

(Following Paper ID and Roll No. to be filled in your Answer Books)

Paper ID : 131855

Roll No.

B.TECH.

Theory Examination (Semester-VIII) 2015-16

### INTRODUCTION TO RADAR SYSTEMS

*Time : 3 Hours*

*Max. Marks : 100*

**Note :- Attempt all questions. All questions carry equal marks.**

**1. Attempt any four parts :-**  $(10 \times 2 = 20)$

- (a) Explain basic principle of radar system with suitable diagram.
- (b) Define pulse width, pulse repetition time, rest time and duty cycle with their formulae.
- (c) Explain the term Blind speed.
- (d) How MTI radar is different from other radar systems.
- (e) What do you understand by second time around signal?

(1)

P.T.O.

- (f) Describe the concept of Doppler frequency shift.
- (g) Explain minimum detectable signal.
- (h) Calculate average power when peak power is 200 kW, pulse width is 2  $\mu$ s and rest time is 2000s.
- (i) Describe the terms clutter and ambiguity.
- (j) What do you mean by false alarm?

- Section-B**
- 2. Attempt any five questions. [5×10=50]**
- (a) Explain MTI radar with suitable block diagram. Also give its applications.
  - (b) Explain conical scan and sequential lobbing in detail.
  - (c) Discuss limitations of tracking accuracy.
  - (d) Explain various antenna parameters.
  - (e) Describe Automatic Tracking with Surveillance radars in detail.
  - (f) What do you understand by Tracking with Radar? Explain mono pulse tracking.

(2)

P.T.O.

- (g) Write short note on radar clutter and accuracy of Radar measurements.
- (h) Derive expression for probability of false alarm. Distinguish it from probability of miss.

### Section-C

**Attempt any two questions** [2×15=30]

- 3. Derive the expression for simple form of radar range equation. Radar is operating at 1.5cm with peak pulse power of 300 kW. The capture area of antenna is  $5\text{m}^2$  and minimum detectable signal is  $10^{-12}\text{ W}$ . Calculate the maximum range of radar if radar cross section of target is  $10\text{ m}^2$ .
- 4. Explain various system losses in detail.
- 5. Write short note on:
  - i. Low angle tracking
  - ii. Delay line canceller

(3)

P.T.O.