Code No: M0422

# **R07**

# Set No. 1

### IV B.Tech I Semester Supplementary Examinations, March 2013 RADAR SYSTEMS

#### (ELECTRONICS AND COMMUNICATION ENGINEERING)

Time : 3 hours

Max. Marks :80

## Answer any Five Questions

#### All Questions carry equal marks

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1.	a) Explain the working principle of a pulsed Radar system?				
	b) A pulsed radar working in L-band at 1.2GHz has an antenna with a gain of				
	30dB and a transmitted power of 3KW. If it is defined to detect a target with				
	a cross section of 15 square meter and a minimum detectable signal is				
	100dBm. What is the maximum range of the radar?	[8+8]			
2.	Write short notes on				
	i) Envelope Detector ii) False-alarm Time & False-alarm Probability	[8+8]			
3.	a) Explain the working principle of a CW Radar?				
	b) Explain the need of Isolation between Transmitter and Receiver?	[8+8]			
4					
4.	a) With suitable block diagram explain about beat frequency up & down?	FO , O1			
	b) Explain about Multi frequency C w Radar?	[8+8]			
5	a) What is a Blind speed? Explain in detail?				
5.	b) What are the limitations of MTI Radar?	[8+8]			
		[010]			
6.	Explain about				
	i) Tracking Range ii) Acquisition system	[8+8]			
7.	Derive the signal-to- noise ratio of a Match filter?	[16]			
8.	Explain in detail about all designing techniques of a Duplexer?	[16]			

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Time : 3 hours

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#### Answer any Five Questions All Questions carry equal marks \*\*\*\*\*

- 1. a) Derive the basic Radar range equation?
  - b) A ground-based air-surveillance radar operates at a frequency of 1.3GHz. Its maximum range is 200nmi for the detection of a target with a cross section of 1 square meter. Its antenna is 12m wide by 4m high and the antenna aperture efficiency is 0.65. The receiver minimum detectable signal is 0.1pico Watts. Determine the following
    - a) Ae in square meter & Gainb) Transmitted powerc) PRF to achieve a R max unamb of 200nmid) Horizontal beamwidthe) Average power if ĩ is 2µsecf) duty cycle[8+8]
- 2. a) Discuss in detail the effect of Radar cross section of targets by considering different shapes of targets. [12]
  b) What is a Creeping wave? Explain? [4]
- 3. a) Explain the working principle of a side band Super heterodyne receiver?b) Calculate the Doppler frequency of a stationary CW Radar Transmitting at 4GHz when a moving target approaches the radar with a radial velocity of 90 km/hour.

[8+8]

4. a) Explain the working principle of FM-CW altimeter?b) Discuss the necessity of frequency modulation while detecting moving targets. [8+8]

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Code No: M0422	<b>R07</b>	Set No. 2
5. Explain in detail, the working	g principle of range-gated Doppler filter	rs. [16]
<ul><li>6. Explain the following</li><li>i) Box car generator</li></ul>	ii) AGC in tracking radar receiv	ver. [8+8]
<ul><li>7. a) Derive the impulse respon</li><li>b) Describe the different type</li></ul>	se characteristics for a matched filter. es of feeds used in radar antenna?	[8+8]
8. Write short notes on i) Displays	ii) Noise figure & temperature	[10+6]

Co	de No: M0422 <b>R07</b>	Set No. 3						
	IV B.Tech I Semester Supplementary Examinations, RADAR SYSTEMS	March 2013						
т	(ELECTRONICS AND COMMUNICATION ENGINE.	ENING) May Marka 190						
I	Answer any Five Questions	WIAA, WIAI NS .00						
	All Questions carry equal marks *****							
1.	a) Discuss Radar frequency bands & Range?							
	b) Explain in detail about peace & war applications of a Radar?	[8+8]						
2.	Explain about System losses in Radar?	[16]						
3.	a) Explain working principle of Non- Zero IF CW doppler radar?							
	b) Explain about IF Doppler filter bank?	[8+8]						
4.	Discuss all possible measurement errors in FM-CW Radar?	[16]						
5.	a) Explain Butterfly effect?							
	b) What is the difference between MTI & Pulse Doppler radar	[8+8]						
6.	Explain the working principle of 2- angle coordinate amplitude Mono pulse tracking radar	comparison						
	wono puise tracking radar.	[10]						
7	a) Explain the principle and process of correlation detection?							
7.	<ul><li>b) Discuss the efficiency of non-Matched filters with non-white no</li></ul>	ise? [8+8]						
8	a) Explain Visual displays to view radar echo signals in all types	of radar systems?						
0.	b) Explain in detail any one of receiver protector device?	[8+8]						

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Со	de No: M042	22	<b>R07</b>	Set No.	4
	IV B.Tech	I Semester Su R	upplementary Examina ADAR SYSTEMS	ations, March 2013	
ſ	(ELEC) Fime : 3 hours	CTRONICS ANI	D COMMUNICATION E	NGINEERING) Max. Marks :	80
		Ans All Qu	wer any Five Questions estions carry equal marks *****	i -	
1.	a) Explain the b) Explain	e working principi) Resolution	ple of basic Radar? ii ) Radar wave form		[8+8]
2.	Explain	i) Integration of ii) PRF and Ran	Rdar Pulse age ambiguities	X	[8+8]
3.	a) Explain, Re b) Discuss diff	cceiver band widt ferences between	th requirements basic Radar and CW Rada	ar	[8+8]
4.	Explain i) ii)	3 pulse cancelle ) Staggered PRF	er.		[8+8]
5.	Explain i) ii)	Sign of the radia MTI Radar with	l velocity power –amplifier Transm	itter	[8+8]
6.	a) Discuss Lin b) Explain Typ	mitations of low pes of Tracking S	v–angle tracking Systems		[8+8]
7.	a) Explain the b) Derive the c	e principle and ch overall noise figu	naracteristics of a matched are of N-stage Cascade netw	filter? ork in dB's	[8+8]
8.	Explain the ne	cessity and funct	tion of TR & ATR circuit	with suitable diagram	[16]

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