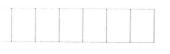


# GBGS SCHEME



17EC833

# ighth 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

a. Explain conventional pulse radar with super-heterodyne receiver block diagram.
b. Briefly describe the major areas of radar applications.
(10 Marks)
(10 Marks)

#### OR

2 a. Obtain simple form of the Radar Range equation.

(10 Marks)

- b. Draw Radar waveform and calculate:
  - (i) The maximum unambiguous range
    - (ii) Duty cycle
    - (iii) The average transmitted power
    - (iv) Bandwidth

Peak pulse power of 400 KW, a PRF of 1500 PPS and a pulse width of 0.8 µsec. (10 Marks)

### Module-2

- 3 a. Discuss probability of false alarm and the probability of detection for envelope detector output. (10 Marks)
  - b. Discuss different types of losses in Radar system.

# (10 Marks)

- OR

  4 a. Derive the modified radar equation interms of signal to noise ratio. (10 Marks)
  - b. Explain the radar cross section of sphere and cone sphere targets.

# (10 Marks)

5 a. Discuss sweep to sweep subtraction and delay line canceller. (10 Marks)

Module-3

b. With neat block diagram, explain Moving Target Detector (MTD) signal processor.

(10 Marks)

# OR

- 6 a. Explain the working of digital Moving Target Indicator (MTI) Doppler signal processor with neat block diagram. (10 Marks)
  - b. Derive the equations for clutter attenuation and MTI improvement factor.

#### (10 Marks)

#### Module-4

- a. List types of tracking radar systems and explain angle tracking in radar systems. (10 Marks)
  - b. Explain the block diagram of two-coordinate amplitude comparison monopulse tracking radar. (10 Marks)

#### OR

- 8 a. Explain the block diagram of 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

- What are the functions of radar antenna? Explain electronically steered phase array antenna. (10 Marks) (10 Marks)
  - What is duplexer? Explain balanced duplexer, circulator and receiver protector. b.

# OR

Explain different types of radar display system. (10 Marks) 10 (10 Marks) Explain steered reflector antenna of radar system.