CBCS SCHEME

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18EC823

Eighth Semester B.E. Degree Examination, June/July 2024
Radar Engineering

Time: 3 hrs. Max. Marks: 100

Note: ***Answer any FIVE full questions, choosing ONE full question from each module.***

Module-1

1 a. Explain block diagram of a Radar with a neat diagram and explain each block. **(10 Marks)**

b. Derive simple form of Radar range equation. Deduce the equation to other forms also. **(10 Marks)**

OR

2 a. Briefly describe the major areas of Radar applications. **(10 Marks)**

b. Explain maximum unambiguous range of a Radar with equation and graph. **(10 Marks)**

Module-2

3 a. Define noise figure of receiver and prove that $R_{max}^4 = \frac{P_t G A_e \sigma}{(4\pi)^2 K T_0 B F_n \left(\frac{S}{N}\right)_{min}}$. **(10 Marks)**

b. Discuss briefly the following types of system losses in Radar :
(i) Microwave plumbing losses.
(ii) Antenna losses.
(iii) Signal processing losses. **(10 Marks)**

OR

4 a. Discuss with equation and graphs the probability of false alarm and the probability of detection using a envelope detector. **(10 Marks)**

b. Explain the Radar cross section of sphere and cone sphere targets. **(10 Marks)**

Module-3

5 a. With necessary equations and graphs explain a CW Doppler Radar and Pulse dopler Radar with neat block diagrams. **(10 Marks)**

b. Explain the working of digital Moving Target Indicator (MTI) Doppler signal processor with neat diagram. **(10 Marks)**

OR

6 a. With neat block diagram, explain the original Moving Target Detector (MTD) signal processor. **(10 Marks)**

b. Derive the equations for clutter attenuation and MTI improvement factor. **(10 Marks)**

Module-4

7 a. Define monopulse tracker. Using block diagram, explain amplitude comparision monopulse tracking Radar for a single angular coordinate. **(10 Marks)**

b. What are the different types of tracking Radar Systems? Explain with diagrams, how angle tracking is done. **(10 Marks)**

OR

8	a.	With neat block diagram, explain conical scan tracking Radar.	(10 Marks)
	b.	Discuss on tracking in range of a tracking Radar with suitable waveforms and equations.	(10 Marks)

Module-5

9	a.	List the different functions served by Radar antenna.	(10 Marks)
	b.	Write short note on : Superheterodyne receiver.	(10 Marks)

OR

10	a.	Explain different types of Radar display system.	(10 Marks)
	b.	Discuss on Electronically steered phased array antennas.	(10 Marks)

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