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 μs 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]

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

OR

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]

OR

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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