



R18 Regulation

Subject code:2E8DH

# TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

(Autonomous, Accredited by NAAC with 'A' Grade)

B.Tech VIII Semester Regular/Supplementary Examinations, April 2023

## Radar Systems

(Electronics and Communication Engineering)

Maximum Marks: 70

Date:08.05.2023 Duration: 3 hours

- Note:
- 1.This question paper contains two parts A and B.
  2. Part A is compulsory which carries 20 marks. Answer all questions in Part A.
  3. Part B consists of 5 Units. Answer any one full question from each unit which carries 10M.
  4. Each question carries 10 marks and may have a, b, c, d as sub questions.

### Part-A

All the following questions carry equal marks

(10x2M=20 Marks)

- 1 Define Unambiguous range in a radar.
- 2 Write about effects due to integration of radar pulses.
- 3 Stationary objects are most easily detected by an FM system? Explain.
- 4 Give Applications of Continuous wave radar?
- 5 What is a delay line canceller?
- 6 Compare MTI & Pulse Doppler radar
- 7 For a radar height of 30m, target height of 100m and a range of 10Km find the range resolution and corresponds pulse width.
- 8 Define continuous tracking radar and track while scan radar.
- 9 What is a Phased Array Antenna.
- 10 Define Beam width of the antenna and radiation intensity.

### Part-B

Answer All the following questions.

(10MX 5=50Marks)

- 11 Derive the expression for maximum radar range equation. [10]  
OR
- 12 Draw the block diagram of a radar system and explain the operation of each block in it. [10]
- 13 Explain how isolation between transmitter and receiver of a radar system can be achieved if single antenna is used for transmission and reception. [10]  
OR
- 14 Establish a relation between Doppler frequency shift and radial velocity of a moving target. [10]
- 15 With the help of necessary block diagram explain the operation of an MTI radar system with a power amplifier in the transmitter. [10]  
OR
- 16 What are blind speeds? Suggest a method to reduce the effect of blind speeds for unambiguous detection of a moving target. [10]
- 17 Draw and explain the following with respect to Tracking in Range [3+3+4]  
i) Echo pulse ii) Early late range gates iii) Difference signal between early and late range gates  
OR
- 18 A. Describe the conical scanning method. [5M]  
B. Explain in detail about low tracking angle. [5M]

19 Explain the principle and characteristics of a matched filter hence derive the expression for frequency response function. [10M]

OR

20 A. Discuss about matched filter correlation function. [5M]  
B. Explain about balanced duplexer using 2 ATR tubes with neat diagram. [5M]