INSTITUTE OF AERONAUTICAL ENGINEERING
(Autonomous)

B.Tech VI Semester End Examinations (Regular), November – 2020

Regulation: IARE–R16

RADAR SYSTEMS

Time: 2 Hours (ECE) **Max Marks: 70**

Answer any Four Questions from Part A
Answer any Five Questions from Part B

PART – A

1. State the RADAR equation for maximum unambiguous range. **[5M]**

2. List the limitations of CW radar. **[5M]**

3. Differentiate coherent and non-coherent MTI radars. **[5M]**

4. Write short notes on: i) Tracking in range and ii) Acquisition **[5M]**

5. Appraise the working of duplexers. **[5M]**

6. List the applications of CW radar **[5M]**

7. Write short notes on double cancellation. **[5M]**

8. Contrast matched filter receiver and cross-correlation receiver. **[5M]**

PART – B

9. Discuss the effect of receiver noise and derive the radar range equation that includes the receiver noise. **[10M]**

10. A Radar system transmits pulses of duration of 2µs and repetition rate of 1kHz. Find the maximum and minimum range of radar. **[10M]**

11. Describe methods to achieve isolation between transmitter and receiver of CW Doppler radar if same antenna is to be used for transmission and reception. **[10M]**

12. With neat block diagram explain in detail the functioning of CW RADAR systems. **[10M]**

13. Explain the working principle of pulse doppler radar. **[10M]**

14. What are delay line cancellers? Explain how they are used in RADAR? **[10M]**

15. With neat diagram, explain in detail about cross correlation receiver **[10M]**

16. Identify the necessity of a matched filter in a radar receiver. Determine the impulse response of a matched filter that is commonly used in a radar receiver. **[10M]**

17. Explain the working of balanced type duplexer with neat diagram. **[10M]**

18. Find the overall noise figure of a radar receiver consisting of a low-noise RF amplifier with noise figure of 1.4 dB and gain of 15 dB, a mixer with 6 dB conversion loss and noise temperature ratio of 1.2, and an IF amplifier with noise figure of 1.0 dB. **[10M]**

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