**R15**

Code No: 128EA

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**

**B. Tech IV Year II Semester Examinations, May - 2019**

**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)**

| | | |
|---|---|---|
| 1.a) | What is maximum Unambiguous range? | [2] |
| b) | List the applications of radar. | [3] |
| c) | What is Doppler effect? | [2] |
| d) | List the applications of CW radar | [3] |
| e) | What is need of delay line canceller | [2] |
| f) | What is blind speeds? | [3] |
| g) | Mention the types of tracking | [2] |
| h) | What is meant by tracking in range? | [3] |
| i) | What is matched filter? | [2] |
| j) | List the types of radar receivers. | [3] |

## PART - B

**(50 Marks)**

| | | |
|---|---|---|
| 2.a) | Draw and explain the simple radar system with a neat block diagram. | |
| b) | Derive the radar range equation. | [5+5] |
| | **OR** | |
| 3.a) | Explain the significance Radar cross section in range equation. | |
| b) | Derive an equation for probability of false alarm. | [5+5] |
| 4. | Write a note on the following:<br>a) FM-CW altimeter b) CW radar. | [5+5] |
| | **OR** | |
| 5.a) | Explain the working principle of multiple frequency CW radar. | |
| b) | What are the bandwidth requirements for a receiver? | [5+5] |
| 6.a) | Explain the working principle and function of each block of power amplifier transmitter in MTI Radar? | |
| b) | Explain the function of pulse Doppler radar and how it is different from simple pulse radar? | [5+5] |
| | **OR** | |
| 7.a) | What is an A-scope display? How it generates butterfly effect in MTI Radar system? | |
| b) | Explain the limitations of MTI Radar. | [5+5] |

8.a) Briefly explain the various tracking techniques of radar.
b) Explain the working of one-coordinate amplitude comparison mono pulse radar. [5+5]

**OR**

9.a) Explain the function of sequential lobe tracking.
b) Explain the working of phase comparison mono pulse radar. [5+5]

10.a) Explain the function of Balanced duplexer.
b) Explain the designing criteria of a Matched filter receiver. [5+5]

**OR**

11.a) Derive the effective noise temperature of N-antenna system.
b) Explain the working principle of Branch –type duplexer. [5+5]

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