you the expected outcome

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

7. Is the lecturer clear and easy to understand?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

8. Rate the value of course in increasing your skills

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

Suggestions if any: .....

P. Bhu

Signature of the participant

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of H&S

Course feedback on

Solid State Physics

Dates: **01/02/2020 to 13-03-2020** Venue: **CE-308**

The Design of the course:

1. Is the course content met your expectation. Y [✓] N [ ]

2. Is the lecture sequence well planned?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

3. The contents of the course is explained with neat diagrams and examples

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

4. Is the level of course high

[ ] Low [ ] moderate [✓] high [ ] Very high

5. Is the course exposed you to the new knowledge and practices

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

6. Rate the knowledge of the speakers in providing you the expected outcome

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

7. Is the lecturer clear and easy to understand?

[ ] Strongly disagree [ ] disagree [ ] agree [✓] strongly agree

8. Rate the value of course in increasing your skills

[ ] Strongly disagree [ ] disagree [ ] agree [✓] strongly agree

Suggestions if any: .....

S. Abhilash Kumar Reddy

Signature of the participant

K.S.R.M. COLLEGE OF ENGINEERING

(UGC-AUTONOMOUS)

Kadapa, Andhra Pradesh, India– 516 003

Approved by AICTE, New Delhi & Affiliated to JNTUA, Ananthapuramu.

An ISO 14001:2004 & 9001: 2015 Certified Institution

Department of H&S

Course feedback on

Solid State Physics

Dates: **01/02/2020 to 13-03-2020** Venue: **CE-308**

The Design of the course:

1. Is the course content met your expectation. Y[✓]/N[ ]

2. Is the lecture sequence well planned?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

3. The contents of the course is explained with neat diagrams and examples

[ ] Strongly disagree [ ] disagree [ ] agree [✓] strongly agree

4. Is the level of course high

[ ] Low [✓] moderate [ ] high [ ] Very high

5. Is the course exposed you to the new knowledge and practices

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

6. Rate the knowledge of the speakers in providing you the expected outcome

[ ] Strongly disagree [ ] disagree [ ] agree [✓] strongly agree

7. Is the lecturer clear and easy to understand?

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

8. Rate the value of course in increasing your skills

[ ] Strongly disagree [ ] disagree [✓] agree [ ] strongly agree

Suggestions if any: .....

P. Vandana

Signature of the participant

K.S.R.M COLLEGE OF ENGINEERING, KADAPA

DEPARTMENT OF HUMANITIES & SCIENCES

Course feedback Form on Solid State Physics : 01/02/2020 to 13-03-2020

Roll Number	Name of the student	Is the course content met your expectation	Is the lecture sequence well planned?	The contents of the course is explained with neat diagrams and examples	Is the level of course high	Is the course exposed you to the new knowledge and practices	Rate the knowledge of the speakers in providing you the expected outcome	Is the lecturer clear and easy to understand?	Rate the value of course in increasing your skills	Suggestions if any:
199Y1A0302	B SRINIDHI SAI	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0303	BANDI SHIVA REDDY	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0304	CHAGANTI SUNIL KUMAR REDI	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0305	CHEPPALI AMATHYA	Y	agree	agree	moderate	agree	agree	agree	agree	
199Y1A0306	CHIRUCHAPALA ABDUL SUBAH	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0307	DEVAPATLA BHARATH SIMHA REDDY	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0308	DUDIMANI SAI SRUJAN KUMAR	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0310	GANGALA VENKATA PRATHAP	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0311	GANUGAPENTA BHARATH	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0318	KONERU SAI KARTHIK	Y	agree	agree	high	agree	agree	agree	strong agree	
199Y1A0319	KOTHAPALLE VAMSIDHAR REDDY	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0320	KUMMARI MANJUNATH	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0322	L M VINAY KUMAR	Y	agree	Stongly agree	high	agree	agree	agree	agree	
199Y1A0323	M.Joshua	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0326	MARKAPURAM MYSORA REDD	Y	Stongly agree	agree	high	agree	agree	agree	agree	
199Y1A0327	MEDIMALA KIRAN KUMAR	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0329	MOLAKALA SREEKANTH REDD	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0330	MOYILLA CHARAN REDDY	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0334	PALLETI VAMSIDHAR REDDY	Y	agree	Stongly agree	moderate	agree	Stongly agree	agree	agree	

