**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 OFELECTRONICS AND COMMUNICTION ENGINEERING**

# VALUE ADDED COURSE

# ON

# "ANTENNA DESIGN"

**Resource Person : Dr. G. Hema Latha, Professor&HOD, Dept. of ECE, KSRMCE**

**Miss. S.Jabeen, Assistant Professor, Dept. of ECE, KSRMCE**

**Course Coordinator: Smt. Y. Sravanthi, Assistant Professor, Dept. of ECE, KSRMCE**

**Duration: 16/11/2023 to 11/12/2023**

# 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**


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Lr./KSRMCE/ECE/2023-24/ Date: 06-11-2023

**To**
The Principal,
KSRMCE-A,
Kadapa.

Respected Sir,

**Sub:** Permission to Conduct Value Added Course on "ANTENNA DESIGN" from 16/11/2023 to 11/12/2023 – Req- Reg.

The Department of Electronics and Communication Engineering is going to Conduct Value Added Course on "ANTENNA DESIGN" to the V Sem B.Tech students from 16/11/2023 to 11/12/2023 in IOT Lab from 04:00PM to 06:00PM. In this regard, I kindly request you to grant permission to conduct the event.

Thanking you sir,

Forwarded to the principal sir
G. [signature]

[signature]
Yours faithfully

( Smt.Y Sravanthi, Asst.Professor, Dept. of ECE.)



Permitted
V.S.S. Murthy
06/11/2023

# K.S.R.M. COLLEGE OF ENGINEERING

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**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/ECE/2023-24/ Date: 07/11/2023

## Circular

The Department of Electronics and Communication Engineering is going to Conduct Value Added Course on "ANTENNA DESIGN" to the V Sem B.Tech students from 16/11/2023 to 11/12/2023 in IOT Lab from 04:00PM to 06:00PM. In this regard all the V Sem B.Tech students are requested to attend make the event success.

Coordinator:
Smt.Y Sravanthi,
Asst. Professor,
Dept. of ECE.

**HOD**

**Dept. of ECE**

Cc to:

IQAC-KSRMCE


**Date: 10/11/2023**

## DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

## REGISTRATION FORM

**Value Added Course**
**On**
**"ANTENNA DESIGN"**
**From 16/11/2023 to 11/12/2023**

| S.No | Full Name | Roll Number | Branch | Semester | Signature |
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**Coordinator:**

**HOD**

K.S.R.M. COLLEGE OF ENGINEERING
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LIGHTED TO LIGHTEN

KSNR lives on..

**Date: 10/11/2023**

## DEPARTMENT OF ELETRONICS AND COMMUNICATION ENGINEERING

## REGISTRATION FORM

**Value Added Course**
**On**
**"ANTENNA DESIGN"**
**From 16/11/2023 to 11/12/2023**

| S.No | Full Name | Roll Number | Branch | Semester | Signature |
|---|---|---|---|---|---|
| 1. | A. Akhila | 219Y1A0403 | ECE | 5th | A. Akhila |
| 2. | A. Chandrika | 219Y1A0405 | ECE | Vth | A. Chandrika |
| 3. | K. Lavanya | 219Y1A0466 | ECE | V | K. Lavanya |
| 4. | A. Kavya | 219Y1A0404 | ECE | V | A. Kavya |
| 5. | G. Sharmila | 219Y1A0457 | ECE | V | G. Sha |
| 6. | C. Sravanthi | 219Y1A0424 | ECE | V | C. Sla |
| 7. | D. Farida | 219Y1A0442 | ECE | V | D. Farida |
| 8. | B. Saikiran | 219Y1A0411 | ECE | V | B. Sai |
| 9. | D. Shilpa | 219Y1A0434 | ECE | V | D. Shilpa |
| 10. | G. Ganesh | 219Y1A0449 | EEE | V | Ganesh |
| 11. | G. Sravani | 219Y1A0453 | ECE | V | Sravani |
| 12. | B. Poornima | 219Y1A0408 | ECE | V | B. Poornima |
| 13. | D. Hemalatha | 219Y1A0437 | ECE | V | D. Hema |
| 14. | B. Charan | 219Y1A0409 | ECE | V | B. Char |
| 15. | C. Renuka | 219Y1A0427 | ECE | V | C. Renu |
| 16. | C. Lavanya | 219Y1A0430 | ECE | V | C. Lavanya |
| 17. | K. Anand | 219Y1A0472 | ECE | V | Anand |
| 18. | M. Sumanth | 219Y1A0491 | ECE | V | Sumanth |
| 19. | P. Haneeba | 219Y1A04C3 | ECE | V | [illegible] |
| 20. | M. Prashanth | 219Y1A0486 | ECE | V | [illegible] |
| 21 | M. Nagendu | 219Y1A0490 | ECE | V | Nand |
| 22 | M. Sumanth | 219Y1A0491 | ECE | V | Sumanth |
| 23 | N. Sahithya | 219Y1A04B2 | ECE | V | Sahi |
| 24 | N. Maneesha | 219Y1A04B3 | ECE | V | Maneesh |
| 25. | N. Swapna | 219Y1A04B4 | ECE | V | Swa |
| 26 | N. Jagadeesh | 219Y1A04B5 | ECE | V | Jag |

| | | | | | |
|---|---|---|---|---|---|
| 27 | O. Ravanamma | 219Y1A04B8 | ECE | V | (signature) |
| 28. | P. Haneefa | 219Y1A04C3 | ECE | V | Haneefa |
| 29. | P. Chandana | 219Y1A04C6 | ECE | V | (signature) |
| 30 | P. Vasanthi Reddy | 219Y1A04C8 | ECE | V | Vasanthi |
| 31 | P. Devendra | 219Y1A04D2 | ECE | V | (signature) |
| 32 | P. Ramadevi | 219Y1A04D3 | ECE | V | Ramadevi |

Coordinator: (signature)

(signature)
HOD

*Value Added Course*

# ANTENNA DESIGN

**40 hrs**

**Course Objectives:**

At the end of the course, students will

- Understand measurement of antenna parameters and application of basic theorems in analyzing radiation characteristics of antenna.
- Design and implement antennas using EM simulation tools.

**Course Outcomes:**

At the end of the course, students will be able to

- Demonstrate the structure and operation of various antennas and to describe their parameters.
- Apply basic theorems to analyze the variation of field strength of radiated waves.
- Measure the radiation pattern of wired, aperture, planar and array antennas.
- Familiar with EM simulation tools to implement antenna prototypes.

**Unit-I: (10 hrs)**

***Wired Antennas:*** Basic theorems in analyzing radiation characteristics of antenna, Dipole antenna, Monopole antenna, Loop antenna, travelling wave antennas (Long Wires), Broadband antennas (Helical).

**Unit-II: (10 hrs)**

***Array Antennas:*** Uniform feed Linear/Planner Array Antennas; Non-Uniform feed Linear/Planar Array Antennas (Binomial/Dolph-Tschebyscheff).

**Unit-III: (08 hrs)**

***Aperture Antennas:*** Uniform/Non-uniform illumination; Rectangular and Circular Apertures; Horn Antennas; Microstrip Antennas; Reflector Antennas.

**Unit-IV: (12 hrs)**

***Hands on:*** Using AMS Kit - Inverse square law, Reciprocity theorem, Measurement of radiation pattern of all wired and aperture antennas, Measurement of radiation pattern of array antennas, Analysis of co-polarization and cross polarization, Using HFSS simulation tool - Design and simulation of microstrip antenna, probe fed patch antenna and array of MSAs.

**Reference Books:**


[1] Constantine A. Balanis, "Antenna Theory: Analysis and Design", John Wiley & Sons Inc., 3rd Edition, 2005

[2] Ben Allen and el., "Ultra-Wideband Antennas and Propagation for Communications, Radar and Imaging", John Wiley & Sons Inc., 2007

[3] Zhi Ning Chen, "Antennas for Portable Devices", John Wiley & Sons, Ltd, May.2007

[4] David M. Pozar, "Microwave Engineering", John Wiley & Sons, Inc., 3rd Edition, 2005

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## SCHEDULE

**Department of Electronics & Communication Engineering**

**Value Added Course**
**On**
**"ANTENNA DESIGN" From 16/11/2023 TO 11/12/2023**

| Date | Timing | Resource Person | Topic to be covered |
|---|---|---|---|
| 16/11/23 | 4 PM to 6 PM | S. Jabeen | Unit 1: Wired Antennas: Basic theorems in analyzing radiation characteristics of antenna |
| 17/11/23 | 4 PM to 6 PM | S. Jabeen | Dipole antenna, Monopole antenna |
| 18/11/23 | 4 PM to 6 PM | S. Jabeen | Loop antenna, travelling wave antennas (Long Wires) |
| 20/11/23 | 4 PM to 6 PM | S. Jabeen | Broadband antennas (Helical) |
| 21/11/23 | 4 PM to 6 PM | S. Jabeen | Applications, Numerical problems |
| 23/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Unit 2: Array Antennas: Uniform feed Linear/Planner Array Antennas |
| 24/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Non-Uniform feed Linear/Planar Array |
| 25/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Antennas (Binomial) |
| 27/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Antenna Arrays (Dolph-Tschebyscheff). |
| 28/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Applications, Numerical problems |
| 29/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Unit 3: Aperture Antennas: Uniform/Non-uniform illumination |
| 30/11/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Rectangular and Circular Apertures |
| 1/12/23 | 4 PM to 6 PM | Dr. G. Hemalatha | Horn Antennas; Reflector Antennas |
| 2/12/23 | 4 PM to 6 PM | S. Jabeen | Microstrip Antennas |
| 4/12/23 | 4 PM to 6 PM | S. Jabeen | Unit 4: Hands on: Using AMS Kit - Inverse square law, Reciprocity theorem |
| 5/12/23 | 4 PM to 6 PM | S. Jabeen | Measurement of radiation pattern of all wired and aperture antennas |
| 6/12/23 | 4 PM to 6 PM | S. Jabeen | Measurement of radiation pattern of array antennas |
| 7/12/23 | 4 PM to 6 PM | S. Jabeen | Analysis of co-polarization and cross polarization |
| 8/12/23 | 4 PM to 6 PM | S. Jabeen | Using HFSS simulation tool - Design and simulation of microstrip antenna |
| 11/12/23 | 4 PM to 6 PM | S. Jabeen | Using HFSS simulation tool - Design and simulation of probe fed patch antenna and array of MSAs |

**Resource Person(s)** **Coordinator(s)** **HOD**

# K.S.R.M. COLLEGE OF ENGINEERING

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## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

**Attendance sheet of Valve Added Course on "ANTENNA DESIGN" From 16/11/2023 to 11/12/2023**

| Sl. No. | Roll No. | Name | 16/11 | 17/11 | 18/11 | 20/11 | 21/11 | 23/11 | 24/11 | 25/11 | 27/11 | 28/11 | 30/11 | 01/12 | 02/12 | 04/12 | 05/12 | 06/12 | 07/12 | 08/12 | 11/12 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 219Y1A0403 | A Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila | Akhila |
| 2 | 219Y1A0404 | A Kavya | Kavya | A | Kavya | Kavya | Kavya | Kavya | Kavya | A | Kavya | Kavya | Kavya | Kavya | Kavya | A | Kavya | Kavya | Kavya | Kavya | Kavya |
| 3 | 219Y1A0405 | A Chandrika | Cha | Cha | Cha | Cha | A | Chan | Chand | Chan | Chan | Chand | Chan | Chand | Chand | Chan | Chan | Cha | Ch | Ch | Ch |
| 4 | 219Y1A0408 | B Poornima | Poorn | Poorn | Poorn | Poorni | Poorn | Poorni | A | Poornima | Poornima | Poornima | Poornima | Poornima | Poornima | Poornima | Poornima | Poornima | A | Poornima | Poornima |
| 5 | 219Y1A0409 | B Charan | Charan | Charan | A | Charan | Charan | Charan | Charan | Charan | Charan | Charan | Charan | Charan | Cha | Cha | Cha | Cha | Cha | Cha | Cha |
| 6 | 219Y1A0411 | B SaiKiran | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | Sai | A |
| 7 | 219Y1A0424 | C Sravanthi | Srava | Sra | Sr | Sra | Sra | Sra | Sra | Sra | Sra | Sra | A | Sravant | Srava | Srava | Srav | Srav | Srav | Sra | Sra |
| 8 | 219Y1A0427 | C Renuka | Ren | Ren | Ren | Ren | Ren | Ren | Ren | Ren | Ren | Ren | Ren | Ren | A | Ren | Renu | Renu | Renu | Renu | Renu |
| 9 | 219Y1A0430 | C Lavanya | Lava | Lava | Lav | Lav | Lav | A | Lava | Lava | Lava | Lava | Lav | Lav | Lav | Lav | Lav | Lav | A | Lav | Lav |
| 10 | 219Y1A0434 | D Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | Shilpa | A | Shilpa | Shilpa | Shilpa | Shilpa |
| 11 | 219Y1A0437 | D Hemalatha | HL | HL | A | HL | HL | HL | HL | HL | Hema | Hema | Hema | Hema | Hema | Hema | Hema | Hema | Hema | Hema | Hema |
| 12 | 219Y1A0442 | D Farida | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF | DF |
| 13 | 219Y1A0449 | G Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | A | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh | Ganesh |
| 14 | 219Y1A0453 | G Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | A | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani | Sravani |
| 15 | 219Y1A0457 | G Sharmila | Sharmila | Sharmila | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sha | Sh | Sha | Sha | Sha | A |
| 16 | 219Y1A0466 | K Lavanya | Lava | A | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | Lava | A |

