

R13

Code No: 118EA

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, April - 2018

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 75

Note: This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub-questions.

PART - A

(25 Marks)

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|------|---|-----|
| 1.a) | Define signal to noise ratio. | [2] |
| b) | What is maximum unambiguous range? | [3] |
| c) | Give the advantages of FM - CW radar. | [2] |
| d) | Write the applications of CW radar. | [3] |
| e) | What is butterfly shape on radar receiver? | [2] |
| f) | What is delay line canceller? | [3] |
| g) | Define squint-angle. | [2] |
| h) | List the disadvantages of sequential lobbing. | [3] |
| i) | Define noise temperature. | [2] |
| j) | Write about correlation function. | [3] |

PART - B

(50 Marks)

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| 2.a) | Describe the operation of radar block diagram. | |
| b) | Derive modified radar range equation. | [5+5] |

OR

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| 3.a) | Explain, how to minimize the false alarm. | |
| b) | With the help of expressions explain radar transmitter power. | [5+5] |

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| 4.a) | Draw and explain CW radar with nonzero IF receiver. | |
| b) | Write the merits and demerits of continuous wave radar. | [6+4] |

OR

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| 5.a) | With suitable waveforms discuss frequency time relationships in FM-CW radar. | |
| b) | Explain, how the various unwanted signals causes errors in FM altimeter. | [5+5] |

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| 6.a) | Describe the operation of MTI Radar with power oscillator transmitter. | |
| b) | Draw and explain three-pulse canceller. | [5+5] |

OR

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| 7.a) | Write a short note on multiple pulse repetition frequencies. | |
| b) | What are the factors limits the MTI performance? Explain. | [5+5] |

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- 8.a) Describe the operation of conical scanning method.
b) Draw and explain the block diagram of one-coordinate amplitude-comparison mono pulse tracking radar. [5+5]

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- 9.a) In mono pulse radar two antennas are used to produce a phase difference of 25° between the echo signals. It operates at frequency of 1.5 GHz. Find the spacing between the antennas, if the angle $\theta=15^\circ$.
b) Discuss about acquisition and scanning parameters. [5+5]

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10. Write a short note on
a) Derivation of matched filter characteristic.
b) Efficiency of non-matched filters.

OR

- 11.a) Draw and explain balanced type duplexer.
b) Explain the merits and limitations of phased array antennas. [5+5]

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