JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

Test-1 (February 2016)

Department of Electronics and Communications Engineering

M.Tech. (Fourth Semester)

Course Code: 13M1WEC432 Duration: 1 hour

Course Name: Radar and Sonar signal processing Maximum Marks: 15

Note: Answer all questions. Specify the assumptions, if made any. Each question carries 3 marks.

1. Derive the radar range equation for bi-static radar system.
2. Draw the block diagram of pulse Doppler radar and give importance of pulse repetitive interval and pulse duration on determination of range and velocity of the target.
3. Write a short note on the atmospheric effects on the radar wave propagation.
4. Give the effect of vertical and horizontal polarization on the radar signal reflections from the earth's surface.
5. A parabolic dish antenna is pointed up into the sky, not directed at the sun. Noise due to the atmospheric radiation is equivalent to a source temperature of 70K. A low noise pre-amplifier with a noise figure of 2 dB and an available power gain of 20 dB with the bandwidth of 20MHz is mounted at the antenna feed.
    a. Find the equivalent noise temperature at the pre-amplifier input.
    b. Find the available noise power at the pre-amplifier output.