Roll Number	Name of the student	Is the course content met your expectation	Is the lecture sequence well planned?	The contents of the course is explained with neat diagrams and examples	Is the level of course high	Is the course exposed you to the new knowledge and practices	Rate the knowledge of the speakers in providing you the expected outcome	Is the lecturer clear and easy to understand?	Rate the value of course in increasing your skills	Suggestions if any:
199Y1A0335	PASUPALA RAVI KUMAR	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0337	PULAKONDAM BHEEMAIAH	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0338	REDDAM VEERA TEJASWAR REDDY	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0341	SHAIK ABDUL RASHEED	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0343	SHAIK GHOUSE BASHA	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0345	SHAIK MAHAMMED MANSOOR	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0348	SHAIK MOHAMMED SHOAIB AKTHAR	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0349	SHAIK NAYEEMUR RAHMAN	Y	agree	agree	high	agree	agree	agree	agree	
199Y1A0350	SHAIK ZABEEULLA	Y	agree	Stongly agree	high	agree	agree	agree	agree	
199Y1A0352	SUDA ABHILASH KUMAR REDD	Y	agree	agree	high	agree	agree	Strongly agree	Strongly agree	
199Y1A0354	SYED ASLAM	Y	agree	agree	high	agree	agree	agree	agree	

Coordinator

HODH&S

Dr. I. SREEVANI M.Sc.,Ph.D
Head of Humanities & Sciences
K.S.R.M. College of Engineering
KADAPA - 516 005

CRYSTALLOGRAPHY AND ULTRASONICS

Ultrasonics: Introduction – Production of ultrasonics by piezoelectric method – Propertiesnd detection – Applications in non-destructive testing.

The word *ultrasonic* combines the Latin roots ultra meaning *'beyond'* and sonic meaning *sound*.

The sound waves having frequencies ranging from 20 Hz – 20 kHz are called audible range.

The sound waves having frequencies less than 20 Hz are called infrasonic.

The sound waves having frequencies above the audible range i.e. above 20000Hz are called *ultrasonic waves*. Generally these waves are called as *high frequency waves*.

Properties of ultrasonic waves:

1. The Ultrasonic waves can propagate through solids, liquids & gases.
2. The Ultrasonic waves cannot travel through vacuum.
3. These waves travel with speed of sound in a given medium.
4. These waves are not electromagnetic waves.
5. The Ultrasonic waves are high frequency sound waves.
6. They produce heating effect when passes through the medium.
7. These waves get reflected, refracted and absorbed by the medium.
8. They can be transmitted over large distances without loss of any energy.
9. These waves can weld certain plastics, metals etc.
10. They can produce vibrations in low viscosity liquids.
11. They produce stationary wave pattern in the liquid while passing through it.

Production of Ultrasonic waves:

PIEZO ELECTRIC GENERATOR OR OSCILLATOR:

PRINCIPLE:

If mechanical pressure is applied to one pair of opposite faces of certain crystals like quartz, Rochelle salt, tourmaline, etc., equal and opposite electrical charges appear across its other faces. This is called as **piezo-electric effect.**

The converse of piezoelectric effect is also true.

If an electric field is applied to one pair of faces, the corresponding changes in the dimensions of the other pair of faces of the crystal are produced. This is known as ***inverse piezoelectric*** effect.

Construction:

*

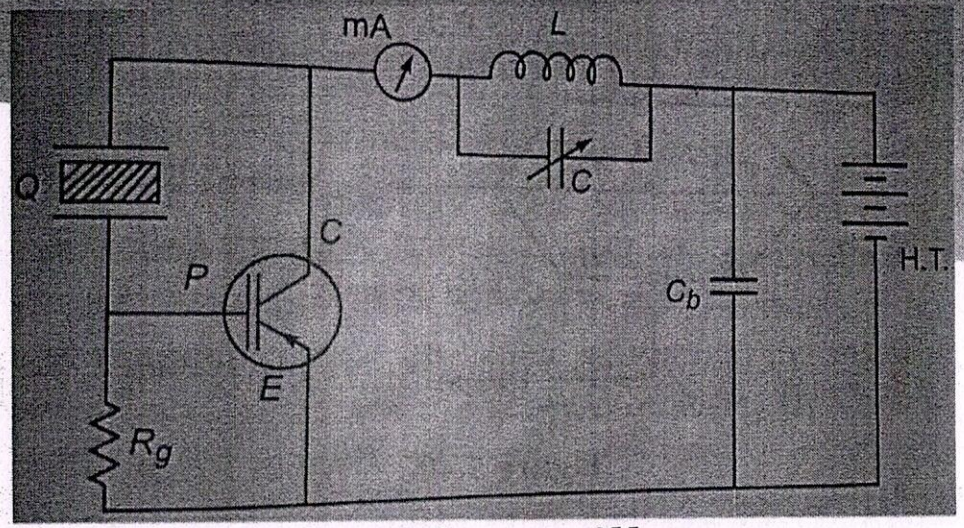


Fig: Piezo electric oscillator

* The quartz crystal is placed between two metal plates A and B.
* The plates are connected to the collector and base of transistor. Collector is also connected to LC circuit and high tension source shunted through a by-pass capacitor C_b.
* C_b is used to stop high frequency currents from passing through battery.
* The capacity of variable capacitor is adjusted so that the frequency of the oscillating circuits is equal to the natural frequency of the crystal.
* R_g provides necessary biasing for the base and emitter circuit.

Working:

* When H.T. battery is switched on, the circuit starts functioning slowly an alternating potential difference is built across the quartz crystal which sets the crystal into vibrations.
* By varying the capacity of capacitor C, at a particular stage the frequency of the alternating potential across the crystal coincides with the natural frequency of quartz crystal setting it to produce ultrasonic waves.
* This stage is indicated by milliameter by showing maximum current.
* The natural frequency of quartz crystal of thickness t is given by

$$f = \frac{n}{2l}\sqrt{\frac{Y}{\rho}}$$

where n = 1,2,3,4 ... etc. for fundamental, first over tone, second over tone etc.,

Y = Young's modulus of the crystal and

ρ = density of the crystal.

Advantages:

1. Ultrasonic frequencies as high as 500 MHz can be obtained with this arrangement.
2. The output of this oscillator is very high.
3. It is not affected by temperature and humidity.

Disadvantages:

1. The cost of piezo electric quartz is very high
2. The cutting and shaping of quartz crystal are very complex.

Detection of ultrasonic waves:

Ultrasonic waves can be detected by various methods as listed below:

1. Piezoelectric detector:

* Ultrasonic waves can be detected by using piezoelectric effect. As shown in Fig.1, when the faces of a quartz crystal along the mechanical axis is subjected to ultrasonic, then it undergoes compression and expansion. The opposite faces along the electrical axis, will have induced charges which establishes a potential difference across the faces. This potential difference indicates the presence of ultrasonic waves.

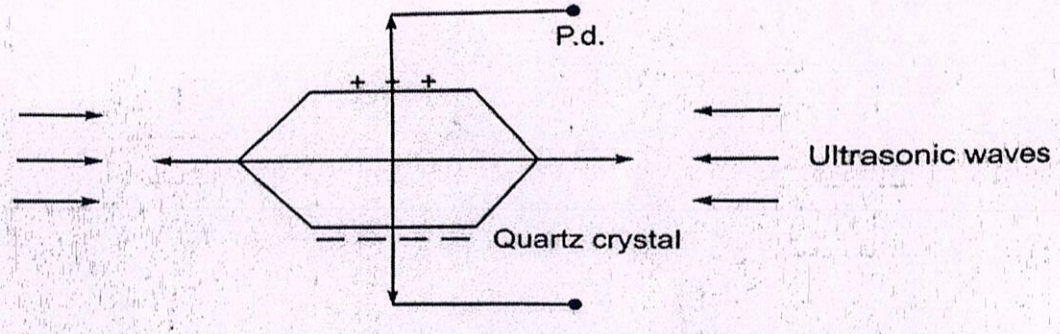
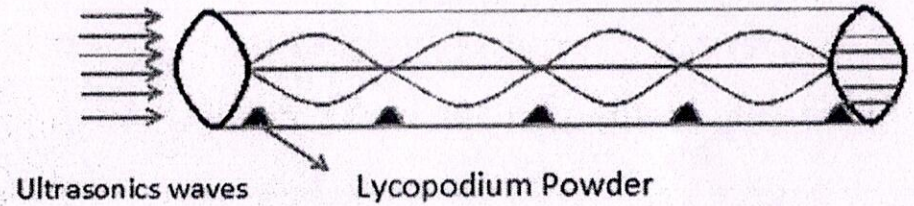