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| 17 | 219Y1A0472 | K Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand | Anand |
| 18 | 219Y1A0480 | K Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | A | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok | Ashok |
| 19 | 219Y1A0482 | K Mounika | K mounika | Mounika | Mounika | Mounika | Mounika | Mounika | Mounika | Mouni | Mouni | Mouni | Mouni | Mouni | Mouni | A | Mouni | Mouni | Mouni | Mouni | Mouni |
| 20 | 219Y1A0486 | M Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | A | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth | Prashanth |
| 21 | 219Y1A0490 | M Nandu | M | M | M | M | M | M | M | M | M | A | M | M | M | M | M | M | M | A | M |
| 22 | 219Y1A0491 | M Sumanth | Suman | Suman | Suman | A | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman | Suman |
| 23 | 219Y1A04B2 | N Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya | Sahithya |
| 24 | 219Y1A04B3 | N Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | A | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha | Maneesha |
| 25 | 219Y1A04B4 | N swapna | Swapna | A | Swapna | Swapna | A | Swapna | A | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna | Swapna |
| 26 | 219Y1A04B5 | N Jagadeesh | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga | Jaga |
| 27 | 219Y1A04B8 | O Ravanamma | O Ravanamma | O Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | A | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma | Ravanamma |
| 28 | 219Y1A04C3 | P Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | A | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa | Haneefa |
| 29 | 219Y1A04C6 | P Chandana | Cha | Cha | Cha | Cha | A | Cha | Cha | Cha | Cha | Cha | Cha | Che | Cha | Cha | Che | Che | Cha | Cha | Che |
| 30 | 219Y1A04C8 | P Vasanth reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy | P.V reddy |
| 31 | 219Y1A04D0 | P Devendra | P.devendra | P.devendra | P.devendra | P.devendra | P.devendra | P.devendra | P.devendra | A | P.devendra | P devendra | P.devendra | A | P.devendra | P.devendra | A | P.devendra | P.devendra | A | P.devendra |
| 32 | 219Y1A04D3 | P Ramadevi | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd | Rmd |

Coordinator(s)

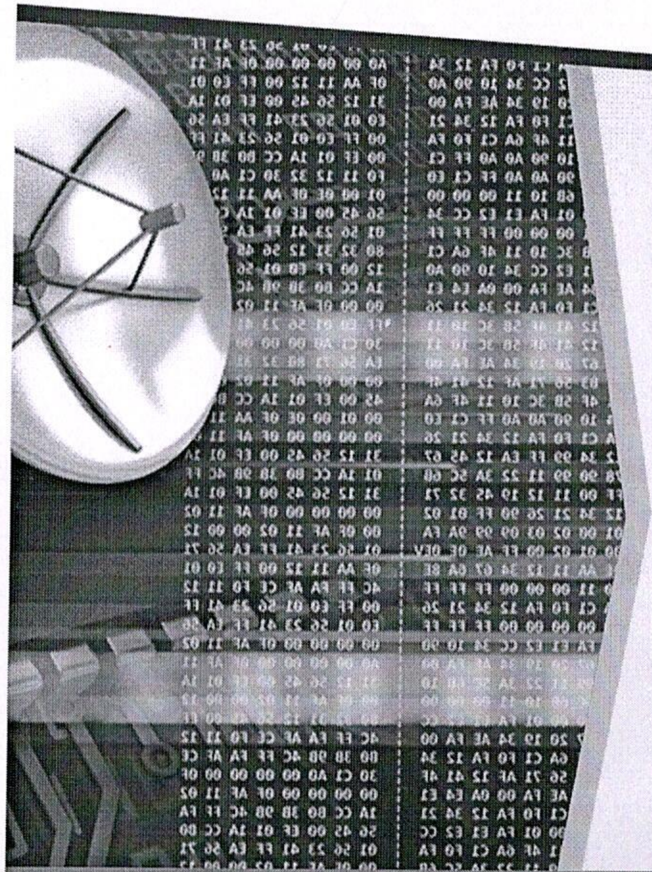
HoD

**ENGINEERING**

16 005
& Affiliated to JNTUA, Ananthapuramu.

# VALVE ADDED COURSE ON

# "ANTENNA DESIGN"



**ECE**

**IoT Lab**

**16-11-2023**
**to**
**11-12-2023**

## Resource Persons

**Dr. G. Hemalatha**
Professor & HOD, ECE.

**Miss. S.Jabee**
Assistant professor, ECE D

Coordinator **Smt. Y. Sravanthi**
Assistant professor, ECE Dept.

*Dr. Kandula Chandra Obul Reddy*
(MD, KGI)

*Smt. K.Rajeswari*
(Correspondent,Secretary,Treasurer)

*Sri K. Madan Mohan Reddy*
(Vice - Chairman)

*Sri K. Ra*
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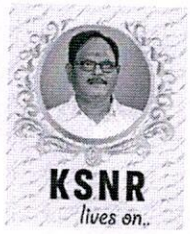



## DEPARTMENT OF ELECTRONICS AND COMMUNICATION ENGINEERING

## ACTIVITY REPORT

**On "Value Added Course" on**

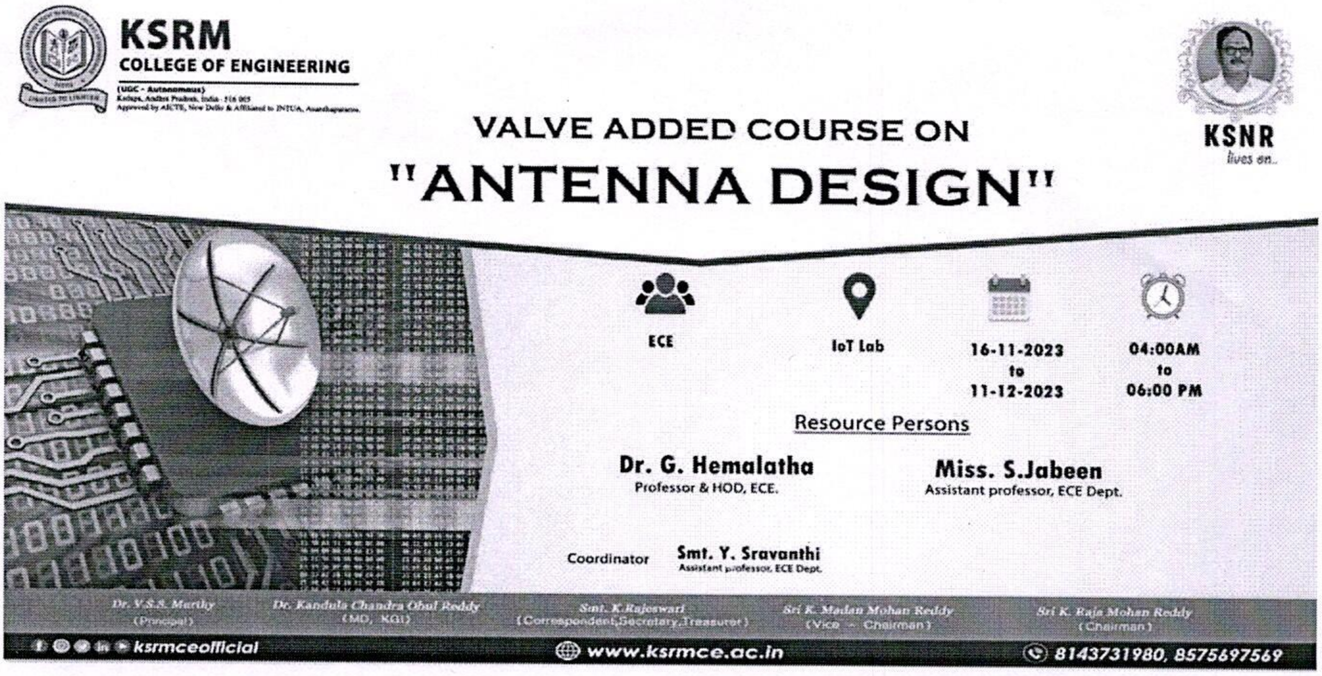
"ANTENNA DESIGN"

**From 16/11/2023 to 11/12/2023**

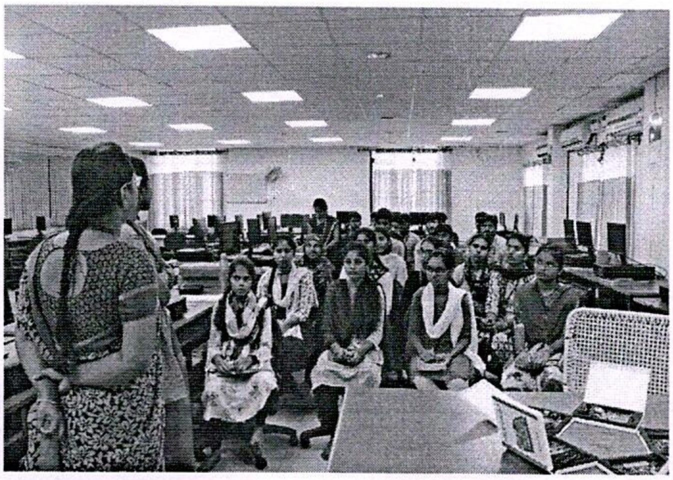
| | | |
|---|---|---|
| **Target Audience** | : | **B.Tech VSEM ECE Students** |
| **Details of Participants** | : | **32 Students** |
| **Resource Person** | : | **Smt. Dr.G.Hema Latha, Professor in Dept. of ECE, KSRMCE**<br>**Miss S.Jabeen, Assistant Professor in Dept. of ECE, KSRMCE** |
| **Coordinator** | : | **Smt.Y Sravanthi,Assistant Professor in Dept. of ECE, KSRMCE** |
| **Organizing Department** | : | **Electronics and Communication Engineering** |
| **Venue** | : | **IOT Lab @ 04:00PM to 06:00PM** |

**Description** : The department of ECE has Organizing Value Added Course on "ANTENNA DESIGN" to the V B. Tech ECE students from 16/11/2023 to 11/12/2023 On this occasion the students are actively attended the lecture and they know the application of Antenna Designing technics. **Smt. Dr. G.Hema Latha & Miss S.Jabeen** as a resource person to the lecture and introduces various types of Antennas , measurement tecnics ans Simulation tool . **Smt .Y Sravanthi, Assistant Professor in Dept. of ECE,** as a coordinator for the event, and all the V B. Tech ECE students are attended the Lecture daily @ 04:00PM to 06:00PM. and finally conveying a vote of thanks at the end of the day to all the participants with certificates.

