

(Subject Code and Roll No. to be filled in your Answer Book)

Roll No.

M.Tech.

III SEM. THEORY EXAMINATION 2011-12

RADAR ENGINEERING

Time : 3 Hours

Total Marks : 100

Note :- (1) Attempt all questions.

(2) All questions carry equal marks.

(3) Assume the missing data if any.

Attempt any **four** of the following :- (5×4=20)

(a) Explain the term “butterfly effect” and “delay line cancellers” in brief.

(b) Define “blind speed” and “range gating”.

(c) Differentiate between FM CW radar and FM CW altimeter.

(d) How a CW radar is different from a multiple frequency CW radar ?

(e) Draw the block diagram of CW radar and mention its application.

(f) Explain in detail about FM CW radar with a block diagram.

2. Attempt any **two** of the following :- (10×2=20)

- (a) Explain MTI radar with a block diagram.
- (b) Explain with a block diagram range gated Doppler filters.
- (c) Explain with a block diagram of non coherent MTI radar.

3. Write in brief on any **two** of the following :- (10×2=20)

- (a) Explain in detail about pulse Doppler radar.
- (b) Explain with a neat diagram about sequential lobing.
- (c) Explain with a neat block diagram of conical scan tracking radar.

4. Attempt any **two** of the following :- (10×2=20)

- (a) Explain briefly about amplitude comparison Monopulse radar. Draw its block diagram.
- (b) Explain briefly the working of a phase comparison Monopulse radar.
- (c) Derive the radar range Equation and discuss the factors affecting the choice of frequency of operation of radar system.

5. Attempt any **two** of the following :- (10×2=20)

- (a) Calculate the maximum range of a radar system which operates at 3 cm with a peak pulse power of 500 kW. If its minimum receivable power is 10^{-13} W. The capture

area of its antenna is 5m^2 and the target cross-section area of target is 20m^2 .

- (b) Describe the role of Delay Line Canceller in MTI radar. Comment on the disadvantages of MTI radar and how it can be overcome.
- (c) Draw the block diagram for measurement of doppler direction using synchronous motor. And discuss how it indicates the direction of the target. Discuss the radar frequencies & its applications.