Fig.1: piezoelectric effect

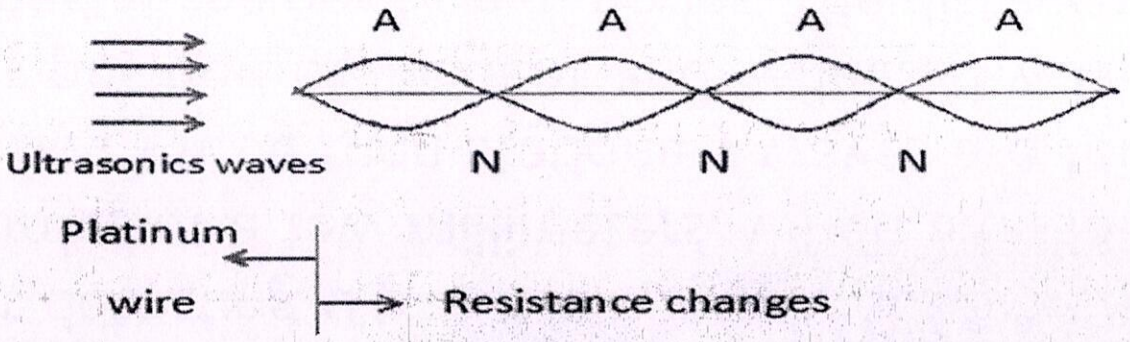
2. Kundt's tube method:

* Kundt's tube filled with lycopodium power can also be used for detecting ultrasonic waves whose wavelength is of the order of a few millimeters. When ultrasonic waves pass through tube then stationary waves are formed due to super position of incident and reflected waves. Heaps are formed at the position of nodes. The distance between adjacent nodes is calculated, which is equal to half the wavelength of ultrasonic waves. Hence with this method wavelength of ultrasonic waves can be calculated.

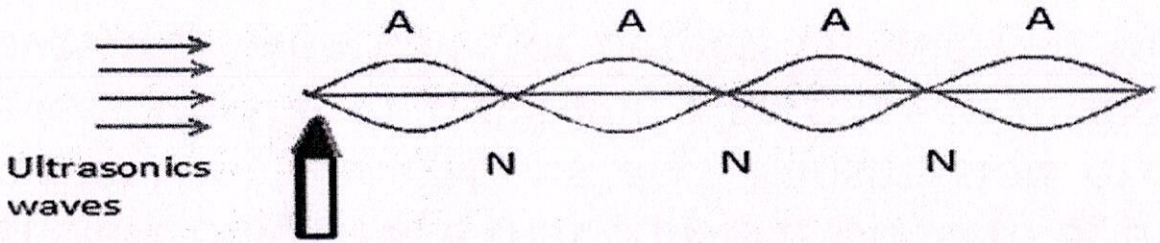


3. Thermal method for detection of ultrasonic waves:

* When a platinum wire is moved in the medium consists of standing waves of ultrasonics due to variations of temperature at nodes and antinodes, the resistance of wire also changes. By noticing the changing in resistance of wire one can detect the presence of ultrasonic waves.



* **4. Sensitive flame method:**
* When a narrow sensitive flame is moved in a medium where ultrasonic waves are present. The flame remains stationary at antinode and flickers at nodes.