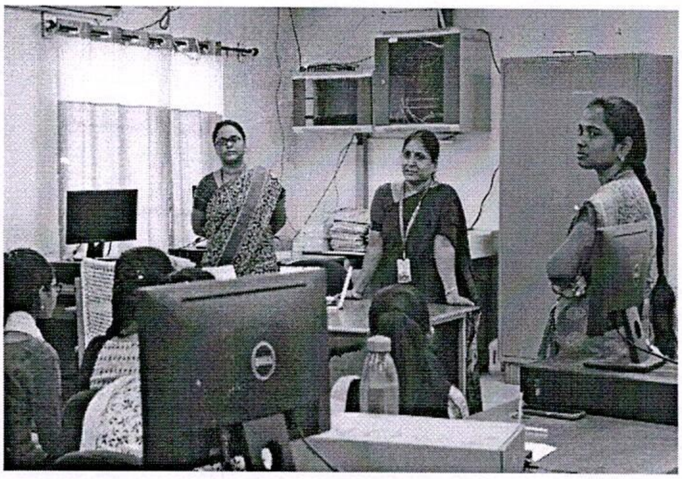
**Photos:**




**Banner**



**Resource Person S.Jabeen delivered the lecture**



**Resource Person Dr. G. Hemalatha addressed the students.**

**Coordinator**

**HOD**

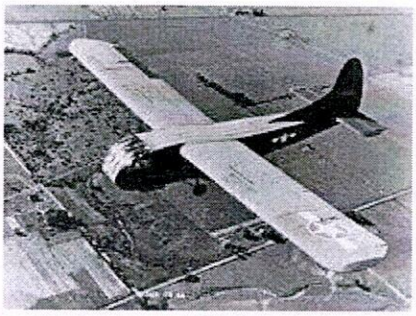
UNIT 4 GLIDING DRONES

- Glider, Lift, Drag, Airfoil and its type
- Incident and decalage angle
- Three axis motions (roll, pitch, and yaw)
- Thrust, Aspect ratio and glide ratio
- Glide or dive and descent, gliding angle
- Climb, Center of pressure, Pitching moment
- Load factor, Angle of attack, Build our own glider drone.

**GLIDER:**

A **glider** is a fixed-wing aircraft that is supported in flight by the dynamic reaction of the air against its lifting surfaces, and whose free flight does not depend on an engine.[1] Most gliders do not have an engine, although motor-gliders have small engines for extending their flight when necessary by sustaining the altitude (normally a sailplane relies on rising air to maintain altitude) with some being powerful enough to take off self-launch.

There are a wide variety of types differing in the construction of their wings, aerodynamic efficiency, location of the pilot, controls and intended purpose. Most exploit meteorological phenomena to maintain or gain height. Gliders are principally used for the air sports of gliding, hang gliding and paragliding. However, some spacecrafts have been designed to descend as gliders and in the past military gliders have been used in warfare. Some simple and familiar types of gliders are toys such as paper planes and balsa wood gliders.



Military Glider

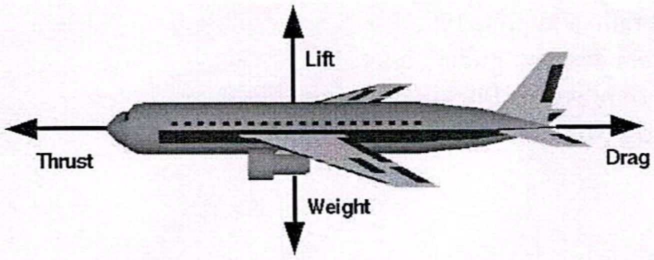
Rocket Glider

**LIFT AND DRAG:**

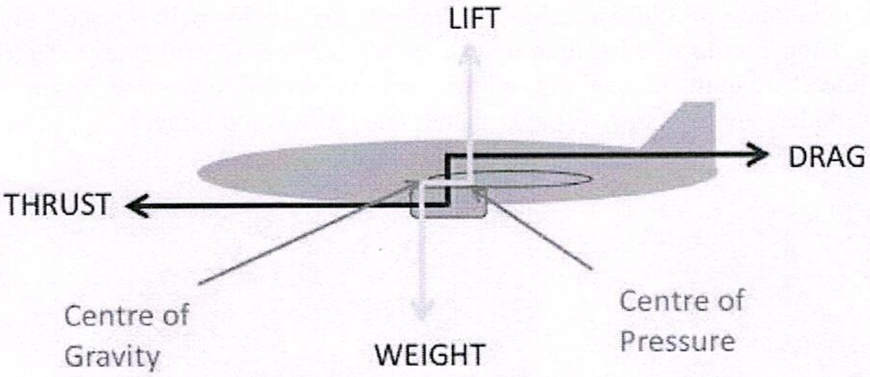
Lift is defined as the component of the aerodynamic force that is perpendicular to the flow direction, and **drag is the component that is parallel to the flow direction**.

But lift and drag can only arise as air moves past an object. **Lift pushes the object upward**, and drag, a type of air resistance, slows it down. ... An airfoil also creates lift by "bending" or redirecting airflow. Oncoming air follows the curved shape of the foil, shifting downward as it moves past.

The lift to drag ratio (L/D) is the amount of lift generated by a wing or airfoil compared to its drag. The lift/drag ratio is used to express the relation between lift and drag and is determined by **dividing the lift coefficient by the drag coefficient, CL/CD**.



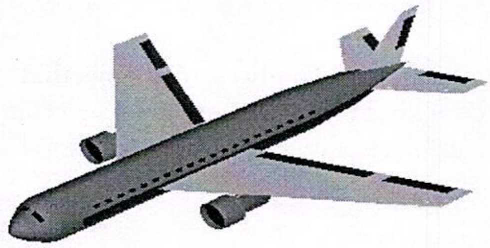

| Flight Condition | Effect |
|---|---|
| Lift > Weight | Plane Rises |
| Weight > Lift | Plane Falls |
| Drag > Thrust | Plane Slows |
| Thrust > Drag | Plane Accelerates |




The drag equation states that drag D is **equal to the drag coefficient Cd times the density r times half of the velocity V squared times the reference area A**. For given air conditions, shape, and inclination of the object, we must determine a value for Cd to determine drag.

## The Drag Equation

Glenn Research Center



$$D = Cd \times \frac{\rho \times V^2}{2} \times A$$

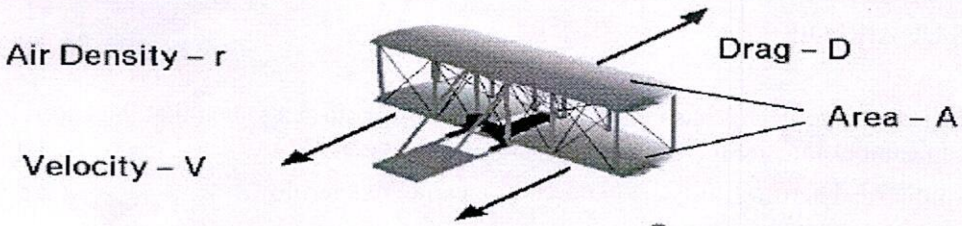
Drag = coefficient x $\frac{\text{density x velocity squared}}{\text{two}}$ x reference area

Coefficient Cd contains all the complex dependencies and is usually determined experimentally.

Choice of reference area A affects the value of Cd .

## Modern Drag Equation

Glenn Research Center




$$D = Cd \frac{r V^2}{2} A$$

Drag = coefficient x density x $\frac{\text{velocity squared}}{\text{two}}$ x reference area

Coefficient Cd contains all the complex dependencies and is usually determined experimentally.

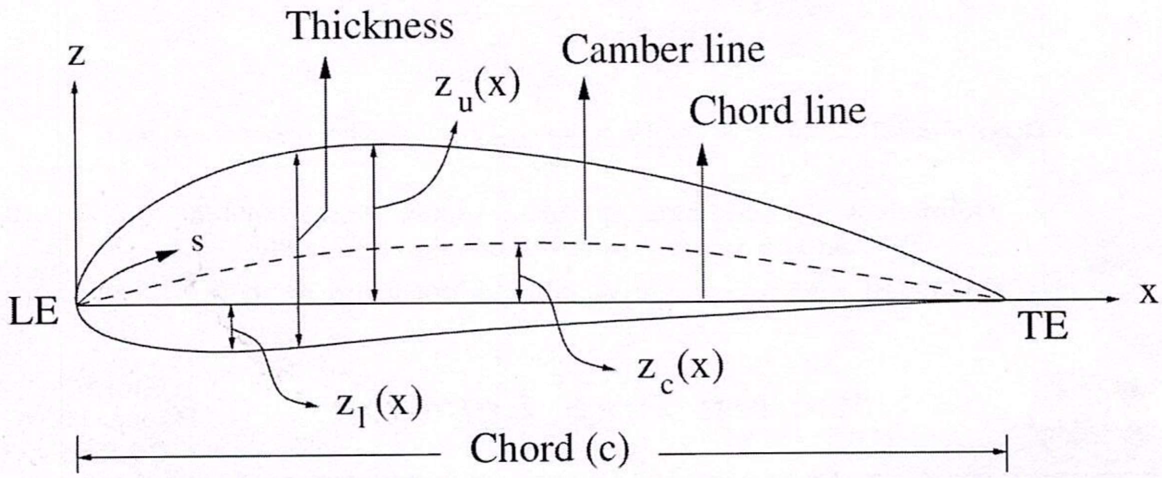
For an aircraft: $Cd = Cd + \frac{Cl_0^2}{\pi \, Ar \, e}$

(aircraft) = (skin friction + form) + (induced)

Airfoil and its Type:

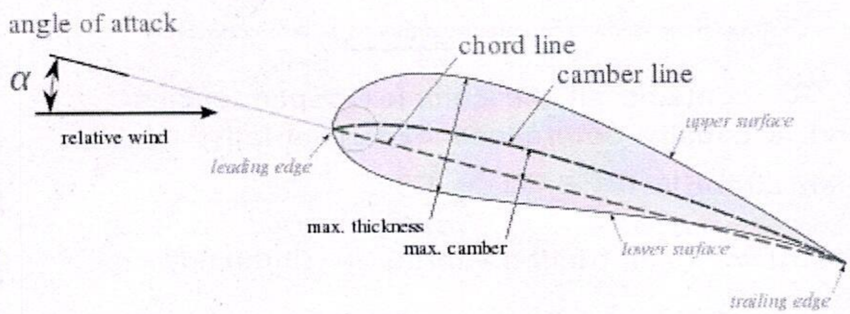
Airfoil, also spelled Aerofoil, shaped surface, such as an airplane wing, tail, or propeller blade, that **produces lift and drag when moved through the air**. An airfoil produces a lifting force that acts at right angles to the airstream and a dragging force that acts in the same direction as the airstream.

Thin airfoil theory is **a straightforward hypothesis of airfoils that relates angle of attack to lift for an incompressible and inviscid flow past an airfoil**. ... Thin airfoil theory is a straightforward hypothesis of airfoils that relates angle of attack to lift for an incompressible and inviscid flow past an airfoil.




- TYPES OF AIRFOIL:

- Symmetrical aerofoil: This has identical upper and lower surfaces such that the chord line and mean camber line are the same producing no life at zero AOA. ...
- Non-symmetrical aerofoil: It is also known as a cambered aerofoil.




- INCIDENT AND DECALAGE ANGLE:

# K.S.R.M. COLLEGE OF ENGINEERING

(UGC - Autonomous)

Kadapa, Andhra Pradesh, India– 516 003

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

LIGHTED TO LIGHTEN

KSNR *lives on..*

## CERTIFICATION OF PARTICIPATION

This is to certify that Mr/Ms B. Sai Kiran bearing Roll No. 219Y1A0411 Has participated in Valve Added course on"ANTENNA DESIGN" and Organized by Department of ECE, K.S.R.M College of Engineering (Autonomous), Kadapa. from 16/11/2023 to 11/12/2023.

Coordinator

HOD

V. S. S. Murthy
PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516005, (A.P.)

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.

KSNR
lives on..

## CERTIFICATION OF PARTICIPATION

This is to certify that Mr/Ms M. Sumanth bearing Roll No. 219Y1A0491 Has participated in Valve Added course on"ANTENNA DESIGN" and Organized by Department of ECE, K.S.R.M College of Engineering (Autonomous), Kadapa. from 16/11/2023 to 11/12/2023.

Coordinator

HOD

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516005, (A.P.)

Principal

# K.S.R.M. COLLEGE OF ENGINEERING

(UGC - Autonomous)

Kadapa, Andhra Pradesh, India– 516 003

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LIGHTED TO LIGHTEN

KSNR
lives on..

