

Code No: 128EA

R15

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B. Tech IV Year II Semester Examinations, July - 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) Write the applications of radar. [2]
- b) Explain PRF and range ambiguities. [3]
- c) Write the merits of FMCW radar. [2]
- d) Define Doppler Effect. [3]
- e) Define blind speed. [2]
- f) What is staggered PRF? [3]
- g) What is single target tracking Radar? [2]
- h) Explain the salient features of tracking Radar. [3]
- i) Why matched filters is needed in detection of Radar signals? [2]
- j) Write the limitations of Phased array antennas. [3]

PART - B

(50 Marks)

2. Describe the operation of Radar with the help of neat block diagram. [10]

OR

- 3.a) Derive modified radar range equation.
- b) Determine the peak power and duty cycle of radar whose average transmitter power is 110 W, pulse width of 0.6 μ s and pulse repetition frequency of 3 KHz. [5+5]

- 4.a) Write short notes on isolation between transmitter and receiver.
- b) Write the receiver bandwidth requirements and determine the acceleration of target having the receiver bandwidth is 60 Hz and operating wavelength is 10 cm. [5+5]

OR

- 5.a) With neat block diagram explain the operation of FM-CW radar.
- b) Describe the operation of FM-CW Altimeter. [5+5]

- 6.a) Explain the operation of MTI Radar with power oscillator transmitter.
- b) With neat sketches, discuss about double cancellation. [5+5]

OR

- 7.a) Explain the need of range gated Doppler filters used in MTI Radar.
- b) Distinguish MTI versus pulse Doppler radar. [5+5]

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- 8.a) Explain how error signal is generated from sequential lobing.
b) Discuss two-coordinate amplitude-comparison mono pulse tracking radar. [5+5]

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9.a) Describe the operation of split-range-gate tracking.
b) Distinguish four continuous-tracking-Radar techniques. [5+5]

10. Write a short note on
a) Correlation functions and cross correlation receiver.
b) Matched filter with non-white noise. [5+5]

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11.a) Derive an expression for noise figure of 'N' networks in cascade.
b) Discuss about beam steering and beam width changes. [5+5]

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