

R09

Code No: 58028

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY-HYDERABAD**B. Tech IV Year II Semester Examinations, May - 2016****RADAR SYSTEMS****(Common to ECE, ETM)****Time: 3 Hours****Max. Marks: 75****Answer any Five Questions
All Questions Carry Equal Marks**

- 1.a) Draw the block diagram of the radar system and explain each block.
- b) Explain the minimum detectable signal and receiver noise concept in basic radar system. [8+7]
- 2.a) Explain radar cross-section of target.
- b) Find the maximum range of radar whose transmitted power is 200 KW. Cross-sectional area of the target is 10 sq.m. The minimum power received is 1 mw. The power gain of the antenna used is 2000, and the operating frequency is 3 GHz.
- c) Calculate the average transmitted power of radar when the peak power is 200 KW, pulse width is 2 micro seconds, and rest time is 2000 sec. [7+4+4]
- 3.a) Draw and explain the block diagram of simple pulse radar.
- b) Explain CW radar. Write its advantages, disadvantages and applications. [8+7]
- 4.a) Explain the applications of Altimeter FMCW radar and write its advantages.
- b) 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 Δf is 1 KHz. [9+6]
- 5.a) With necessary block diagram explain the principle and operation of pulse Doppler radar.
- b) Explain delay line cancellers and discuss the limitations of single delay line cancellers. [8+7]
- 6.a) Explain the block diagram of Monopulse tracking radar.
- b) What are the various methods of Acquisition before tracking a target with radars? Explain in detail. [8+7]
- 7.a) What is meant by correlation? Explain cross-correlation with the help of neat diagram.
- b) Briefly explain about the efficiency of non-matched filters. [8+7]
- 8.a) Define and distinguish the following terms:
 - i) Noise figure ii) Noise temperature iii) System noise temperature and receivers.
- b) Explain the radiation pattern of phased array antenna with suitable equations. [8+7]

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