## CERTIFICATION OF PARTICIPATION

This is to certify that Mr/Ms A. Chandrika bearing Roll No. 219Y1A0405 Has participated in Valve Added course on"ANTENNA DESIGN" and Organized by Department of ECE, K.S.R.M College of Engineering (Autonomous), Kadapa. from 16/11/2023 to 11/12/2023.

Coordinator HOD Principal

V. S. S. Murthy

PRINCIPAL
K.S.R.M. COLLEGE OF ENGINEERING
KADAPA-516005, (A.P.)

# Feedback form on Value Added Course "ANTENNA DESIGN" from **16/11/2023 to 11/12/2023**

sravanthi.y@**ksrmce.ac.in** (not shared) Switch account

* Required

Roll Number *

Your answer

Name of the Student *

Your answer

The objectives of the Value Added Course were met (Objective) *

- Excellent
- Good
- Satisfactory
- Poor

The content of the course was organized and easy to follow (Delivery) *

- ◯ Excellent
- ◯ Good
- ◯ Satisfactory
- ◯ Poor

The Resource Persons were well prepared and able to answer any question (Interaction) *

- ◯ Excellent
- ◯ Good
- ◯ Satisfactory
- ◯ Poor

The exercises/role play were helpful and relevant (Syllabus Coverage) *

- ◯ Excellent
- ◯ Good
- ◯ Satisfactory
- ◯ Poor

The Value Added Course satisfy my expectation (Course Satisfaction) *

- Excellent
- Satisfactory
- Good
- Poor

Any Issues

Your answer

Submit

Clear form

Never submit passwords through Google Forms.

| Sl. No. | Roll No. | Name | The objectives of the Value Added Course were met (Objective) | The content of the course was organized and easy to follow (Delivery) * | The exercises/ role play were helpful | The Value Added Course satisfy my expectation (Course Satisfaction) | Any Issues |
|---|---|---|---|---|---|---|---|
| 1 | 219Y1A0403 | A Akhila | Excellent | Good | Excellent | Excellent | nothing |
| 2 | 219Y1A0404 | A Kavya | Excellent | Good | Good | Excellent | nothing |
| 3 | 219Y1A0405 | A Chandrika | Excellent | Good | Good | Excellent | nothing |
| 4 | 219Y1A0408 | B Poornima | Excellent | Excellent | Good | Excellent | nothing |
| 5 | 219Y1A0409 | B Charan | Excellent | Excellent | Good | Excellent | |
| 6 | 219Y1A0411 | B SaiKiran | Good | Excellent | Good | Excellent | nothing |
| 7 | 219Y1A0424 | C Sravanthi | Good | Excellent | Good | Good | |
| 8 | 219Y1A0427 | C Renuka | Good | Excellent | Good | Good | |
| 9 | 219Y1A0430 | C Lavanya | Good | Excellent | Good | Good | |
| 10 | 219Y1A0434 | D Shilpa | Good | Excellent | Good | Good | |
| 11 | 219Y1A0437 | D Hemalatha | Good | Excellent | Good | Excellent | nothing |
| 12 | 219Y1A0442 | D Farida | Good | Excellent | Good | Excellent | |
| 13 | 219Y1A0449 | G Ganesh | Good | Good | Excellent | Excellent | |
| 14 | 219Y1A0453 | G Sravani | Good | Good | Excellent | Excellent | |
| 15 | 219Y1A0457 | G Sharmila | Excellent | Good | Excellent | Excellent | |
| 16 | 219Y1A0466 | K Lavanya | Excellent | Good | Excellent | Excellent | |
| 17 | 219Y1A0472 | K Anand | Excellent | Good | Satisfacto | Excellent | |
| 18 | 219Y1A0480 | K Ashok | Excellent | Good | Satisfacto | Excellent | |
| 19 | 219Y1A0482 | K Mounika | Excellent | Good | Satisfacto | Excellent | |
| 20 | 219Y1A0486 | M Prashanth | Good | Excellent | Satisfacto | Excellent | nothing |
| 21 | 219Y1A0490 | M Nandu | Good | Excellent | Satisfacto | Excellent | |
| 22 | 219Y1A0491 | M Sumanth | Excellent | Excellent | Satisfacto | Good | |
| 23 | 219Y1A04B2 | N Sahithya | Satisfactory | Excellent | Good | Good | nothing |
| 24 | 219Y1A04B3 | N Maneesha | Good | Satisfactory | Good | Excellent | |
| 25 | 219Y1A04B4 | N swapna | Good | Satisfactory | Good | Satisfactory | nothing |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| 26 | 219Y1A04B5 | N Jagadeesh | Good | Satisfactory | Good | Satisfactory | |
| 27 | 219Y1A04B8 | O Ravanamma | Good | Excellent | Good | Satisfactory | |
| 28 | 219Y1A04C3 | P Haneefa | Good | Satisfactory | Good | Satisfactory | |
| 29 | 219Y1A04C6 | P Chandana | Good | Satisfactory | Good | Satisfactory | |
| 30 | 219Y1A04C8 | P Vasanth reddy | Good | Satisfactory | Good | Satisfactory | |
| 31 | 219Y1A04D0 | P Devendra | Excellent | Satisfactory | Good | Excellent | |
| 32 | 219Y1A04D3 | P Ramadevi | Excellent | Satisfactory | Good | Excellent | |

# Antenna Types

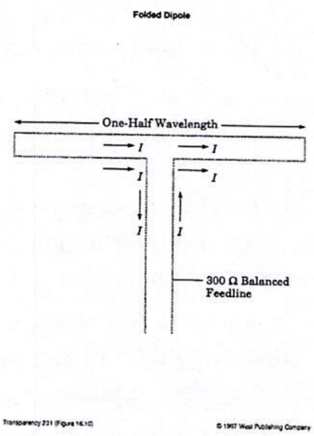
- Dipole
- Folded Dipole
- Monopole
- ARRAYS: Yagi-Uda (parasitic arrays)
-               Phased Arrays
- Loop                          *Ground Plane
- Helical                       *Discone
- Turnstile
- Microstrip Patch
- Dish

## – Monopole Antenna

- ¼ wavelength fed at one end
- Fed with unbalanced feedline with ground conductor connected to earth ground.
- In practice it usually requires an array of radials to develop a better ground plane. (Marconi antenna)

## Folded Dipole Antenna

Same length as 1/2 wave dipole
Parallel conductors joined at each end separated by an appropriate spacing.
300 ohm radiation resistance:
Even though current is same magnitude but out of phase with respect to the wire, in SPACE the currents are actually in the same direction due to FOLDING of antenna.
Given the same conditions a dipole and folded dipole radiate the same amount of power.
The current at the feedpoint of the folded dipole is only half the total current.



If the power is the same as the 1/2 wave dipole and current is reduced by half due to folding then feedpoint voltage must be doubled.

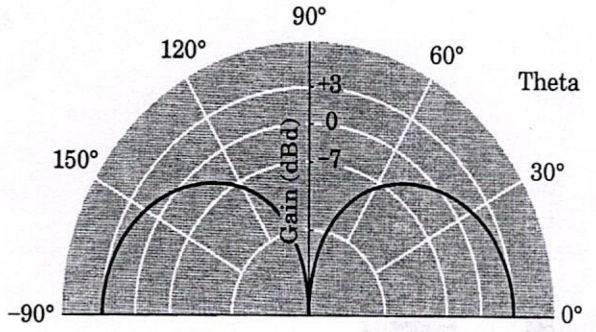
$$P = VI = 2V\left(\frac{I}{2}\right)$$

$$R = V / I$$

$$R' = \frac{2V}{I/2} = \frac{4V}{I} = 4R$$

The result of twice the voltage and half the current is a feedpoint impedance that is four times that of a dipole.

Vertical Monopole

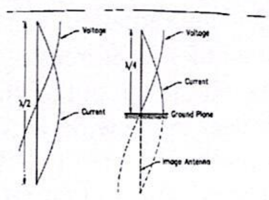



Transparency 232 (Figure 18.13)



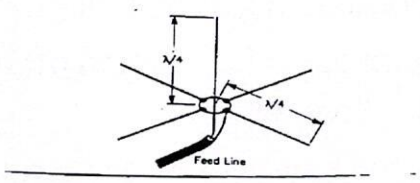
# Monopole Antenna

- ¼ wavelength fed at one end
- Fed with unbalanced feedline with ground conductor connected to earth ground.
- In practice it usually requires an array of radials to develop a better ground plane. (Marconi antenna)
- When used at low frequencies the field should be vertically polarized and antenna could be a tower.
- The tower is ground insulated and fed at a point above ground with a Gamma match. Z increases upward.



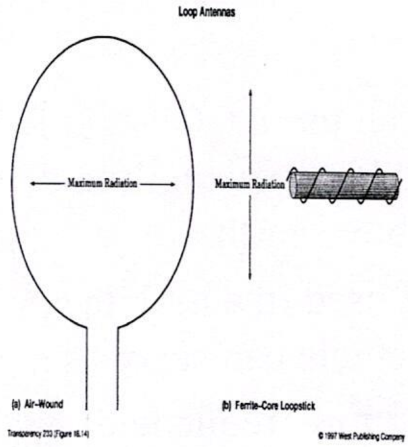
# Ground Plane Antenna

- Can use a COUNTERPOISE system of radials cut to ¼ wavelength to develop ground plane elevated above earth.
- If used in a mobile application the roof of the vehicle can serve as a ground plane.
- At low frequencies a whip antenna can be used with a loading coil.



# Loop Antenna

- Typically a receiving antenna.
- Uses an air core with radiation in the plane of the loop.
- A ferrite core loopstick is also used typically in A.M receivers.
- Radiation is in same plane as the loop but broadside to the loopstick
- Can also be used as a coil in the R.F. tuned circuit.



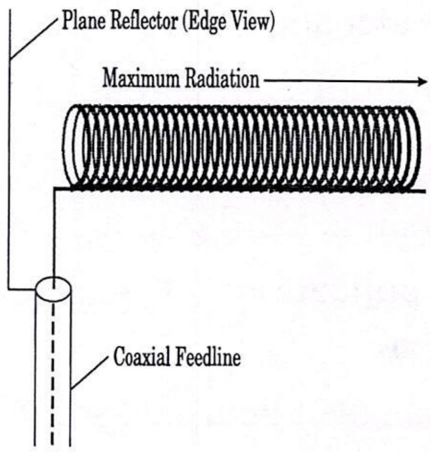

# 5/8th wavelength Antenna

- Application as a mobile or base station antenna..
- Omnidirectional response in horizontal plane.
- Advantage is realized in the concentration of low angle radiation in horizontal direction.
- Does not require as good a ground plane because feedpoint Z at 5/8th wavelength is higher therefore lower current.
- Z is lowered to match 50 ohm feedline by matching section.

# Helical Antenna

- Helix is spiral
- An example: ¼ wavelength dipole shortened into helix (rubber ducky) for handheld transeivers.
- Typically several wavelengths long and used with a ground plane.
- Circumference is ½ wavelength and the turns are ¼ wavelength apart.
- Application: VHF satellite transmission. (cross polarization)

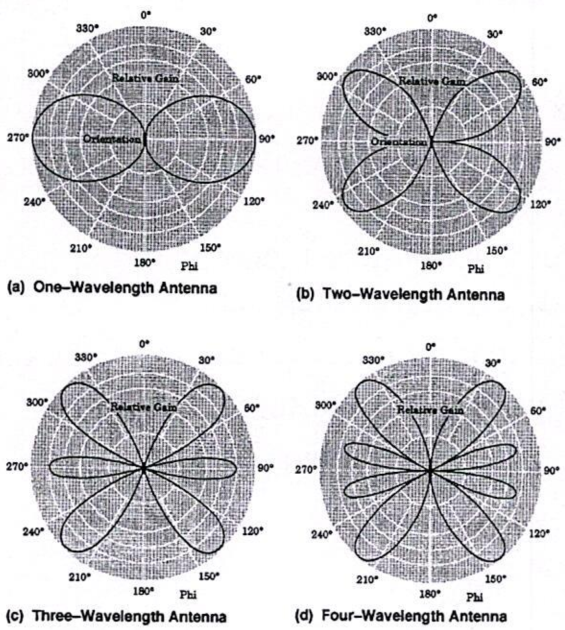
Helical Antenna




Transparency 234 (Figure 18.17)



Long-Wire Antennas




(a) One–Wavelength Antenna

(b) Two–Wavelength Antenna

(c) Three–Wavelength Antenna

(d) Four–Wavelength Antenna

Transparency 235 (Figure 18.19)

## Discone Antenna

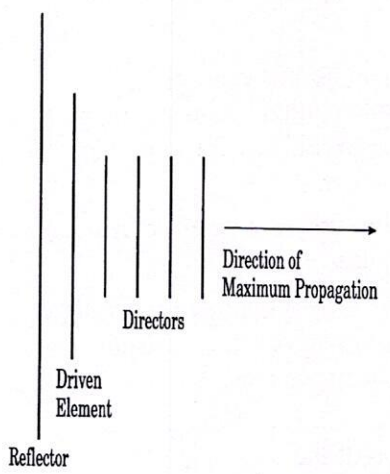
- Widebandth – 10:1 range.
- Omnidirectiional in horizontal plane.
- Vertically polarized.
- Gain is similar to a dipole. Z approaches 50 ohms.
- Application: RX scanner antenna for VHF and UHF.
- Can also be used for TX.

