



R20 Regulation

Subject code: 3E8DD

TKR COLLEGE OF ENGINEERING AND TECHNOLOGY

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

B.Tech VIII Semester Supplementary Examinations, November 2025

RADAR ENGINEERING

(ECE)

Maximum Marks: 70

Date: 25.11.2025

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)		Marks	CO	Bloom Tx
1	Define the term radar range resolution and write the equation.	2M	CO1	BT1
2	What is meant by false alarm?	2M	CO1	BT1
3	Why isolation between Transmitter and Receiver is required in CW Radar?	2M	CO2	BT2
4	What is FM-CW Altimeter?	2M	CO2	BT1
5	Give the role of a delay line canceller in MTI Radar.	2M	CO3	BT1
6	What is Staggered PRF?	2M	CO3	BT1
7	List the disadvantages of sequential lobbing.	2M	CO4	BT2
8	What is AGC in conical Scanning?	2M	CO4	BT1
9	Write a note on the efficiency of non-matched filters.	2M	CO5	BT2
10	State a few important advantages of Phased array Radars.	2M	CO5	BT1

Part-B

Answer All the following questions. (5X10M=50Marks)		Marks	CO	Bloom Tx
11	a) A radar system operates at 3 cm wavelength with peak pulse power of 100 KW. If its minimum detectable signal is $4\mu W$, radar cross section area is $12 m^2$ & effective antenna aperture is $6 m^2$. Calculate maximum range of the radar. b) Derive the simple Radar Range equation.	6M 4M	CO1	BT4
OR				
12	a) Derive the expression for probability of false alarm (P_{fa}), when only noise is present at the input of the IF Amplifier. b) Briefly explain various types of losses taking place in radar systems.	5M 5M	CO1	BT4
13	a) What is the Doppler effect? What are some of the ways in which it manifests itself? What are its radar applications? b) Explain the operation of the two frequency CW Radar.	5M 5M	CO2	BT3
OR				
14	a) Explain how the noise signals are limiting the performance of FMCW altimeter.	5M	CO2	BT3

	b) Explain operation of FM-CW Radar.	5M		
15	Compare and contrast the situations with a Power amplifier and Power oscillator in the transmitter of a MTI system with neat block diagrams.	10M	CO3	BT4
	OR			
16	Explain blind speed and the methods for reducing the effects of blind speed. What are the factors that limit the MTI performance? Explain.	5M 5M	CO3	BT4
17	a) In mono pulse radar two antennas are used to produce a phase difference of 25° between the echo signals. It operates at frequency of 1.5 GHz. Find the spacing between the antennas, if the angle $\theta=15^\circ$. b) Discuss about acquisition and scanning parameters.	5M 5M	CO4	BT3
	OR			
18	a) Draw and explain the block diagram of one-coordinate amplitude-comparison mono pulse tracking radar. b) Describe the operation of conical scanning method.	5M 5M	CO4	BT3
19	What is Matched filter receiver? Derive expression for the response of Matched filter characteristics.	10M	CO5	BT4
	OR			
20	Write about radiation pattern of phased array antennas with suitable equations. And also write applications of phased array antennas.	10M	CO5	BT3