Code No: **RT41048** **R13** **Set No. 1**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1.	a)	List the applications of radar.	[4]
	b)	Explain about PRF and range Unambiguous.	[4]
	c)	What is the need of full wave rectifier in delay line canceller?	[4]
	d)	Explain the use of hybrid junction in mono pulse tracking radar.	[4]
	e)	Write the merits of electronically steered phased array antennas.	[3]
	f)	Define noise figure.	[3]

PART–B *(3x16 = 48 Marks)*

2.	a)	Derive and explain simple radar equation.	[8]
	b)	Explain about radar-cross section fluctuations.	[8]
3.	a)	What is Doppler effect? Write the applications and limits of CW radar.	[8]
	b)	Discuss the various unwanted signals which cause errors in FM-CW altimeter.	[8]
4.	a)	Describe the operation of MTI Radar with power amplifier transmitter.	[8]
	b)	Discuss how error signal is generated from sequential lobing.	[8]
5.		Write a short note on (a) Acquisition and scanning parameters (b) Radomes	[16]
6.	a)	With suitable expressions explain series-fed, frequency-scan linear array.	[8]
	b)	Explain about Constant-False-Alarm-Rate receiver.	[8]
7.	a)	What is display? Discuss various types of displays.	[8]
	b)	With neat sketches explain series versus parallel feeds.	[8]

Code No: **RT41048** **R13** **Set No. 2**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) Define signal to noise ratio. [4]
   b) Mention salient features of FMCW radar. [4]
   c) Write the differences between MTI and pulse Doppler radar. [4]
   d) Distinguish amplitude and phase comparison mono-pulse radar. [4]
   e) Define matched filter. [3]
   f) List the types of radar receivers. [3]

PART–B *(3x16 = 48 Marks)*

2. a) List the types of radars and write their applications. [8]
   b) With the help of expressions explain radar transmitter power. [8]

3. a) Draw and explain block diagram of CW Doppler radar with non zero IF receiver. [8]
   b) With the help of expressions explain multiple frequency CW radar. [8]

4. a) Explain double cancellation staggered PRF with the help of neat diagrams. [8]
   b) Discuss the operation of conical scanning method. [8]

5. a) Describe the operation of amplitude comparison mono pulse radar for single angular coordinate. [8]
   b) Explain radar antenna parameters. [8]

6. a) Write a short note on different types of phase shifters. [8]
   b) Derive the response characteristics of matched filter. [8]

7. a) With suitable expressions explain noise figure of two networks in cascade. [8]
   b) What is phased array antenna? Explain the radiation pattern of phased array antenna. [8]

Code No: **RT41048** **R13** **Set No. 3**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) What is integration of radar pulses? [4]
   b) Determine the acceleration of target having the receiver bandwidth is 70 Hz and operating wavelength is 12cm. [4]
   c) What is blind speed? How it can be avoided? [4]
   d) Mention the types of tracking. [3]
   e) What is CFAR receiver? [4]
   f) What is a beam steering? [3]

PART–B *(3x16 = 48 Marks)*

2. a) Derive modified radar range equation. [8]
   b) Explain the effect of Signal to Noise ratio in radar with suitable expressions. [8]

3. a) Describe the operation of CW Radar with neat diagram. [8]
   b) Explain the range and Doppler measurement of FM-CW radar. [8]

4. a) What is the necessity of Doppler filter banks used in MTI Radar? [8]
   b) Discuss, what are the limits effects the MTI performance. [8]

5. a) Draw and explain the block diagram of two-coordinate amplitude–comparison mono pulse tracking radar. [8]
   b) Design and explain cosecant-squared antenna pattern. [8]

6. a) Write a short note on architecture for phased arrays. [8]
   b) Discus the relationship between matched filter characteristics and correlation function. [8]

7. a) Explain principle of operation of balanced type Duplexer using TR tubes and two short-slot hybrid junctions. [8]
   b) Write the applications and limitations of phased array antennas. [8]

Code No: **RT41048** **R13** **Set No. 4**

IV B.Tech I Semester Regular/Supplementary Examinations, Oct/Nov - 2018

RADAR SYSTEMS

(Electronics and Communication Engineering)

Time: 3 hours **Max. Marks: 70**

Question paper consists of Part-A and Part-B
Answer ALL sub questions from Part-A
Answer any THREE questions from Part-B
*****

PART–A *(22 Marks)*

1. a) What is minimum detectable signal? [3]
   b) Write the equations for collapsing loss. [4]
   c) What is need of delay line canceller? [4]
   d) Write the differences between trackers. [4]
   e) List the types of phase shifters. [4]
   f) Write the merits of Phased array antennas. [3]

PART–B *(3x16 = 48 Marks)*

2. a) Draw and explain simple radar block diagram. [8]
   b) Explain how radar cross section controls the radar performance. [8]

3. a) Discuss the concept of isolation between transmitter and receiver. [8]
   b) Describe the principle of operation of FM-CW radar using sideband super heterodyne receiver. [8]

4. a) Draw and explain MTI Radar with power oscillator transmitter. [8]
   b) Write the differences between MTI versus pulse Doppler radar. [8]

5. a) In mono pulse radar two antennas are used to produce a phase difference of 30^o between the echo signals. It operates at frequency of 1.75 GHz. Find the spacing between the antennas if the angle $\theta = 18^o$. [8]
   b) Draw and explain parabolic-reflector antenna. [8]

6. a) Describe the operation of digitally phase shifters. [8]
   b) With the help of expressions explain Envelop detector. [8]

7. Write a short note on
   (a) Circulator as Duplexers
   (b) Beam steering and Beam width changes [16]