## Parasitic Array – Yagi-Uda

- Array antennas can be used to increase directivity.
- Parasitic array does not require a direct connection to each element by a feed network.
- The parasite elements acquire their excitation from near field coupling by the driven element.
- A Yagi-Uda antenna is a linear array of parallel dipoles.
- The basic Yagi unit consists of three elements:
- 1. Driver or driven element
- 2. Reflector
- 3. Director

# Yagi-Uda Antenna

- Develops an endfire radiation pattern.
- Optimum spacing for gain of a reflector and driven element is 0.15 to 0.25 wavelengths
- Director to director spacings are 0.2 to 0.35 wavelengths apart.
- Reflector length is typically 0.5 wavelengths or 1.05 that of the driven element.
- The driven element is calculated at resonance without the presence of parasitic elements.
- The directors are usually 10 to 20% shorter than at resonance.



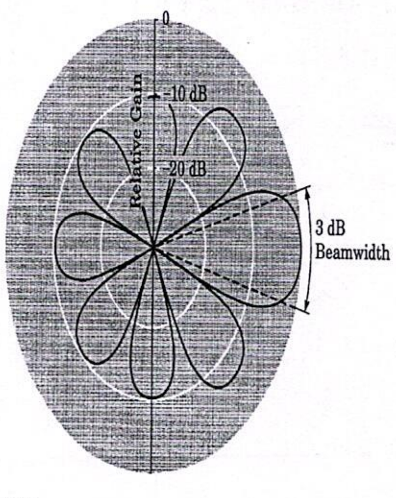

Transparency 236 (Figure 18.25)



# Yagi-Uda antennas

- Gain is related to boom length and number of directors.
- Max directivity of a 3 element Yagi is 9 dBi or 7dBd.
- Addition of directors up to 5 or 6 provides significant increase in gain. Addition of more directors has much less impact on gain.
- Increasing N from 3 to 4 results in 1 dB increase.
- Adding a director to go from 9 to 10 presents a 0.2 dB gain improvement.
- Adding more reflectors has minimal impact on gain however does impact on feedpoint Z and the backlobe.

Radiation Pattern for Eight-Element Yagi

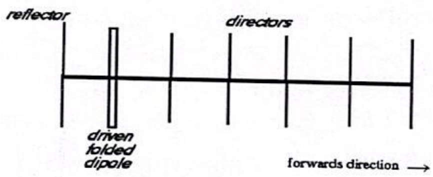


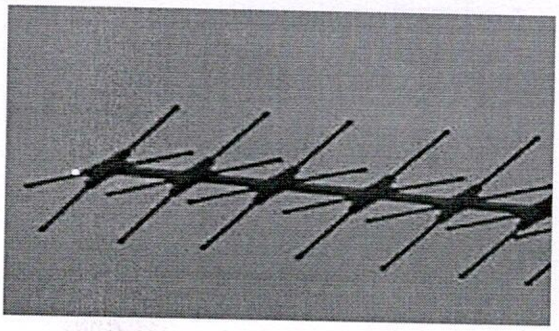

Transparency 237 (Figure 18.26)

# Yagi-Uda

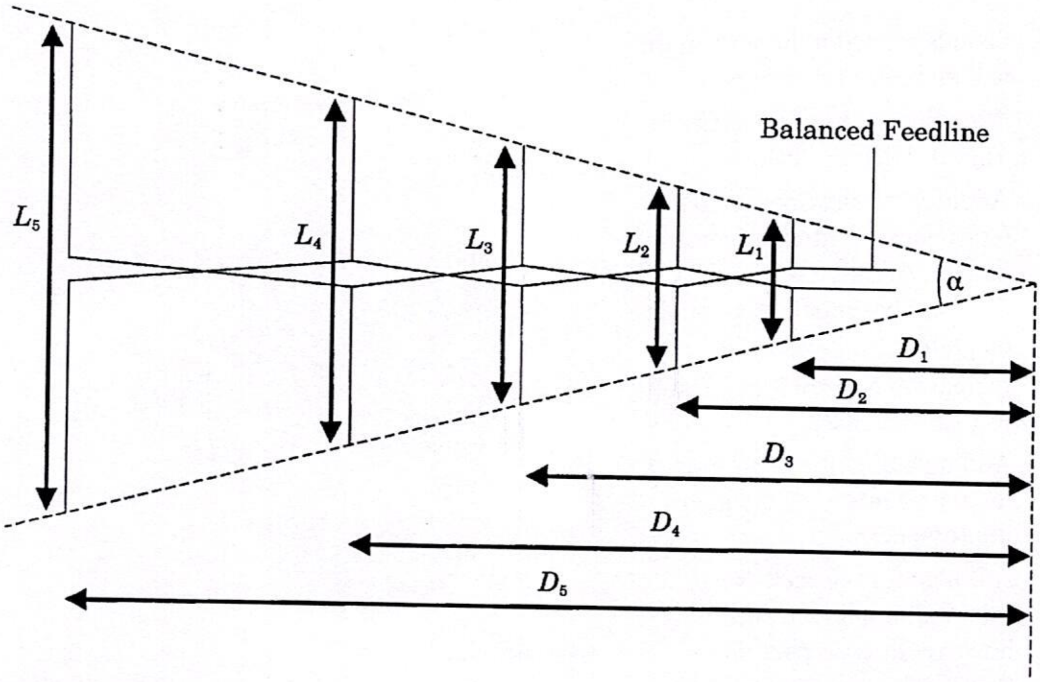
- Metal booms can be implemented because voltage is at zero midway through the element.
- Other factors that effect resonant lengths:
- 1. A comparatively large boom will require parasitic elements to increase their length.
- 2. Length to diameter ratio of the elements.

**Seven element Yagi-Uda**



**Log-Periodic Dipole Array**




Transparency 238 (Figure 18.27)

$$\tau = \frac{L_1}{L_2} = \frac{L_2}{L_3} = \frac{L_3}{L_4} = \ldots\ldots$$

*where L is respective element lengths*

$$\tau = \frac{D_1}{D_2} = \frac{D_2}{D_3} = \frac{D_3}{D_4} = \ldots\ldots$$

*where D represents spacings between elements and apex of angle closing them.*
*$D_1$ is shortest.*

$$\frac{L_1}{2D_1} = \tan\frac{\alpha}{2}$$

Alpha is the angle of the apex of tapered elements and is typically 30 degrees.

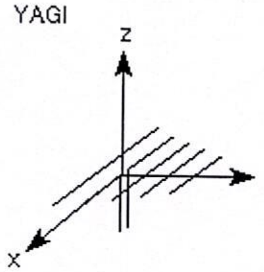
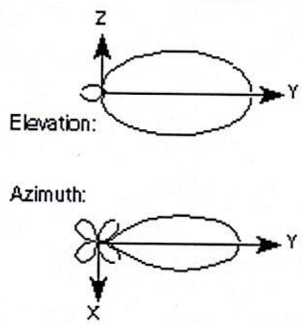
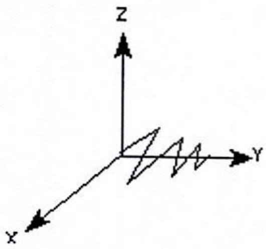
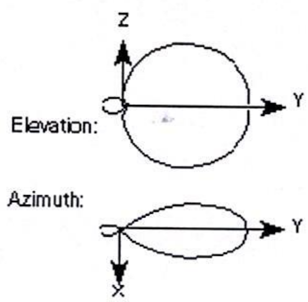
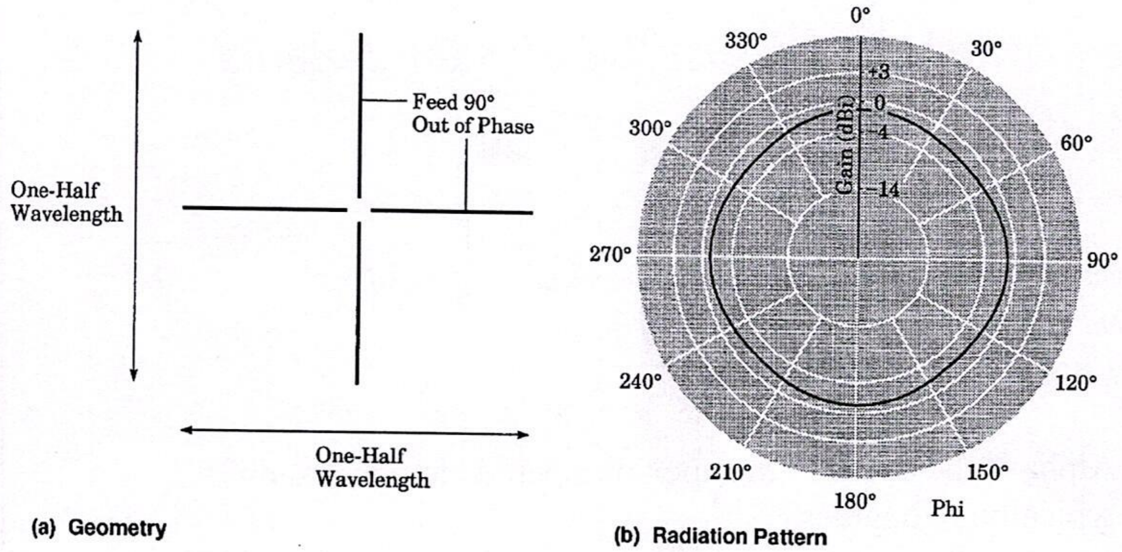
| Antenna Type | Radiation Pattern | Characteristics |
|---|---|---|
| YAGI   |   | **Polarization:** Linear<br>Horizontal as shown<br>**Typical Half-Power Beamwidth**<br>50 deg X 50 deg<br>**Typical Gain:** 5 to 15 dB<br>**Bandwidth:** 5% or 1.05:1<br>**Frequency Limit:**<br>**Lower:** 50 MHz<br>**Upper:** 2 GHz |
| LOG PERIODIC   |   | **Polarization:** Linear<br>**Typical Half-Power Beamwidth:**<br>60 deg x 80 deg<br>**Typical Gain:** 6 to 8 dB<br>**Bandwidth:** 163% or 10:1<br>**Frequency Limit:**<br>**Lower:** 3 MHz<br>**Upper:** 18 GHz<br>**Remarks:** This array may be formed with many shapes including dipoles or toothed arrays. |

