JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
B. Tech IV Year II Semester Examinations, April – 2014
RADAR SYSTEMS
(Common to ECE, ETM)

Time: 3 Hours   Max. Marks: 75

Answer any Five Questions
All Questions Carry Equal Marks
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1.a) Derive the radar range equation in terms of minimum detectable signal.
 b) What is Maximum Unambiguous Range? How is it related with pulse repetition rate?

2.a) Explain in detail about various system losses involved in radar system.
 b) The bandwidth of IF amplifier in a Radar receiver is 1 MHZ. If the threshold to noise ratio is 13 dB, determine the false alarm time.

3.a) With the help of a suitable block diagram, explain the operation of CW radar with non-zero IF in the receiver.
 b) List out the applications of CW radar and explain it.

4.a) Determine the range and Doppler velocity for FMCW radar if the target is approaching the radar. Given the beat frequency f_b(up)=15 KHz and f_b(down) = 25 KHz for the triangular modulation, the modulating frequency is 1 MHz and Doppler frequency shift is 1 KHz.
 b) Discuss about the multiple frequency CW radar.

5.a) Draw and explain frequency response characteristics of a MTI using range gates and filters.
 b) An MTI radar operates at 6 GHz with a PRF of 800 PPS. Calculate the lowest three Blind speeds of this radar.

6.a) Write the differences between Conical Scan and Monopulse Tracking Radar.
 b) Describe the operation of Monopulse tracking radar with its block diagram.

7.a) What is meant by correlation? Explain cross-correlation with the help of neat block diagram.
 b) Derive the expression for frequency response of the matched filter with Non-white noise.

8.a) Explain how beam width of a phased array antenna will vary with steering angle.
 b) What is a duplexer and describe a typical duplexer with a schematic diagram.

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