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15EC833

Eighth Semester B.E. Degree Examination, July/August 2021
RADAR Engineering

Time: 3 hrs.

Max. Marks: 80

Note: *Answer any FIVE full questions.*

1   a.   Define RADAR. Explain the basic principle of RADAR with block diagram.   **(08 Marks)**
     b.   Briefly describe the major area of radar application.   **(08 Marks)**

2   a.   With a neat diagram, explain conventional pulse radar with a superheterodyne receiver.   **(08 Marks)**
     b.   Explain the simple form of radar equation.   **(08 Marks)**

3   a.   Derive the modified RADAR equation in terms of signal to noise ratio.   **(08 Marks)**
     b.   Briefly discuss the following type of signal losses in RADAR.
          i)   Antenna losses
          ii) Losses in Doppler processing radar.   **(08 Marks)**

4   a.   Explain the concepts of pulse repetition frequency and range ambiguities in case of radar.   **(08 Marks)**
     b.   Making use of portion of radar receiver block diagram, discuss with necessary equation the probability of false alarm and probability of detection.   **(08 Marks)**

5   a.   Explain the working of digital Moving Target Indicator (MTI) Doppler signal processor with neat diagram.   **(08 Marks)**
     b.   With a neat block diagram, explain how simple pulse radar extracts the Doppler frequency shaft of the echo signal from the moving target.   **(08 Marks)**

6   a.   Illustrate with neat block diagram, single – delay line canceller. Also derive the expression for frequency response of single-delay line canceller.   **(08 Marks)**
     b.   Write a note on blind speeds.   **(08 Marks)**

7   a.   Define monopulse tracker. Using block diagram, explain amplitude comparison monopulse tracking radar in one angle co-ordinates.   **(08 Marks)**
     b.   With a neat block diagram, explain conical scan tracking radar.   **(08 Marks)**

8   a.   Discuss the concept of phase comparison monopulse.   **(08 Marks)**
     b.   Compare monopulse and conical radar tracking system.   **(08 Marks)**

9   a.   List the different functions served by radar antenna.   **(08 Marks)**
     b.   What is the role of duplexers in radar system? Illustrate the transmit condition and receiver condition in case of balanced duplexer.   **(08 Marks)**

10   a.   List the advantages and limitations of electronically steered phased array antenna.   **(08 Marks)**
     b.   Explain different types of radar display system.   **(08 Marks)**