**Figure 11**

### Turnstile Antenna



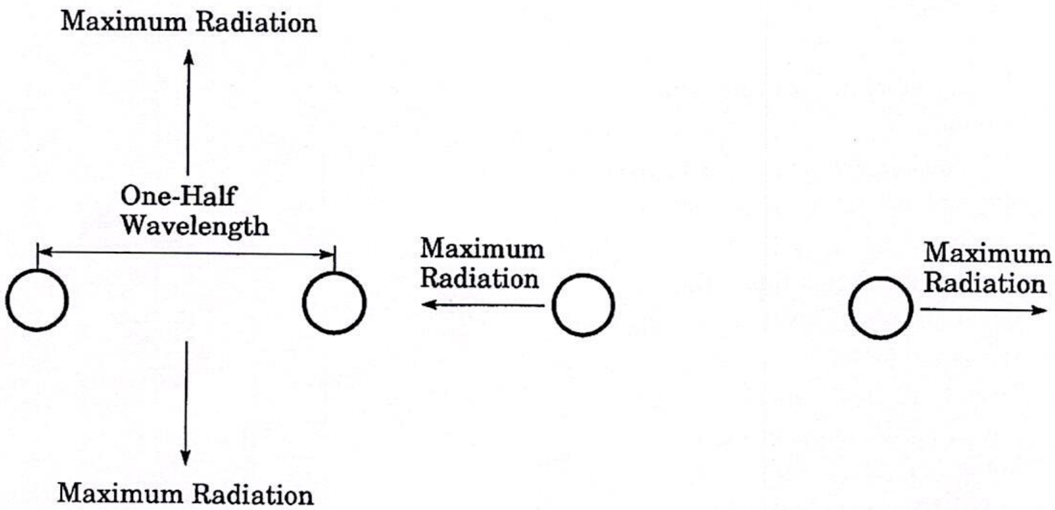

Transparency 239 (Figure 18.28)



# Phased Array Antennas

- To be discussed: Monopole Array
- Collinear Array
- Broadside Array
- Endfire Array

**Monopole Array**

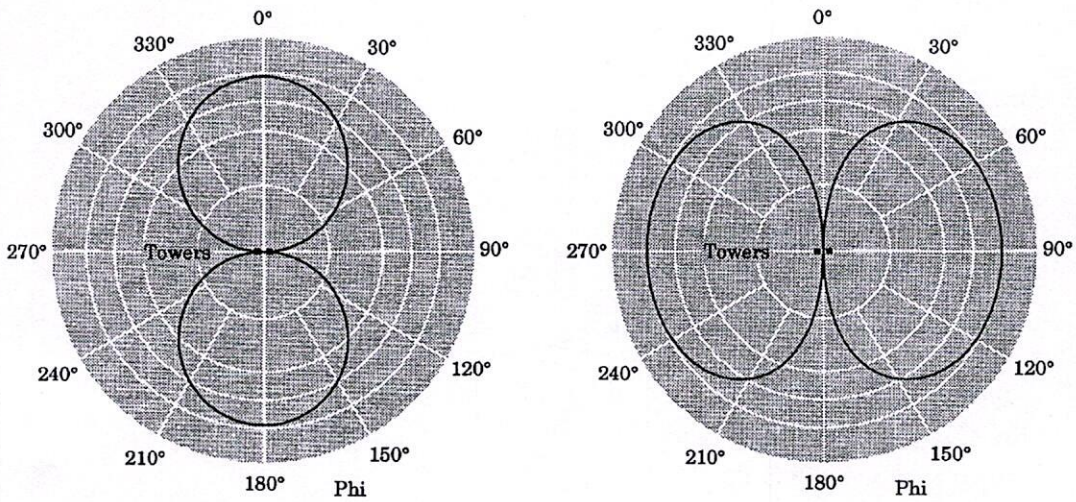



**(a) Towers Fed in Phase** **(b) 180° Out of Phase**

ansparency 240 (Figure 18.29)



**Radiation Patterns for Monopole Arrays**

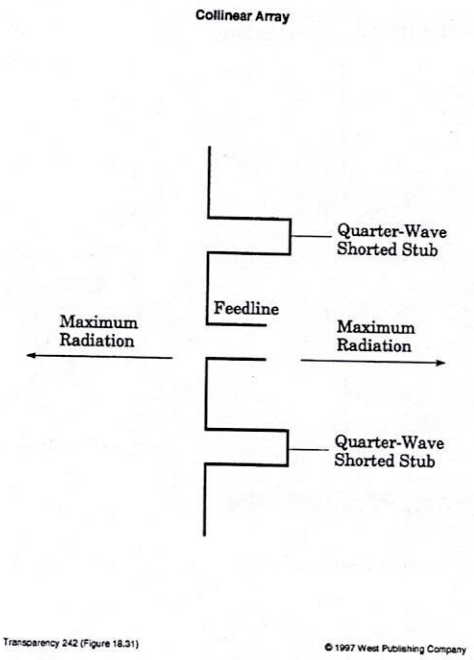



**(a) Two Monopoles in Phase** **(b) Two Monopoles Out of Phase**

ransparency 241 (Figure 18.30)

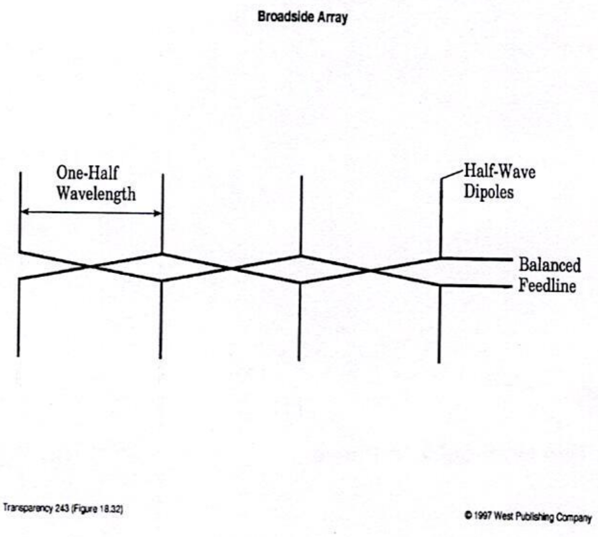
# Collinear Arrav

- Two or more half wavelength sections.
- A broadside array because the axes of the elements are along same line.
- Half wave sections are linked by ¼ wave transmission lines. They develop a phase reversal to keep all dipoles in phase.
- Usually vertical with an omnidirectional pattern in the horizontal plane with a narrow angle of radiation in the vertical.
- What would be a good application for this system?

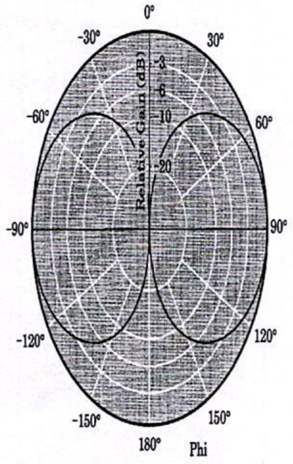



# Multi-Element Broadside and Endfire Arrays

- BROADSIDE elements are spaced ½ wavelength apart.(180 degree phase shift.
- In order to maintain a broadside presentation of the field the elements are fed out of phase.
- ENDFIRE elements are also ½ wavelength apart Elements are fed in phase.
- Radiation from all elements sum of the end.



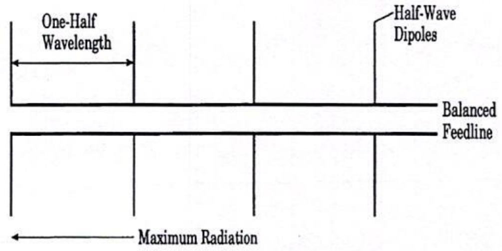
Collinear/Broadside Comparison




Transparency 244 (Figure 18.33)



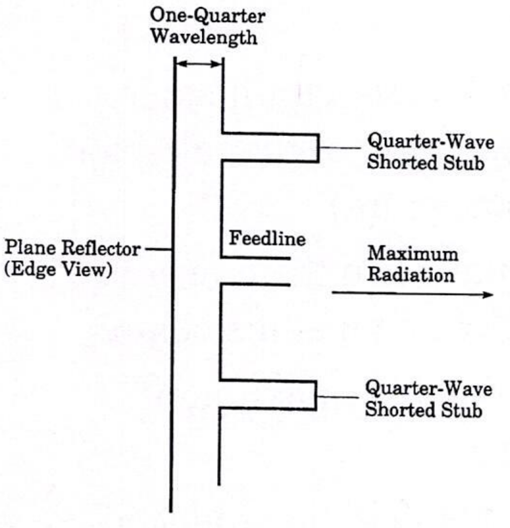
End-Fire Array




Transparency 245 (Figure 18.35)



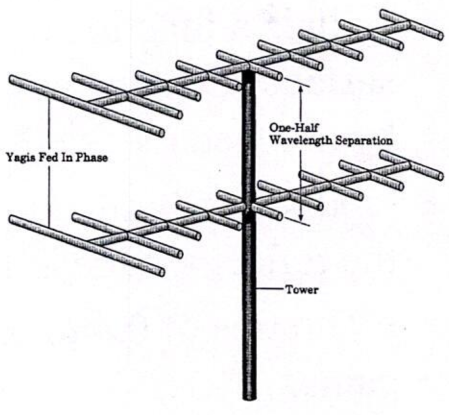
Collinear Array with Plane Reflector




Transparency 247 (Figure 18.38)



Stacked Yagis




Transparency 246 (Figure 18.36)

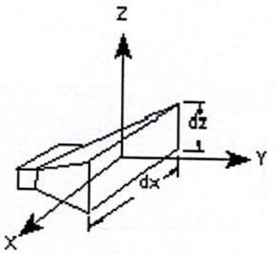
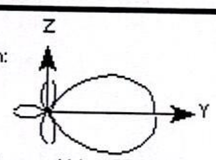
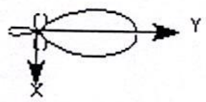
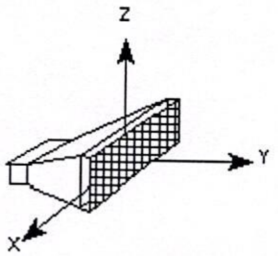
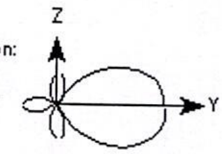
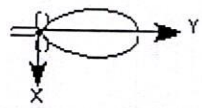
| Antenna Type | Radiation Pattern | Characteristics |
|---|---|---|
| HORN  | Elevation:  3 dB beamwidth = 56 $\lambda$°/dz<br>Azimuth:  3 dB beamwidth = 70 $\lambda$°/dx | **Polarization:** Linear<br>**Typical Half-Power Beamwidth:** 40 deg x 40 deg<br>**Typical Gain:** 5 to 20 dB<br>**Bandwidth:** If ridged: 120% or 4:1; If not ridged: 67% or 2:1<br>**Frequency Limit:** **Lower:** 50 MHz **Upper:** 40 GHz |
| HORN W / POLARIZER  | Elevation: <br>Azimuth:  | **Polarization:** Circular, Depends on polarizer<br>**Typical Half-Power Beamwidth:** 40 deg x 40 deg<br>**Typical Gain:** 5 to 10 dB<br>**Bandwidth:** 60% or 2:1<br>**Frequency Limit:** **Lower:** 2 GHz **Upper:** 18 GHz |

**Figure 9**

# Parabolic Reflector

- Gain is a function of parabolic reflector diameter, surface accuracy and illumination of the reflector by the feed mechanism.(focal point)
- Optimum illumination occurs when the power at the reflector edge is 10 dB less than at the centre.
- F/D ratios of 0.4 to 0.6 will deliver maximum gains.
- A collimated beam of radiation will be produced.

