R16

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year I Semester Examinations, March - 2021
RADAR SYSTEMS
(Electronics and Communication Engineering)

Time: 3 Hours

Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks
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1.a) Define the Maximum unambiguous range and derive its relations.
 b) Write Radar frequencies and its applications.
 c) How threshold detection is used to detect the minimum signal?   [5+5+5]

2.a) Derive the modified Radar range equation What are the modifications are there with respect to Radar range equation?
 b) How an envelope detector is used to determine the probability of false alarm when noise alone is assumed to be present as input to the receiver?   [8+7]

3.a) Draw the block diagram of simple CW radar and explain the working of beat frequency amplifier.
 b) What are the two practical effects which limit the amount of transmitted leakage power which can be tolerated at the receiver?   [10+5]

4.a) How to measure the doppler direction using synchronous two phase motor? Explain.
 b) Determine the range and doppler velocity of an approaching target using a triangular modulation FMCW radar. Given beat frequency $f_{b(up)}$ = 15KHz and $f_{b(down)}$ = 25KHz, modulating frequency:1MHz, Δf:1KHz and operating frequency:3GHz.   [8+7]

5.a) What are the differences between MTI and Pulse radar?
 b) How a scope is used to measure successive sweeps of MTI radar?
 c) What are the coho and stalo in MTI radar transmitter?   [5+5+5]

6.a) What are the limitations of MTI radar performance?
 b) Explain the sequential lobing tracking radar technique with suitable diagrams.   [5+10]

7.a) Derive the matched filter characteristics and draw its impulse response.
 b) Explain the working of cross correlation receiver with neat block diagram.   [7+8]

8.a) What are the salient features of Radar receiver?
 b) Explain the basic concepts of phased array antennas of Radar receiver.   [5+10]

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