

HALL TICKET NUMBER

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PACE INSTITUTE OF TECHNOLOGY & SCIENCES::ONGOLE  
(AUTONOMOUS)

IV B.TECH I SEMESTER END SUPPLEMENTARY EXAMINATIONS, MARCH-2023  
RADAR SYSTEMS  
(ECE Branch)

Time: 3 hours

Max. Marks: 60

Note: Question Paper consists of Two parts (Part-A and Part-B)

**PART-A**Answer **all** the questions in Part-A (5X2=10M)

| Q.No. | Questions  | Marks | CO | KL |
|-------|--|-------|----|----|
| 1.    | a) Mention any four applications of Radar.                       | [2M]  | 1  | 1  |
|       | b) Give any two differences between MTI and Pulse Doppler Radar. | [2M]  | 2  | 1  |
|       | c) What is the purpose of Delay Line Canceller?                  | [2M]  | 3  | 1  |
|       | d) What is squint angle in tracking radars?                      | [2M]  | 4  | 1  |
|       | e) What is radiation pattern?                                    | [2M]  | 5  | 1  |

**PART-B**Answer **One Question from each UNIT (5X10=50M)**

| Q.No.    | Questions  | Marks | CO | KL |
|----------|--|-------|----|----|
| UNIT-I   |  |       |    |    |
| 2.       | a) Draw and explain the operation of pulse radar.  | [5M]  | 1  | 2  |
|          | b) A radar is required to have an unambiguous range of 500km, what is the maximum PRF that may be used? If the pulse length is 5 ns, what is the duty cycle for the transmitter? | [5M]  | 1  | 2  |
| OR       |  |       |    |    |
| 3.       | a) Explain the range ambiguities with respect to Pulse Repetition Frequency with relevant waveforms.   | [5M]  | 1  | 2  |
|          | b) Discuss about the radar cross section of targets.   | [5M]  | 1  | 3  |
| UNIT-II  |  |       |    |    |
| 4.       | a) Explain about CW radar with neat diagram.   | [5M]  | 2  | 2  |
|          | b) Give the applications of CW radar.  | [5M]  | 2  | 1  |
| OR       |  |       |    |    |
| 5.       | a) Illustrate how the Range and Doppler Measurement is done in FM-CW   | [5M]  | 2  | 3  |
|          | b) With a transmit (CW) frequency of 5GHz, find the Doppler frequency seen by a stationary Radar when the target radial velocity is 100 km/h(62.5mph)?                           | [5M]  | 2  | 4  |
| UNIT-III |  |       |    |    |
| 6.       | a) With the help of block diagram, explain MTI Radar with power amplifier transmitter  | [5M]  | 3  | 3  |
|          | b) Explain the concept of blind speed with the help of relevant diagrams.  | [5M]  | 3  | 2  |
| OR       |  |       |    |    |
| 7.       | a) With the help of block diagram, explain MTI Radar with power Oscillator transmitter   | [5M]  | 3  | 3  |
|          | b) Compare and contrast MTI and Pulse Doppler Radar.   | [5M]  | 3  | 2  |
| UNIT-IV  |  |       |    |    |
| 8.       | a) Draw and explain the block diagram of conical-scan tracking radar.  | [5M]  | 4  | 2  |
|          | b) Explain amplitude-comparison monopulse tracking radar with relevant diagrams.   | [5M]  | 4  | 3  |

| OR     |    |  |      |   |   |
|--------|----|--|------|---|---|
| 9.     | a) | What are the various methods of acquisition before tracking a target with radars? Explain in detail. | [5M] | 4 | 4 |
|        | b) | Explain phase-comparison monopulse tracking radar with necessary diagrams.                           | [5M] | 4 | 4 |
| UNIT-V |    |  |      |   |   |
| 10.    | a) | Derive the equation for Matched Filter Receiver.   | [5M] | 5 | 5 |
|        | b) | Write short notes on Correlation Detection.  | [5M] | 5 | 5 |
| OR     |    |  |      |   |   |
| 11.    | a) | Explain branch type duplexer with neat sketch.   | [5M] | 5 | 5 |
|        | b) | Describe the concept of series and parallel feeds in radar receivers.                                | [5M] | 5 | 5 |

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