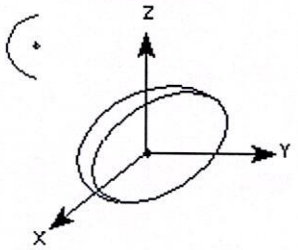
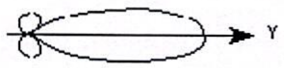
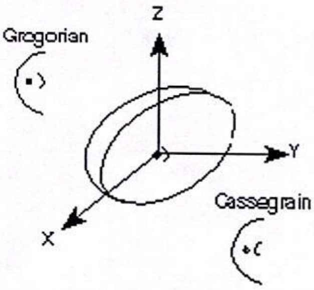
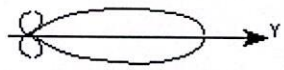
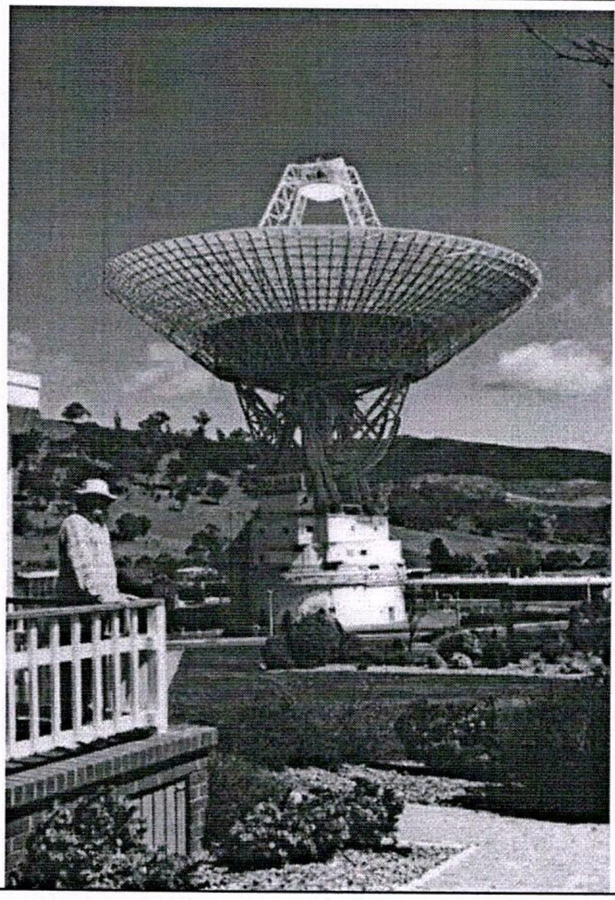
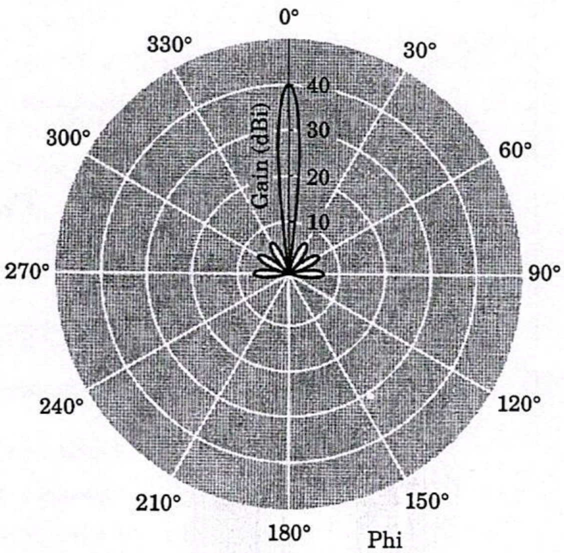
| Antenna Type | Radiation Pattern | Characteristics |
|---|---|---|
| PARABOLIC (Prime)   | Elevation & Azimuth   | **Polarization:** Takes polarization of feed<br>**Typical Half-Power Beamwidth:** 1 to ·0 deg<br>**Typical Gain:** 20 to 30 dB<br>**Bandwidth:** 33% or 1.4:1 limited mostly by feed<br>**Frequency Limit:**<br>**Lower:** 400 MHz<br>**Upper:** 13+ GHz |
| PARABOLIC   | Elevation & Azimuth   | **Polarization:** Takes polarization of feed<br>**Typical Half-Power Beamwidth:** 1 to 10 deg<br>**Typical Gain:** 20 to 30 dB<br>**Bandwidth:** 33% or 1.4:1<br>**Frequency Limit:**<br>**Lower:** 400 MHz<br>**Upper:** 13+ GHz |

**Figure 10**



Polar Pattern for Typical Parabolic Antenna




Transparency 249 (Figure 18.41)



$$G = \frac{\eta \pi^2 D^2}{\lambda^2}$$

*where G is the power RATIO with respect to isotropic radiator*

$\eta$ = *efficiency*

$\lambda$ = *free space wavelength*

$$\theta = \frac{70\lambda}{D}$$ Beamwidth

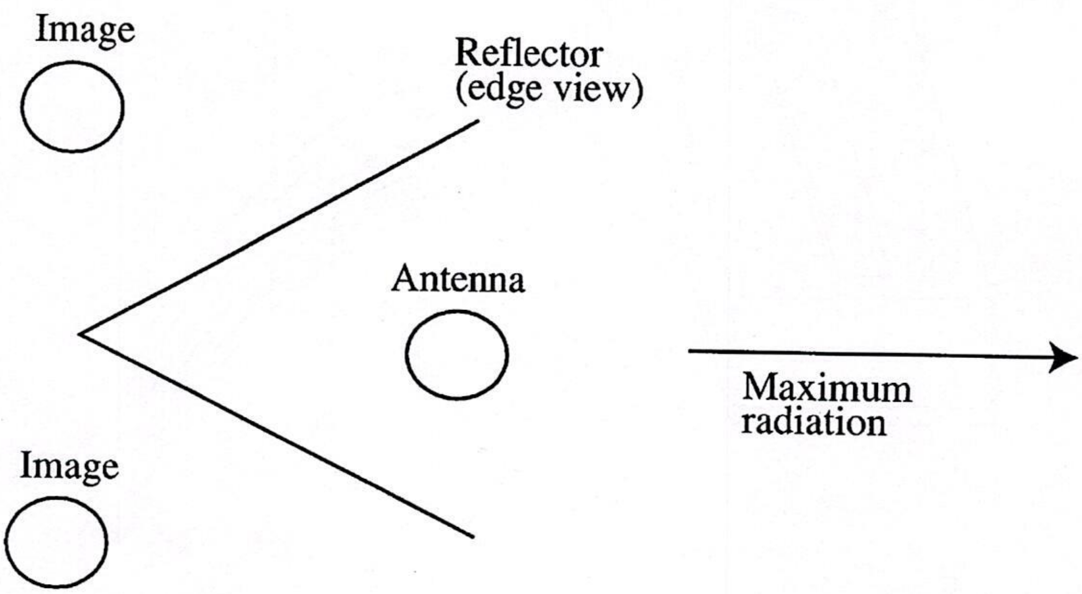
$$f = \frac{D^2}{16d}$$

f = focal point

D = dish diameter

D = depth from plane at mouth of dish to vertex.

**Corner Reflector and Images**




Transparency 248 (Figure 18.39)



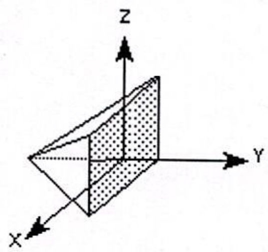
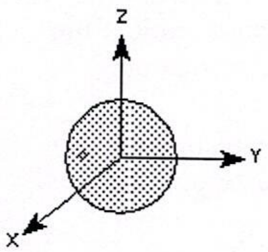
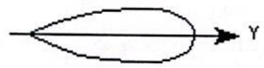
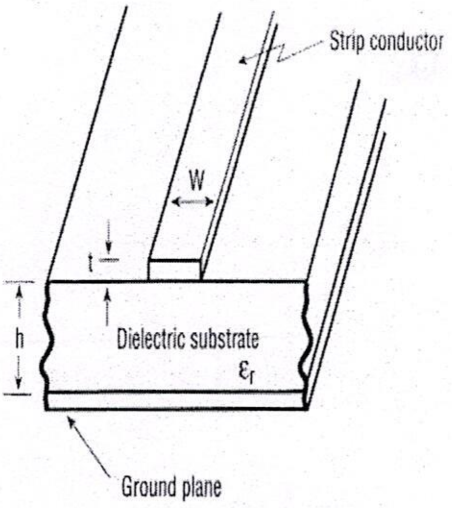
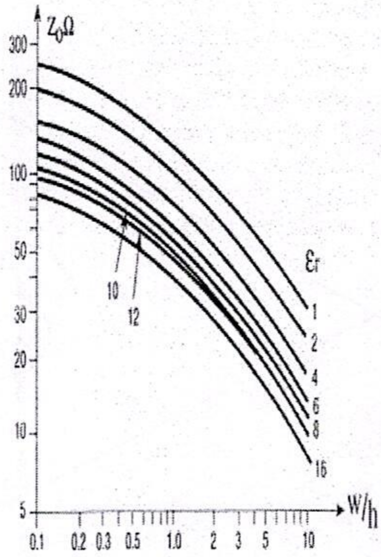
| Antenna Type | Radiation Pattern | Characteristics |
|---|---|---|
| CORNER REFLECTOR   | Elevation: (Z-Y)<br>Azimuth: (X-Y)<br>Dependent upon feed emitter | **Polarization:**<br>Feed dependent<br>**Typical Half-Power Beamwidth**<br>40 deg x variable<br>**Typical Gain:** 10 dB above feed<br>**Bandwidth:** Narrow<br>**Frequency Limit**<br>**Lower:** 1 GHz<br>**Upper:** 40 GHz<br>**Remarks:** Typically fed with a dipole or colinear array. |
| LUNEBURG LENS   | Elevation & Azimuth   | **Polarization:**<br>Feed dependent<br>**Typical Half-Power Beamwidth:**<br>System dependent<br>**Typical Gain:** System dependent<br>**Bandwidth:** Narrow<br>**Frequency Limit**<br>**Lower:** 1 GHz<br>**Upper:** 40 GHz<br>**Remarks:** Variable index dielectric sphere. |

**Figure 14**

## MICROSTRIP LINE




Microstrip Dimensions




Variation of $Z_0$ for Different Dielectric Constants and Aspect Ratio

# Microstrip Antennas

- MICROSTRIP LINE:
- In a microstrip line most of the eletric field lines are concentrated underneath the microstrip.
- Because all fields do not exist between microstrip and ground plane we have a different dielectric constant than that of the substrate. It is less, depending on geometry.
- The electric field underneath the microstrip line is uniform across the line. It is possible to excite an undesired tranverse resonant mode if the frequency or line width increases. It now behaves like a resonator consuming power.
- A standing wave develops across its width as it acts as a resonator. The electric field is at a maximum at both edges and goes to zero in the centre.

K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003

DEPARTMENT OF ELECTRONICS_AND_COMMUNICATION_ENGINEERING

VALUE ADDED/CERTIFICATE COURSE

ON

"ANTENNA DESIGN" FROM 16/11/2023 to 11/12/2023

KSNR lives on..

## AWARD LIST

| S.NO | Roll Number | Name of the Student | Marks Obtained |
|---|---|---|---|
| 1 | 219Y1A0403 | A Akhila | 16 |
| 2 | 219Y1A0404 | A Kavya | 17 |
| 3 | 219Y1A0405 | A Chandrika | 18 |
| 4 | 219Y1A0408 | B Poornima | 16 |
| 5 | 219Y1A0409 | B Charan | 17 |
| 6 | 219Y1A0411 | B SaiKiran | 18 |
| 7 | 219Y1A0424 | C Sravanthi | 16 |
| 8 | 219Y1A0427 | C Renuka | 14 |
| 9 | 219Y1A0430 | C Lavanya | 18 |
| 10 | 219Y1A0434 | D Shilpa | 17 |
| 11 | 219Y1A0437 | D Hemalatha | 12 |
| 12 | 219Y1A0442 | D Farida | 18 |
| 13 | 219Y1A0449 | G Ganesh | 15 |
| 14 | 219Y1A0453 | G Sravani | 15 |
| 15 | 219Y1A0457 | G Sharmila | 18 |
| 16 | 219Y1A0466 | K Lavanya | 16 |
| 17 | 219Y1A0472 | K Anand | 17 |
| 18 | 219Y1A0480 | K Ashok | 15 |
| 19 | 219Y1A0482 | K Mounika | 15 |
| 20 | 219Y1A0486 | M Prashanth | 15 |
| 21 | 219Y1A0490 | M Nandu | 15 |
| 22 | 219Y1A0491 | M Sumanth | 18 |
| 23 | 219Y1A04B2 | N Sahithya | 17 |
| 24 | 219Y1A04B3 | N Maneesha | 16 |
| 25 | 219Y1A04B4 | N swapna | 15 |
| 26 | 219Y1A04B5 | N Jagadeesh | 15 |
| 27 | 219Y1A04B8 | O Ravanamma | 18 |
| 28 | 219Y1A04C3 | P Haneefa | 18 |
| 29 | 219Y1A04C6 | P Chandana | 12 |
| 30 | 219Y1A04C8 | P Vasanth reddy | 13 |
| 31 | 219Y1A04D0 | P Devendra | 14 |
| 32 | 219Y1A04D3 | P Ramadevi | 12 |

