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18EC823

Eight Semester B.E. Degree Examination, June/July 2023
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 basic principle of radar.   **(10 Marks)**
    b.   Show that simple form of radar range equation.
$$R_{max} = \left[\frac{P_t A_e^2 \sigma}{4\pi\lambda^2 S_{min}} \right]$$
    (10 Marks)

OR

2   a.   Explain block diagram of a conventional pulse radar with a superheterodyne receiver.
    (10 Marks)
    b.   Explain the application of radar.   **(10 Marks)**

Module-2

3   a.   Define noise figure of receiver and prove that
$$R_{max}^4 = \frac{P_t G A_e \sigma}{(4\pi)^2 K T_o B F_n (S/N)_{min}}$$
    (10 Marks)
    b.   Explain probabilities of detection and false alarm in radar receiver.   **(10 Marks)**

OR

4   a.   Explain Radar cross section of targets.   **(10 Marks)**
    b.   Briefly explain various radar system losses.   **(10 Marks)**

Module-3

5   a.   With a neat block diagram explain single delay line canceler.   **(10 Marks)**
    b.   With a neat block diagram explain MTI radar with power amplifier transmitter.   **(10 Marks)**

OR

6   a.   Explain digital MTI doppler signal processor with a neat block diagram.   **(10 Marks)**
    b.   Explain Moving Target Detector (MTD) signal processor with a neat block diagram.
    (10 Marks)

Module-4

7   a.   Explain the types of tracking radar systems.   **(10 Marks)**
    b.   Explain Amplitude-Comparision Monopulse in one angle coordinate with a neat block diagram.   **(10 Marks)**

OR

8 a. Explain conical scan and sequential lobing with a diagram. (10 Marks)

    b. Explain conical scan tracking radar system with a neat block diagram. (10 Marks)

Module-5

9 a. Explain functions of the radar antenna. (10 Marks)

    b. Explain different antenna parameters. (10 Marks)

OR

10 a. Explain receiver noise figure. (10 Marks)

    b. Explain types of radar displays. (10 Marks)

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