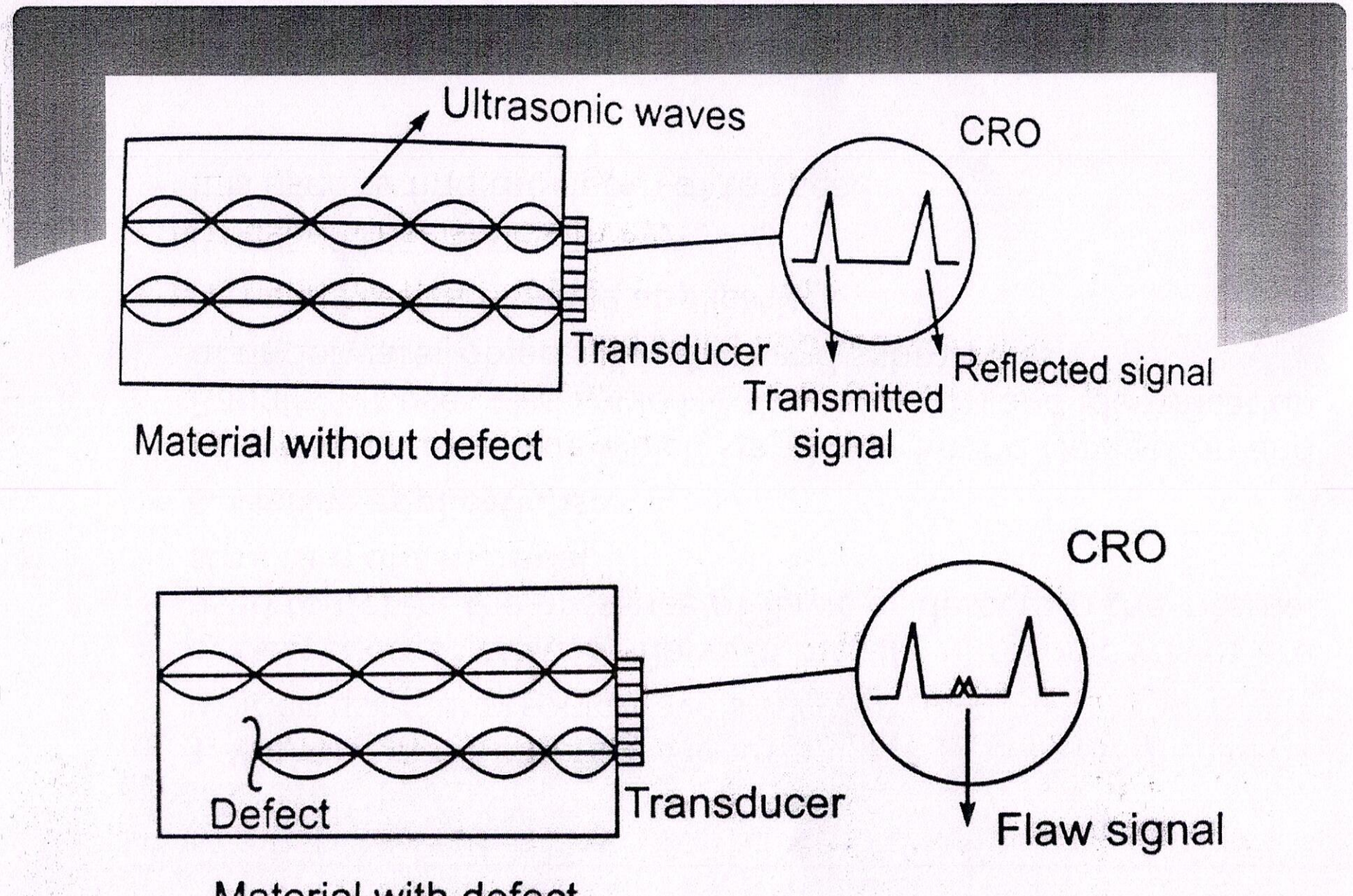


2.5. Applications of Ultrasonics:

1. Nondestructive Testing

* Ultrasonic wave were extensively used for nondestructive testing of the material, i.e., detecting the defects (flaws) inside the material without disturbing material properties. Nondestructive testing systems consists of transducers (An electronic device that converts on form of energy into another) for generations and transmission of ultrasonic waves into the material and also to receive the reflected waves from the flaws or defects. To identify the defects, cathode ray oscilloscope is used.

When the transducer generates and transmits the ultrasonic waves into the testing material it will be reflected by the other end of the material and is received by the transducer. Corresponding to transmitted and reflected waves we can observe two well-resolved signals on the screen of CRO.


Ultrasonic waves
CRO
Transducer
Reflected signal
Transmitted signal
Material without defect
CRO
Defect
Transducer
Flaw signal
Material with defect

* **2. Drilling:** Ultrasonic waves are used for drilling small holes in very hard materials like glass, diamond, quartz, calcite and silicon etc.
* **3. Welding and Soldering:** Almost all plastic and metals can be welded using ultrasonic wave's suitable form of energy.
* **4. Detection of craks or flaws in metals:** ultrasonic waves are used to detect the presence of flaws or defects in the internal structure of a material.
* **5. Marine applications:**
* SONAR is a technique which stands for Sound Navigation and Ranging. It uses ultrasonic for the detection and identification of underwater objects like ships and submarines.
* It is used for fish-finding application.
* It is used for seismic survey.
* It is used to find the depth of the sea.

* **6. Medical applications:**
* In therapeutics, ultrasonic waves are used to apply message and deep heat therapy to muscle tissues.
* In diagnostics: Medical sonography is an ultrasound based diagnostic medical imaging technique used to visualize muscles, tendons.
* Date of pregnancy
* Check the location of the placenta
* Check for the number of fetuses
* Check for fetal movement, breathing and heartbeat.