Coordinator

HoD

18

## K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003

## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## VALUE ADDED COURSE ON

## ANTENNA DESIGN FROM 16/11/2023 TO 11/12/2023

## ASSESSMENT TEST

**Roll Number:** 219Y1A04B8 **Name of the Student:** O. Pavanamma

**Time: 20 Min** **(Objective Questions)** **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. According to Webster's dictionary, what is an antenna? [ d ]
   a) Impedance matching device
   b) Sensor of electromagnetic waves
   c) Transducer between guided wave & free space wave
   d) Metallic device for radiating or receiving radio waves

2. An isotropic radiation is _________ [ d ]
   a. It is a point source of radiation
   b. It radiates uniformly in all direction
   c. It has a uniform intensity
   d. All the above

3. Which of the following is the condition for beam area? [ a ]
   a) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was zero apart from that
   b) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was unity apart from that
   c) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was zero apart from that
   d) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was unity apart from that

4. In broadside array, all the elements in the array should have similar excitation along with similar amplitude excitation for maximum radiation. [ a ]
   a) Phase
   b) Frequency
   c) Current
   d) Voltage

5. If the tower antenna is not grounded, which method of excitation is/are applicable for it? [ a ]

a) Series
b) Shunt
c) Both a and b
d) None of the above

6. Which of the following are the examples of a wire antenna? [ d ]

a) Dipole antenna
b) Monopole antenna
c) Helix antenna
d) All the above

7. Which of the following is a dual reflector antenna? [ a ]

a) Cassegrain antenna
b) Parabolic antenna
c) Offset reflector antenna
d) Wire antenna

8. What is the corner angle of a flat reflector antenna? [ b ]

a) 90°
b) 180°
c) 60°
d) 45°

9. When the feed is moved along the main axis in a reflector antenna what happens to the beam pattern? [ c ]

a) It broadens
b) It deteriorates
c) Beam remains unchanged
d) Side lobes are increased

10. If the walls of the circular waveguide are flared out, then it is called _____ [ d ]

a) Pyramidal horn
b) E-plane horn
c) H-plane horn
d) Conical horn

11. In Horn antennas impedance matching is provided by _______ [ a ]

a) flaring
b) increasing Power
c) decreasing axial length
d) Balun

12. If the aperture antenna is tapered only in H-plane then which of the following is true compared to uniform non-tapered aperture antenna? [ c ]

a) Principle patterns in E-plane and H-plane are same in both cases
b) Principle patterns in E-plane and H-plane are different in both cases
c) Principle patterns in E-plane is same and H-plane is different
d) Principle patterns in E-plane is different and H-plane is same

13. Which of the following is used to excite nad to radiate the antenna? [ a ]
a) Feed line
b) Ground plane
c) Patch
d) Substrate

14. Which of the following statement is true? [ a ]
a) As the number of elements increase in array it becomes more directive
b) As the number of elements increase in array it becomes less directive
c) Point to point communication is not possible with more number of array elements
d) There is no uniform progressive phase shift in linear uniform array

15. The excitation amplitudes of the binomial array follow ___________ [ a ]
a) Pascal's triangle
b) Bermuda triangle
c) Right angled triangle
d) Natural squares

16. A small loop type loop antenna is used as ___ component in communication? [ a ]
a) Receivers
b) Transmitters
c) Transceivers
d) None of the above

17. Which dipole has an overall length lesser than ½ λ? [ a ]
a) Short Dipole
b) Half-wave Dipole
c) Folded Dipole
d) Monopole

18. In which of the following polarization the electric field components are perpendicular to each other and have unequal magnitudes? [ b ]
a) Linear
b) Vertical
c) Circular
d) Elliptical

19. The direction of maximum radiation in end-fire array is ______ with respect to the array axis. [ a ]
a) 0° or 180°
b) 90°
c) 45°
d) 270°

20. For a center fed short antenna, current distribution is _____ at center and ____ at ends. [ d ]
a) Low, high
b) High, high
c) Low, low
d) High, low

# K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003

## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## VALUE ADDED COURSE ON

## ANTENNA DESIGN FROM 16/11/2023 TO 11/12/2023

## ASSESSMENT TEST

18

**Roll Number:** 2194IA04O5 **Name of the Student:** A. Chandrika

**Time: 20 Min** **(Objective Questions)** **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. According to Webster's dictionary, what is an antenna? [ d ]
a) Impedance matching device
b) Sensor of electromagnetic waves
c) Transducer between guided wave & free space wave
d) Metallic device for radiating or receiving radio waves

2. An isotropic radiation is _________ [ d ]
a. It is a point source of radiation
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d. All the above

3. Which of the following is the condition for beam area? [ a ]
a) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was zero apart from that
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4. In broadside array, all the elements in the array should have similar excitation along with similar amplitude excitation for maximum radiation. [ a ]
a) Phase
b) Frequency
c) Current
d) Voltage

5. If the tower antenna is not grounded, which method of excitation is/are applicable for it? [ a ]

a) Series
b) Shunt
c) Both a and b
d) None of the above

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d) Conical horn

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b) Principle patterns in E-plane and H-plane are different in both cases
c) Principle patterns in E-plane is same and H-plane is different
d) Principle patterns in E-plane is different and H-plane is same

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c) Patch
d) Substrate

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a) Short Dipole
b) Half-wave Dipole
c) Folded Dipole
d) Monopole

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a) Linear
b) Vertical
c) Circular
d) Elliptical

19. The direction of maximum radiation in end-fire array is ______ with respect to the array axis. [ a ]
a) 0° or 180°
b) 90°
c) 45°
d) 270°

20. For a center fed short antenna, current distribution is _____ at center and ____ at ends. [ d ]
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b) High, high
c) Low, low
d) High, low

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**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**VALUE ADDED COURSE ON**

**ANTENNA DESIGN FROM 16/11/2023 TO 11/12/2023**

18/20

**ASSESSMENT TEST**

**Roll Number:** 2114/A0411 **Name of the Student:** B. Sai kiran

**Time: 20 Min** **(Objective Questions)** **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. According to Webster's dictionary, what is an antenna? [ d ]
a) Impedance matching device
b) Sensor of electromagnetic waves
c) Transducer between guided wave & free space wave
d) Metallic device for radiating or receiving radio waves

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c. It has a uniform intensity
d. All the above

3. Which of the following is the condition for beam area? [ a ]
a) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was zero apart from that
b) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was unity apart from that
c) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was zero apart from that
d) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was unity apart from that

4. In broadside array, all the elements in the array should have similar excitation along with similar amplitude excitation for maximum radiation. [ a ]
a) Phase
b) Frequency
c) Current
d) Voltage

5. If the tower antenna is not grounded, which method of excitation is/are applicable for it? [ d ] ✗

a) Series
b) Shunt
c) Both a and b
d) None of the above

6. Which of the following are the examples of a wire antenna? [ a ] ✗

a) Dipole antenna
b) Monopole antenna
c) Helix antenna
d) All the above

7. Which of the following is a dual reflector antenna? [ a ] ✓

a) Cassegrain antenna
b) Parabolic antenna
c) Offset reflector antenna
d) Wire antenna

8. What is the corner angle of a flat reflector antenna? [ a ] ✓

a) 90°
b) 180°
c) 60°
d) 45°

9. When the feed is moved along the main axis in a reflector antenna what happens to the beam pattern? [ a ] ✓

a) It broadens
b) It deteriorates
c) Beam remains unchanged
d) Side lobes are increased

10. If the walls of the circular waveguide are flared out, then it is called _____ [ d ] ✓

a) Pyramidal horn
b) E-plane horn
c) H-plane horn
d) Conical horn

11. In Horn antennas impedance matching is provided by _______ [ a ] ✓

a) flaring
b) increasing Power
c) decreasing axial length
d) Balun

12. If the aperture antenna is tapered only in H-plane then which of the following is true compared to uniform non-tapered aperture antenna? [ c ] ✓

a) Principle patterns in E-plane and H-plane are same in both cases
b) Principle patterns in E-plane and H-plane are different in both cases
c) Principle patterns in E-plane is same and H-plane is different
d) Principle patterns in E-plane is different and H-plane is same

13. Which of the following is used to excite nad to radiate the antenna? [ a ]

a) Feed line
b) Ground plane
c) Patch
d) Substrate

14. Which of the following statement is true? [ a ]

a) As the number of elements increase in array it becomes more directive
b) As the number of elements increase in array it becomes less directive
c) Point to point communication is not possible with more number of array elements
d) There is no uniform progressive phase shift in linear uniform array

15. The excitation amplitudes of the binomial array follow ___________ [ a ]

a) Pascal's triangle
b) Bermuda triangle
c) Right angled triangle
d) Natural squares

16. A small loop type loop antenna is used as ___ component in communication? [ a ]

a) Receivers
b) Transmitters
c) Transceivers
d) None of the above

17. Which dipole has an overall length lesser than ½ λ? [ a ]

a) Short Dipole
b) Half-wave Dipole
c) Folded Dipole
d) Monopole

18. In which of the following polarization the electric field components are perpendicular to each other and have unequal magnitudes? [ b ]

a) Linear
b) Vertical
c) Circular
d) Elliptical

19. The direction of maximum radiation in end-fire array is ______ with respect to the array axis. [ a ]

a) 0° or 180°
b) 90°
c) 45°
d) 270°

20. For a center fed short antenna, current distribution is _____ at center and ____ at ends. [ d ]

a) Low, high
b) High, high
c) Low, low
d) High, low

## K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003

## DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING

## VALUE ADDED COURSE ON

## ANTENNA DESIGN FROM 16/11/2023 TO 11/12/2023

18 Sy

## ASSESSMENT TEST

**Roll Number:** Name M. Somanth **Name of the Student:** 219Y1A04a) (Roll number)

**Time: 20 Min** **(Objective Questions)** **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. According to Webster's dictionary, what is an antenna? [ a ] X
a) Impedance matching device
b) Sensor of electromagnetic waves
c) Transducer between guided wave & free space wave
d) Metallic device for radiating or receiving radio waves

2. An isotropic radiation is _________ [ d ] ✓
a. It is a point source of radiation
b. It radiates uniformly in all direction
c. It has a uniform intensity
d. All the above

3. Which of the following is the condition for beam area? [ d ] X
a) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was zero apart from that
b) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained maximum over ΩA and was unity apart from that
c) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was zero apart from that
d) It is a solid angle through which all power radiated by the antenna would stream if P (Θ, φ) maintained minimum over ΩA and was unity apart from that

4. In broadside array, all the elements in the array should have similar excitation along with similar amplitude excitation for maximum radiation. [ a ] ✓
a) Phase
b) Frequency
c) Current
d) Voltage

5. If the tower antenna is not grounded, which method of excitation is/are applicable for it? [ a ]
a) Series
b) Shunt
c) Both a and b
d) None of the above

6. Which of the following are the examples of a wire antenna? [ d ]
a) Dipole antenna
b) Monopole antenna
c) Helix antenna
d) All the above

7. Which of the following is a dual reflector antenna? [ a ]
a) Cassegrain antenna
b) Parabolic antenna
c) Offset reflector antenna
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10. If the walls of the circular waveguide are flared out, then it is called _____ [ d ]
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13. Which of the following is used to excite nad to radiate the antenna? [ a ]
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14. Which of the following statement is true? [ a ]
a) As the number of elements increase in array it becomes more directive
b) As the number of elements increase in array it becomes less directive
c) Point to point communication is not possible with more number of array elements
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15. The excitation amplitudes of the binomial array follow ___________ [ a ]
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**K.S.R.M. COLLEGE OF ENGINEERING (AUTONOMOUS), KADAPA-516003**

**DEPARTMENT OF ELECTRONICS & COMMUNICATION ENGINEERING**

**VALUE ADDED COURSE ON**

**ANTENNA DESIGN FROM 16/11/2023 TO 11/12/2023**

18

**ASSESSMENT TEST**

**Roll Number:** 219Y1A0457 **Name of the Student:** G.Sharmila

**Time: 20 Min** **(Objective Questions)** **Max.Marks: 20**

Note: Answer the following Questions and each question carries **one** mark.

1. According to Webster's dictionary, what is an antenna? [ d ]
a) Impedance matching device
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2. An isotropic radiation is _________ [ d ]
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