Code No: R15A0429 **R15**

MALLA REDDY COLLEGE OF ENGINEERING & TECHNOLOGY

(Autonomous Institution – UGC, Govt. of India)

IV B.Tech- II Semester Supplementary Examinations, April 2023

Radar Systems

(ECE)

Roll No										

ime: 3 hours **Max. Marks: 75**

Note: This question paper contains two parts A and B
Part A is compulsory which carriers 25 marks and Answer all questions.
Part B Consists of 5 SECTIONS (One SECTION for each UNIT). Answer FIVE Questions, Choosing ONE Question from each SECTION and each Question carries 10 marks.

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PART-A (25 Marks)

1). a	Explain the significance of probability of false alarm.	**[2M]**
b	Calculate the range of a target, if the time taken by the signal to travel and return is 100μs?	**[3M]**
c	Draw the block diagram of CW Doppler radar.	**[2M]**
d	Give brief explanation on Multiple Frequency CW Radar.	**[3M]**
e	Write about MTI radar parameters.	**[2M]**
f	List different tracking mechanisms that are employed in Radar system.	**[3M]**
g	Write functions of search radar.	**[2M]**
h	What is matched filter? Why it is needed in pulse Radar?	**[3M]**
i	Discuss in brief measuring of noise figure.	**[2M]**
j	Define noise temperature.	**[3M]**

PART-B (50 MARKS)

SECTION-I

2	Derive the Radar Range equation and explain the factors on which it depends.	**[10M]**
	OR	
3	Explain the working of Radar with the help of a block diagram and hence bring out the role of transmitter & receiver in Radar.	**[10M]**

SECTION-II

4	Calculate the Doppler shift (f_d) when the relative velocity of target with respect to radar is 50 knots (1knot = 1.852 kms) at a transmitted frequency of 80 MHZ. Derive the formula used.	**[10M]**
	OR	
5	Bring out at least 5 differences between Pulse and CW Radar with neat schematics.	**[10M]**

SECTION-III

6	Describe the operation of MTI Radar with power oscillator transmitter	**[10M]**
	OR	
7	How moving target is distinguish from stationary target?	**[10M]**

SECTION-IV

8	Discuss Matched filter receiver and derive Matched filter characteristics.	**[10M]**

OR

9 What is cross correlation? And explain in detail about functioning of cross correlation reciver. **[10M]**

SECTION-V

10 Write about radiation pattern of phased array antennas with suitable equations. **[10M]**

OR

11 A radar receiver is connected to a 30Ω resistance antenna that has an equivalent noise resistance of 25Ω. Calculate the noise figure of the receiver and the equivalent noise temperature of the receiver. **[10M]**

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