JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT
TEST – 3 EXAMINATIONS, MAY-JUNE 2016
M.TECH IV SEMESTER

COURSE CODE: 13M1WEC432   MAX. MARKS: 35

COURSE NAME: Radar and Sonar Signal Processing

COURSE CREDITS: 03   MAX. TIME: 2 HRS

Note: *All questions are compulsory. Carrying of mobile phone during examination will be treated as case of unfair means. Each question carries 05 marks.*

1. Draw the 4 × 4 Butler's matrix using phase shifters and give all the radiation patterns possible for this configuration.
2. Find the beam-width between the first nulls and the 3-dB beam-width for a uniform linear antenna array of six elements spaced at half wavelength. The progressive phase shift between the antenna elements has been given as 30^0.
3. Write a short note on synthetic aperture radar with relevant equations.
4. What do you mean by pulse compression and explain in detail about the pulse compression using the linear frequency modulated signal.
5. Derive the expression for the ambiguity function for a rectangular pulse with a Doppler mismatch between the matched filter response and the received signal.
6. What are the different types of scanning techniques used in radar systems. Explain them in detail.
7. Explain the following terms
   a. Phased antenna arrays.
   b. Track while scan systems.
   c. Noise figure of cascaded systems.
   d. Barker codes.
   e. Sonar applications.