

Code: 9A04703

R09

B.Tech IV Year I Semester (R09) Regular & Supplementary Examinations December 2014

**RADAR SYSTEMS**

(Electronics and Communication Engineering)

Time: 3 hours

Max. Marks: 70

Answer any FIVE questions  
All questions carry equal marks

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- 1 (a) Explain the applications of radar.  
(b) Derive the radar range equation in terms of minimum detectable signal.
- 2 (a) Explain the terms integration loss & radar cross section of a target.  
(b) Calculate the minimum pulse interval and pulse repetition frequency required for radar to detect unambiguous targets up to a range of 125 miles.
- 3 (a) Draw the block diagram and explain the operation of a CW radar.  
(b) Compute the velocity of the target if it produces a Doppler shift of 1 KHz and operating wavelength is 3 cm. Derive the relationship used.
- 4 (a) Explain range and Doppler measurement in FM-CW radar.  
(b) Explain FM-CW.
- 5 (a) With a neat schematic diagram, explain the operation of MTI radar.  
(b) An MTI radar system operating at 10 GHz and PRF = 100 Hz receives echoes from an aircraft that is approaching the radar with radial velocity component of 1 km/sec. Determine the Doppler frequency.
- 6 (a) Explain various limitations of tracking radars.  
(b) Explain different scanning techniques and tracking mechanisms.
- 7 (a) Discuss matched filter receiver and derive matched filter characteristics.  
(b) Explain about cross correlation receiver.
- 8 (a) Distinguish and explain branch type and balanced type duplexers.  
(b) Explain by changing relative phase, how beam position can be varied in phased array antennas.

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