DRONACHARYA COLLEGE OF ENGINEERING

Sessional Examination

RADAR & SONAR ENGG.
VIII-Semester (ECE)

Time Allowed: 90 Min. ***Max. Marks: 40***

Note: - *Attempt any four Questions. All questions carry equal marks*

1. What is MTI ? With the help of a block diagram explain its working.
2. What is blind speed and blind phases ? How multiple / staggered pulse repetition p.r.f.s are able to eliminate the same ?
3. Explain the working of Digital Signal Processing with I & Q Channels. Also discuss its advantages and disadvantages.
4. What are transverse filters and Doppler filters ? Explain with diagrams.
5. What are the Major difficulties which are being faced by an MTI radar fitted on a moving platform ? How these limitation are eliminated ?
6. Discuss the functioning of a Pulse Doppler Radar.

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7. Explain the working of Pulse Radar with the help of a block diagram.
8. What is the maximum unambiguous range. How it is related to the Pulse Repetition rate ? Explain with diagram.
9. Explain the following terms in brief :
   a. Pulse Width
   b. Average Power
   c. Duty Cycle
   d. Radar Frequencies
   e. Doppler shift
10. What are the different types of system loses ?
11. With help of a diagram explain the working of FMCW Radar.
12. Write short notes on any four :
   a. Propagation Effects
   b. Minimum Detectable Signal
   c. Ducting Effect in Radars
   d. Antenna Loss
   e. Plumbing Losses

DRONACHARYA COLLEGE OF ENGINEERING
KHENTAWAS ,FARUKHNAGAR, GURGAON

Sessional Examination April 2009, VIII Semester,ECE

Subject: Radar and Sonar Engineering

Max Marks: 100

Time Allowed:3 hours

NOTE: 1. Attempt any five question.
2. Each question carry equal marks

Q 1 a) With the help of block diagram of a basic radar set explain its operation. List various radar applications.
b) What are various radar frequencies. (15+5)

Q 2 a) Derive and explain the basic Radar Range equation as governed by the minimum receivable echo power Per minute.
b) A Naval air Defence Tracking Radar working in X-band is transmitting peak power of 100KW. Pulse width is 2 μs. and pulse repetitive frequency is 500Hz. For this radar determine:- (i) Duty cycle (ii) Average Power (iii) Unambiguous range (iv) Suitable bandwidth (v) Hits pen scan if beam width is 3^o and scanning rate is 10 RPM.(10+10)

Q 3 a) What is Doppler effect. What is its use in Radar. List various application of CW radar
b) With the help of block diagram explain the working of FMCW Radar. (10+10)

Q 4 a) With the help of block diagram explain the working of MTI Radar.
b) What are blind speed? How can their effect be reduced.
c) For a radar operating on wavelength of 3cm with a prf of 2400 Hz, determine the blind speed.

Q 5 a) With the help of a diagram describe the conical scanning method of tracking an acquired target.
b) Explain in detail, monolulse method of target tracking in one angular co-ordinate.

Q 6 a) What is a mixer? Explain various types of mixers used in radar. 10
b) What are radar display? Discuss various types of Radar Displays. 10

Q 7 What is SONAR ? Explain its principal and working application? Also list limitation of SONAR. 20

Q 8 Write short notes on any three:- 20

(i) System Losses
(ii) Duplexers
(iii) Acquisition
(iv) Receiver Protectors
(v) Delay Lines