



CBCS SCHEME

15EC833

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Eighth Semester B.E. Degree Examination, Jan./Feb. 2023 Radar Engineering

Time: 3 hrs.

Max. Marks: 80

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

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-1

- 1 a. Define Radar. Explain the basic principle of radar. (06 Marks)
- b. Discuss the various applications of radar. (06 Marks)
- c. A radar is to have a maximum range of 300 km. What is the maximum allowable pulse repetition frequency for unambiguous reception? (04 Marks)

OR

- 2 a. Explain with neat diagram the working of conventional pulse radar with superheterodyne receiver. (06 Marks)
- b. Derive radar range equation. (06 Marks)
- c. What is the duty cycle of radar with a pulse width of 4 μ sec and a repetition time of 8msec? (04 Marks)

Module-2

- 3 a. Explain in detail signal to noise ratio in radar equation. (06 Marks)
- b. Explain the probability of false alarm. (06 Marks)
- c. Write a short note on simple target on sphere. (04 Marks)

OR

- 4 a. Explain in detail pulse repetition frequency. (06 Marks)
- b. Explain the probability of detection. (06 Marks)
- c. Write a short note on simple target on cone. (04 Marks)

Module-3

- 5 a. Draw the block diagram of MTI radar that uses a power amplifier as the transmitter. (06 Marks)
- b. Write a note on sweep to sweep subtraction and the delay line canceller. (06 Marks)
- c. For an MTI radar, what are the first three blind speed at 2 GHz when PRF is 1 kHz? (04 Marks)

OR

- 6 a. Draw the block diagram of digital MTI Doppler signal processor. (06 Marks)
- b. Write a note on blind speed in digital MTI processing. (06 Marks)
- c. What is the Doppler shift when tracking a car moving away from radar at 100 miles/hour? The radar is operating at 1 GHz. (04 Marks)

Module-4

- 7 a. What are the types of tracking system in radar? (06 Marks)
- b. Define Monopulse tracking. Explain amplitude comparison monopulse. (06 Marks)
- c. Write a short note on conical scan. (04 Marks)

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OR

- 8 a. Give the comparison of trackers. (06 Marks)
b. Draw the block diagram of conical scan tracking radar. (06 Marks)
c. Write a note on phase comparison monopulse. (04 Marks)

Module-5

- 9 a. Define antenna. What are the functions of Radar antenna? (06 Marks)
b. Write in detail about radiation patterns of phased arrays antenna. (06 Marks)
c. Explain any four types of display presentations. (04 Marks)

OR

- 10 a. Write any three antenna parameters. (06 Marks)
b. Define duplexer. Explain briefly balanced duplexer. (06 Marks)
c. Write a short note on Radar Receiver. (04 Marks)
