Code: 20A04702c

R20

B.Tech IV Year I Semester (R20) Regular Examinations December/January 2024

RADAR ENGINEERING

(Electronics & Communication Engineering)

Time: 3 hours Max. Marks: 70

PART – A

(Compulsory Question)

*****

1 Answer the following: (10 X 02 = 20 Marks)

(a) What are the components of the radar equation? 2M

(b) Draw the radar waveform if duty cycle is 20% and f = 2 GHz, P_{avg} is 7 watts. 2M

(c) Calculate the Doppler frequency of an aircraft moving with a speed of 550 Knots and when the CW radar is working with λ = 8 cms. 2M

(d) Give the advantages of FM - CW radar. 2M

(e) Write the principle of Moving Target Indication (MTI) in radar systems. 2M

(f) What are the limitations of MTI Radar? 2M

(g) Draw the block diagram of cross correlation receiver. 2M

(h) Compare the amplitude comparison and phase comparison monopulse tracking techniques. 2M

(i) Write the working principle of a navigational aid: Very High Frequency Omni-Directional Range (VOR). 2M

(j) What is Instrument Landing System (ILS)? 2M

PART – B

(Answer all the questions: 05 X 10 = 50 Marks)

2 (a) Explain the significance of Radar cross section in Radar range equation. 5M

(b) Explain about PRF and range ambiguities. 5M

OR

3 Explain about Radar cross section of targets. 10M

4 (i) Draw and explain CW radar with nonzero IF receiver. 10M
(ii) Write the merits and demerits of continuous wave radar.

OR

5 Explain the principle of operation of FM-CW Radar with using side band super heterodyne Receiver. 10M

6 Explain the principle of operation of MTI radar with power oscillator transmitter. 10M

OR

7 Explain the necessity of Range gated Doppler filters in MTI radar with a neat diagram. 10M

8 Explain in detail about Sequential lobing. 10M

OR

9 (a) Define the Following: 5M
(i) Noise Figure,
(ii) Noise Temperature.

(b) Explain about Constant False Alarm Rate Receiver. 5M

10 Discuss the concept of electronically steered phased array antennas. 10M

OR

11 Discuss in brief about Navigational Aids. 10M

*****